

Knowledge Assessment of Teachers of Students with Autism Spectrum Disorder from Applied Behaviour Analysis Perspective

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Summary

This study aims to assess the knowledge of teachers working with students with autism spectrum disorder (ASD) regarding applied behaviour analysis (ABA). The study was concerned with teachers' knowledge of ABA, its application in the classroom, barriers to its use and desired training opportunities and/or resources to enhance teacher application of ABA strategies in the classroom. Data were collected via an online survey completed by 190 teachers with students diagnosed with ASD in British schools. The results revealed overall knowledge of ABA strategies for classrooms, with only some teachers uninformed about the broad use and some key elements, and general familiarity with skills crucial for applying ABA. Actual knowledge of ABA was found to be high. In terms of application of ABA, the majority of the teachers employed a wide range of known strategies. A number of barrier to the application of ABA were noted including a lack of knowledge and training, a lack of administrative support and a lack of time and physical resources. Theoretical knowledge is crucial for practical applications; however, practical training was found to be important to ensure intervention efficacy.

Keywords: *applied behaviour analysis, autism spectrum disorder, teachers, special education.*

1. Introduction

Autism spectrum disorder (ASD) has been conceptualised as a behaviourally described neurodevelopmental condition related to the existence of social-communication and behaviours deficits. For Ousley & Cermak, (2014) these two dimensions characterise the main defining features of those with ASD. As children with ASD are increasingly educated in the mainstream classroom, applied behaviour analysis (ABA) is fast becoming a key instrument in practices for behaviourism as it aims to employ theories of education and learning in order to improve and modify behaviour (Milton, 2018). Extensively, ABA has been used to assist individuals with

autism spectrum disorder (ASD) and their families in improving social skills, learning and overall quality of life (Denne, Hastings, & Hughes, 2017; Fennell and Dillenburger, 2018; Parker & Childs, 2019; Robinson & McGill, 2018; Kirkham, 2017). There is extensive empirical evidence supporting the use of an intervention in the classroom for students diagnosed with ASD (Orinstein et al., 2014; Dawson et al., 2012). Statistical studies have also emphasised the importance of ABA intervention for ensuring optimal outcomes for children diagnosed with ASD (Fein et al., 2013).

However, ABA interventions, particularly those that are classroom-based, are not applied or even available universally (Fennell et al., 2018; Dillenburger, Keenan, Doherty, Byrne, & Gallagher, 2012). According to Fennell et al. (2018), the 'lack of ABA-based interventions has a negative effect on service cost, family stress levels, [the] quality of available services, and long-term outcomes' (p. 110). Other researchers have found similar results (Howlin, Savage, Moss, Tempier, & Rutter, 2014; Buescher, Cidav, Knapp, & Mandell, 2014). Rather than utilising a unified approach toward implementing ABA, British schools apply it eclectically.

Because there are increasing numbers of children with ASD being taught in mainstream classrooms, teachers' knowledge has become important, however, it has been shown that self-reported knowledge has exceeded actual knowledge of ABA, although this not related to training (Fennell and Dillenburger, 2018). Teachers are required to have expertise in evidenced-based educational interventions as well as ASD (Alexander et al., 2015). Unfortunately, teacher training does not include autism and there is a need for professional development (Odom et al., 2010). It has been shown that certain approaches to ABA for ASD, including incidental teaching and discrete trial teaching, are better supported through effective staff training procedures (Ryan, 2011).

This study aims to assess the knowledge of teachers specialising in students with ASD regarding ABA, teacher perceptions on available learning strategies to enhance their knowledge for ABA intervention and the current

barriers to the use of ABA strategies in the classroom. The paper hopes to inform those involved in teacher training, especially for teachers of children with disabilities, such as those with ASD.

Specific focus is placed on professional development, training, workshops, and courses. The research questions are: (1) Which ABA strategies do teachers of students diagnosed with ASD have knowledge of, and what is the extent of this knowledge? (2) Which ABA strategies do teachers use in the classroom? (3) What are the barriers to the use of ABA strategies in the classroom? (4) What learning opportunities are available to teachers to acquire ABA strategies? (5) What are the most desired learning programmes among teachers for the successful implementation of ABA in ASD education programmes?.

2. Method

Data were gathered via an online survey administered through Survey Monkey. The self-administered survey (see appendix 1) was structured according to the abovementioned research questions in addition to demographic data, teaching experience and level of training, class composition and students' level of cognitive and behavioural challenges. The survey included open-ended, Likert scale, and multiple-choice questions designed to address these research questions. While the Likert scale items measured perceived knowledge, actual knowledge was also determined by presenting the respondents with six statements about ABA intervention and the management of ASD using ABA strategies, three of which were true.

Open-ended questions were used to assess teachers' application of ABA in the classroom in order to gain a nuanced understanding of the strategies employed, allowed teachers provided their subjective perspectives on barriers to the application of ABA and desired training opportunities. Multiple-choice questions appraised experiences of training opportunities and the effectiveness of such training.

A total of 190 teachers who specialise in teaching students diagnosed with ASD in British schools participated in the survey (See Table 1), with 70% women and 30% men. The research participants were recruited using a three-pronged strategy to maximise recruitment.

- (1) Participants were recruited directly through four professional development courses aimed at teachers of students diagnosed with ASD and other children with special educational needs. A total of 350 course attendants were offered access to the survey through an email. This group constituted 26.3% (n = 50) of the overall participants.
- (2) Emails with an information sheet on the researcher's background, an overview of the

study and its purpose, information pertaining to consent, and a link to the survey were sent to a publicly available list of British schools with special provisions for children with ASD. Email addresses of the schools were obtained through school websites, via which a request for participation and all relevant details about the study were sent. This group constituted 28.9% (n = 55) of the overall participants.

- (3) Emails with an information sheet on the researcher's background, an overview of the study and its purpose, information pertaining to consent, and a link to the survey were sent to the email addresses of schools with ASD-specific classes. Email addresses of the schools were obtained through school websites, via which a request for participation and all relevant details about the study were sent. This group constituted 44.7% (n = 85) of the overall participants.

The research was conducted in accordance with the British Psychological Society (BPS) code of ethics. Participants were emailed an information sheet fully detailing the scope and composition of the study, along with an attached consent form. All participants gave informed consent. Participants were treated with respect as individuals. The participants were informed of their right to withdraw from the study at any point in time on a no-questions-asked basis. Details of the respondents were kept confidential within this study, in line with BPS values of privacy and confidentiality.

3. Findings

The majority of the respondents (60%) were between the ages of 30 and 45. With respect to general teaching experience, 40% of the respondents reported having over 10 years of experience, while only 30% had over 5 years of experience of ASD-related teaching. In terms of experience germane to behaviour management courses, approximately 58% of the respondents reported that they had completed a course at the undergraduate and/or graduate level on behaviour management for students with ASD. However, fewer respondents reported having taken courses on ABA specifically (around 40%). Only 20% indicated participation in an ABA-specific course at either the undergraduate or postgraduate level, while the remaining participants had undergone some form of training related to the implementation of ABA strategies in the classroom. With respect to education, approximately 79.2% had a bachelor's degree, while 13.8% had a master's degree. One respondent had a doctoral degree, while the remaining teachers had completed a diploma programme specialising in ASD.

Out of the 190 participants, 70 (37%) were from public schools, 30 (16%) were from private schools and 90 (47%)

were from ASD-specific education programmes. With respect to the number of children diagnosed with ASD in teachers’ programmes, 45% of the respondents had 1–5 students, 35% had between 6–10 students, and 20% had more than 20 students in their programme. Concerning the students’ age groups, 70% of the participants had students from 6–9 years old, while 15% had students between from 10–12 years old, and 15% had students from 13–15 years old. The respondents were asked to indicate their students’ level of cognitive impairment using a scale of 1–5, with 1 suggesting mild cognitive impairment and 5 signalling severe cognitive impairment. In total, approximately 50% of the teachers had students displaying intermediate levels of cognitive impairment, while 45% and 5% of teachers had students with mild and severe forms of cognitive impairment, respectively. A similar scale was used to determine the degree of behavioural problems; 45% stated that their students had an intermediate degree of behavioural problems, 35% of students had mild behavioural problems, and 20% had severe behavioural problems.

Table 1: Demographics of the participants in the study

Characteristic	Category	N	Percentage
All participants		N = 190	
Gender	Female Male		70% 30%
Age	Below 30 30-45 Above 40		20% 60% 20%
General Teaching experience	Less than 5 years Over 5 years Over 10 years		40%
ASD teaching	Less than 5 years Over 5 years Over 10 years		70% 30%
Experience relating to behavioural management	No course on ABA at undergraduate Postgraduate 60% Course on ABA at Undergraduate Postgraduate 20% Implementation of ABA strategies in the classroom 20%		
Education	Undergraduate degree 79.2% Masters degree 13.8% Diploma in ASD the rest Doctoral degree 1%		

Schooling	Public school 70% Private school 30% ASD specific programmes 90%		
Number of children diagnosed with ASD in teacher’s programmes	1 - 5 children 6 - 10 children 20+ children		45% 35% 20%
Age groups of the students being taught	6 - 9 years 10 - 12 years 13 - 15 years		70% 15% 15%
Level of cognitive impairment. in students being taught	Mild cognitive impairment Intermediate cognitive impairment Severe cognitive impairment		45% 50% 5%
Level of behavioural problem in students being taught	Mild behavioural problems Intermediate behavioural problems Severe behavioural problems		35% 45% 20%

3.1. Teachers’ self-declared understanding of ABA and actual knowledge of ABA strategies

As part of the second section of the survey, teachers were asked to provide their self-perceptions on their knowledge of ABA strategies, while their actual knowledge was concurrently measured using responses to statements. Self-perceived knowledge was high with the majority of teachers saying they were knowledgeable or very knowledgeable.

Concerning the six statements that were included to measure the actual knowledge of teachers, about ABA, three of which were true and three were false all of the statements were answered correctly except for only four teachers that were uncertain about ABA improving language and helps to play with siblings and there were 17 teachers who were uncertain about ABA improving academic age. Overall, the responses show a high level of actual knowledge.

3.2 Teachers’ application of ABA in the classroom

The current study found that the sample of teachers used a variety of ABA strategies in the classroom, although the prompting strategy was the most frequently used followed by modelling strategies. Other ABA approaches under the behaviour contract and group contingency strategies were less frequently used by the respondents (see Table 2).

To evaluate the teachers' application on the practice of the token economy as a positive reinforcement tool, they were asked if they had used a system where students could earn rewards for positive behaviour. A total of 70% of respondents said they used this practice always, while 20% stated they used it often and remaining respondents said they used it sometimes.

In response to the idea that teachers gave more attention for positive behaviour than negative behaviour, the vast majority disagreed with this idea (see Table 2). As for the teacher displaying positive behaviour by allowing students to spend time on a preferred activity, the vast majority of teachers agreed with this idea, however, a significant number, 36, were unsure (see Table 2).

Table 2 Application of ABA

Statement for application of ABA	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
You give students more attention when they display positive behaviours as opposed to negative behaviours.	-	6	10	41	133
You display positive behaviour by permitting students to spend time on a preferred activity.	53	80	36	21	-
	Always	Often	Sometimes	Rarely	Never
You use a system via which students can earn points or stars for positive behaviour.	133	38	19	-	-
You provide your students with rewards when they chalk small successes in relation to broader and more complex	19	95	65	11	-

tasks.					
You provide your students with the agency to make joint decisions about which specific behaviours they will work towards attaining.	19	57	80	-	34
You demonstrate some of the positive behaviours (modelling strategies) you seek to elicit from the children in the class so that they can also learn and perform them.	95	70	15	10	-
You use prompting or guidance, so your students learn positive behaviours.	138	38	10	-	4

To appraise their application of the shaping strategies, the teachers were asked how often they provided their students with rewards when they achieved small successes in relation to broader, more complex tasks. Only ten percent of the respondents said they always use this strategy, 50% said often, and approximately 34% reported they sometimes use this strategy and the remainder stated they rarely used it.

Teachers' use of behaviour contract strategies was determined by asking how often they provided their students with the agency to make joint decisions about which specific behaviours they will work towards attaining. Only ten percent always used this strategy, 30% used it often, 42% sometimes and the remainder have never used it.

Teachers' use of modelling strategies that are implemented as part of behavioural management in relation to children with ASD was also determined. The teachers were asked about positive behaviours they seek to elicit from their

students in the classroom to boost learning and performance. A total of 50% responded that they always used this approach, while 36.8% said often, the remaining respondents said they used it sometimes or rarely.

The survey also questioned teachers' use of prompting or guidance as their students learn positive behaviours. A total of 72.6% of the participants said they always used this strategy, 20.% maintained that they used it often, while 5.2% reported that they used it sometimes and the remaining respondents indicated that they never used this strategy.

In response to the open question about applying ABA in the classroom a number of ideas arose. The use of rewards was often mentioned, this relates to the token economy approach to motivating pupils. Another idea was that teachers broke tasks down into smaller tasks, this is the discrete trial teaching approach and is a well-known strategy in ABA application. Interestingly a number of the teachers said that they used patience and allowed pupils to do tasks in their own time, they also said that they took a back seat supervisory role, both of these ideas are related to the naturalistic teaching approach in ABA application. Importantly, these findings pertain only to respondents who noted the practice of ABA strategies in their classrooms. Some respondents said that they only harnessed these strategies occasionally, while others did not employ them at all.

3.3 Barriers to the use of ABA strategies in the classroom

Diverse barriers were observed in the use of ABA strategies in the classroom. Approximately 28% of the respondents felt that they did not have sufficient knowledge of ABA use in the classroom, creating a barrier to effective classroom application. This was particularly the case in terms of employing behaviour strategies (11%). Other participants (14%) pointed to a lack of administrative support as an obstacle to the use of behaviour strategies. However, approximately 55% of the respondents reported that they received significant, frequent support for using ABA in the classroom. These respondents did not perceive their respective administrations as a hindrance to the use of ABA in the classroom. Some participants witnessed a lack of guidance and feedback concerning the application of ABA strategies (28%). These respondents remarked on the imperative need for standardised guidelines to facilitate teachers' use of specific techniques. They maintained that for the most part, the onus is on the teacher to select ABA strategies to use, creating a lack of consistency among cohorts. The availability of supplies and resources was also a barrier to the use of ABA strategies in the classroom (12%). Yet for most respondents, this was not conceptualised as a problem. A notable 40% of the sample

signalled a dearth of support from colleagues as a stumbling block to applying ABA strategies in their classrooms. Time was also a limitation for 30.5% of the respondents. These responses suggest that the implementation of ABA strategies requires time, and that the classroom setting does not provide enough time to carry out these strategies in the way they were designed. Other participants felt that ABA is not necessarily effective (15%) as a behaviour strategy, which serves as a hurdle to them using it extensively in their classrooms.

3.4 Type of training desired by teachers

As mentioned previously, not all participants have received adequate training in ABA strategies in particular, although they have undergraduate or post-graduate degrees in education. Approximately 70% of the respondents stated that training is crucial to ensure they are able to use behaviour management strategies successfully. The desired areas of training included behaviour management strategies (50%), collaborating with expert teachers (20%), characteristics of ASD (10%), and training in the area of developing realistic, appropriate behavioural goals for students in their classrooms (10%). Others wished for training in accessing suitable resources for the classroom (5%) and in respective administrator and teacher roles in relation to behaviour management (5%). Within the context of respondents who expressed a preference for training, 60% mentioned a desire for in-service training, while the rest affirmed that universities and ASD teaching courses in general need to do more to enhance the use of ABA in the classroom. Aside from training, other respondents indicated a desire for active learning methods (10%) to boost the practical application of ABA rather than theoretical knowledge. Around 20% of the respondents stated that self-study is also important, as education is constantly evolving in response to students' needs. This implies that teachers need to engage more extensively in self-study.

4. Discussion and Conclusion

This study aimed to assess the knowledge of teachers specialising in students with ASD regarding ABA, focusing on current barriers to classroom application and the learning opportunities available to teachers. The first research question pertains to teachers' knowledge of students who are diagnosed with ASD regarding ABA strategies. The results showed that most ABA strategies were often applied in the classroom and that there was a high level of actual knowledge accompanied by a high level of self-perceived knowledge. The literature suggests that in behavioural management and learning among children diagnosed with ASD, there is no single, overarching intervention that teachers must use in the

classroom, as ABA is designed on an individual basis, to be used according to the needs of the student in question (Fennell et al., 2018). Notwithstanding, various strategies in ABA have been shown to be useful in enabling the learning of children with ASD and for addressing their disruptive behaviour. Thus, it is important for teachers to have a broad knowledge of ABA in order to ensure the efficacy of the intervention.

The results suggest that the teaching skills of the teachers is equally important as a strategy in classrooms in managing students with disorders such as ASD. Nevertheless, the teachers that lacked knowledge in this area may experience adverse effects on their confidence in implementing behavioural techniques. Previous research has revealed similar outcomes (Walter, Gouze, & Lim, 2006; Baker, 2005). The findings pointed to an implicit understanding of ABA principles, yet there are barriers to applying the approach in the classroom setting. This signals a high level of theoretical knowledge, but a shortage of practical expertise. Theoretical know-how of intervention techniques is crucial for practical applications, but practical training is also important to ensure the success of the intervention.

Preceding studies demonstrate that student outcomes are directly correlated with teachers' professional development, as well as their level of education (Darling-Hammond, 2010). The second research question is germane to ABA strategies used by teachers in the classroom. Group contingency is vital for decreasing inappropriate behaviour among children with disabilities (Hawkins, Haydon, Denune, Larkin, & Fite, 2015). Several scholars have turned to group contingency approaches such as the good behaviour game (GBG), to manage to classroom and to improve student behaviour (McKenna & Flower, 2014). Given the centrality of this technique to ABA, it is critical that teachers receive training to ensure they are up to date in terms of their knowledge and methods.

Evidenced-based reforms must also be made in schools to improve the application of ABA in the classroom. Notwithstanding, a data collection technique that goes beyond qualitative feedback is imperative. The third research question regards the learning opportunities available to teachers for ABA strategies. The majority of the teachers who were interviewed noted satisfaction with learning opportunities, which were mostly provided at the pre-service stage, yet a significant number of respondents expressed a desire for in-service training, which aligns with Fennell and Dillenburger's (2018) proposition that: ...in planning and implementing professional development activities... [it is important] that organizers engage in more complex analysis of outcomes including: teacher knowledge, change to teacher practice, change to teacher thinking, and affect on student learning. This ideal is contrary to the typical one-shot workshop approach

currently employed in most US...and Irish...schools. While the ultimate goal of professional development for teachers is the improved learning outcomes for their students, evidence based on data gathered throughout the process will help deliver these outcomes (p. 111).

Kurniawati et al. (2017) also demonstrated the importance of training programmes for boosting teacher knowledge and attitudes towards their classroom, although they did not indicate whether teacher training positively affects actual teaching practices and student outcomes. The results of this study suggest that teachers prefer in-service training opportunities and training in specific areas. This is linked to the argument above, which stresses the urgent need for professional development for teachers. However, training while working of specific areas may be more difficult than that regular training.

The generalisability of these results is subject to certain limitations. For instance, Although, the findings of this study have a number of important implications for future practice, further research is required to ascertain the training needs of teachers to enhance the classroom application of ABA. There are a number of important changes which need to be made. There is, therefore, the suggestion that theoretical knowledge is high but not necessarily practical knowledge. Having theoretical knowledge of the application of the intervention is crucial for practical applications but practical training is also important to ensure the efficacy of the intervention. The research showed that prompting and modelling strategies are popularly used but this is not necessarily the case with respect to behaviour contract and group contingency strategies. Further, in-depth research is required to ascertain the training needs of teachers to improve classroom applications of ABA.

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