

# ABA in Schools – Essential or Optional?

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Children with ASD face a number of learning challenges from very early in life. Often sleeping, eating, behaviour, communication, and toileting issues are the earliest challenges faced by parents and caregivers. Many intervention techniques and treatments abound to address these deficits - all claiming to have promising, if not astounding, results. Choosing the right intervention for children with ASD is in the best interest of the child, the family, and the community.

## Why Applied Behaviour Analysis?

Several provincial, state, and federal (US) agencies have reviewed relevant comparative research studies and agreed that there is solid evidence that early and intensive ABA intervention can produce meaningful, lasting improvements and learning for a large number of children with ASD (National Research Council, 2001).

There have also been studies that have looked at ABA in comparison to other treatments—intensive ABA, intensive ‘eclectic’ intervention, and non-intensive intervention (Howard, Sparkman, Cohen, Green, & Stainslaw, 2005). Again, the results of this study showed that children with intensive ABA treatment performed better on post-treatment testing than either of the other two groups. More alarming was the fact that the children who received non-intensive intervention (i.e., early publicly funded programs) showed a regression in skills at post-test.

While there has been much discussion of *early* intervention, is there evidence that intervention delivered after the pre-school years can be effective? There is some evidence that children who begin intensive ABA treatment later (after 4 years of age) or continue with treatment after their pre-school years make substantial gains across all skill areas measured (i.e., cognitive, visual-spatial, language, and adaptive behaviour skills) over the same group who received intensive ‘eclectic’ treatment (Eikeseth, Smith, Jahr, & Eldevik, 2002).

Thus, intensive ABA programming is not only evidence-based but is also cost effective when long-term education, care, and housing of individuals who have not received intensive treatment is taken into account.

## What is ABA?

Behaviour analysis for autism uses procedures that have been demonstrated (through applied research) to work in helping individuals to learn new skills in an enjoyable way. As well, problem behaviours are assessed and systematically remediated through effective intervention plans, which look at the function(s) of the target behaviour. More formal and technical definitions follow:

### ABA

“Applied behavior analysis is the science in which procedures derived from the principles of behavior are systematically applied to improve socially significant behavior to a meaningful degree and to demonstrate experimentally that the procedures employed were responsible for the improvement in behavior”.  
Cooper, Heron & Heward, 1987, p. 14)

### IBI

IBI refers to Intensive Behavioural Intervention (i.e., typically greater than 20 hours per week). IBI relies

on procedures drawn primarily from the field of ABA in which a number of procedures, including but not limited to, discrete trial training (DTT), are used most often in a one-to-one format to teach new skills. This intensive teaching is often combined with decreasing or eliminating maladaptive behaviours. It encompasses the procedures found in ABA—structured goal setting, systematic delivery of programs, the use of reinforcement provided at high intensity, and the implementation of precise teaching techniques.

ABA programs are based on empirical (data driven) research, and include:

- Direct observation and measurement of behaviour
- Analysis of antecedents (the instruction, setting, or desire that comes before the behaviour)
- Positive reinforcement (the delivery of something that encourages the target behaviour to occur again)
- Effective teaching techniques such as shaping, backward chaining, forward chaining, prompting, and prompt fading

ABA is a field within Psychology. It has many years of scientific and academic research and knowledge. There are established standards of practice, educational requirements for practice, and identified college and university courses, which lead to diplomas and degrees within the field. There are licensing bodies within the US and emerging standards of practice and licensing bodies within Ontario.

#### Critical Components (Methods and Teaching Techniques) found within ABA

A number of basic principles and effective teaching methods are found within any ABA program. These methods and principles, when combined with sound target goals (i.e., the curriculum) ensure that learning or behavioural change will take place. Many ‘programs’ or skill development that we, as learners, have experienced in our lives utilize these techniques.

- **Motivation** - (called an “establishing operation” (EO) or “motivational operation” (MO) in behavioural terms) – why we choose certain things at specific times to engage in, use or do. Therefore, an EO/MO determines what is wanted and what the person will do to try to receive that item or condition. Understanding EO’s (what a person wants and what they do to get the desired item) and maximizing motivation significantly increases the success of instruction. This is especially true of children with ASD who are not intrinsically motivated by social reinforcement or self-motivation (i.e., listening to the teacher because you want her to like you, or, finishing your assignment just to have completed it).
- **Reinforcement** – is the hallmark of an ABA program. All people use reinforcement in every day life. Reinforcement is determined by watching its effect on behaviour over a period of time. Something is a reinforcer (whether it is a desired item or social contact or social praise) if it increases the behaviour that immediately preceded the delivery of the reinforcement. A reinforcer can be ‘positive’ (the addition or application of something) or ‘negative’ (the removal of something). Thus, negative reinforcement is not equated with ‘punishment’ but rather is the removal of something undesirable, which increases the target behaviour.
- **Shaping** – is a technique where behaviour is gradually changed over time by using reinforcement under strict criteria. There must be consistency in programming and in delivery of the reinforcement when shaping procedures are used so that the behaviour is systematically changed to the target level.
- **Prompts** – are additional ‘cues’ or ‘hints’ that are provided in order to ensure correct responses at the beginning of learning. Prompts can take a number of formats: physical (i.e., hand-over-hand assistance), gestural (i.e., pointing or motioning), modeling (demonstration or imitation prompts), visual (i.e., pictures/objects), textual (i.e., written words), and verbal (i.e., spoken cues). Prompts must be faded to allow for independent responding in order to demonstrate mastery and generalization of a skill.

- **Modeling (Imitation Training)** – modeling can be considered a prompt within specific programs; however, it can also be considered an instructional tool. It is imperative that children with ASD learn to imitate the adults and peers in the world around them. Social skills are acquired through modeling of peers. Recently, new techniques involving video modeling have shown to be highly effective in teaching a number of skills—play skills, self-help routines, communication skills, and motor imitation skills.
- **Discrete Trial Instruction (DTI) or Discrete Trial Teaching (DTT)** – one of the primary instructional methods in ABA programs. DTI/DTT involves analyzing skills and breaking down larger tasks into component or ‘discrete’ skill steps, which are taught one at a time until mastery before adding the next skill in the hierarchy. There are three ‘parts’ to a discrete trial:
  - 1) the instruction or SD – discriminative stimulus,
  - 2) the behaviour or response by the child, and
  - 3) the consequence (feedback to the child or reinforcement).DTI/DTT has often been thought to be highly repetitive, slow paced, and robotic. However, discrete trials can be delivered in a number of formats - fast paced, interspersed with old and new targets, in a natural environment or situation, within a group setting, and varied to promote better learning, generalization, and maintenance of skills.
- **Natural Environment Training (NET)** – utilizes a number of critical components that serve to strengthen learning, promote mastery of the skill, and ensure generalization to new environments. These components include:
  - 1) rapid pacing of instructions and programs
  - 2) errorless learning involving increased prompting for all new tasks with rapid fading of prompts to increase independent responses
  - 3) interspersed programs (i.e., mixing of old and new program targets with rapid switching between programs—not delivering programs in a ‘mass trial’),
  - 4) more child directed in that the child determines motivators or demonstrates a high EO and the programs are delivered within this context, and
  - 5) data collection is varied to allow for more rapid documentation of responses and thus, a more rapid pace to the teaching session.
- **Task Analysis and Chaining** – procedures that involve detailed analysis of a skill and then creation of a ‘task list’ where the skill is broken down into sequential steps and taught step-by-step. Many task analysis programs involve self-help skills such as dressing/undressing, household chores (i.e., setting the table), toilet training programs, etc.

A large number of ABA principles already occur within our educational programs and our classrooms across Ontario. Talented individuals naturally employ the principles of ABA in their teaching. These techniques have been used with all learners at all age levels—pre-school children, typical children, children with ASD, typical adults, adult workers, and adults with disabilities. When we think of the vast number of learning opportunities that we have moved through in our life we begin to understand which ABA principles have been used to teach the various skills. Many research studies have highlighted the benefits to using instructional materials created using ABA principles—for all learners. Nevertheless, many of our typical children adapt to many teaching styles and methodologies. Children with ASD, however, exhibit unique learning styles that match the instructional methods found within the field of ABA. For many children with ASD, learning does not take place when other instructional methods are employed.

When we examine the elements of ABA (noted above) for typical learners and children with ASD, we can see the importance in using the principles of ABA within all learning environments and specifically for students with ASD.

<b>ABA Technique</b>	<b>Typical Classroom Learner</b>	<b>Child With ASD</b>
Motivation	Motivation is key within all aspects of life. Teachers often create highly motivating environments for their students using visuals supports within their classrooms, presentation of thematic units, access and presentation of material through multimedia displays. Some students are intrinsically motivated to learn (although some would argue that there is a delayed reinforcement of a specific job or life goal that is at work and not just their 'love of learning').	Motivation is often associated with unusual interests or activities for students with ASD. Establishing Operations (EOs) initially must sometimes be at a more primitive level (using basic wants and needs) in order to establish motivation for learning.

<b>ABA Technique</b>	<b>Typical Classroom Learner</b>	<b>Child With ASD</b>
<p><b>Reinforcement</b></p>	<p>Teachers, coaches, bosses, businesses, and organizations use reinforcement everyday in order to motivate individuals. These are often primary reinforcers - food, drink, and shelter (which is why there are labour laws to set out the maximum number of hours per day that an individual may work before receiving a lunch/dinner break and working conditions for specific jobs). However, secondary reinforcers often serve as high reinforcement because of initial pairing with primary reinforcement. These are often things such as toys/objects, activities, social contact or praise, and tokens or money (which allows access to other primary and secondary reinforcement).</p> <p>Many types of reinforcement are provided by teachers—tangibles such as stickers, check marks, or ‘reward objects’; food (i.e., pizza parties); social praise; and, token systems. Often typical children will have large and varied repertoires of reinforcers but good students still do not work without reinforcement.</p>	<p>Reinforcement is crucial in changing the behaviour and increasing learning in children with ASD. However, the reinforcer inventories are often very specific, small, and idiosyncratic for these children. The children themselves (and not the adults in the environment) determine the reinforcer and thus, these are very child-specific and often take a very long time to change by pairing primary reinforcers - food or drink - with other tangibles, social praise, or activities, to become reinforcing in and of themselves.</p>
<p><b>Shaping</b></p>	<p>Shaping sometimes occurs systematically with typical children and at other times occurs almost incidentally. Typical learners bring with them many strengths such as imitation and modeling skills, which assist them in rapid shaping of behaviours. Shaping can occur in many activities within school such as printing lessons, gym class, and social interaction/social skills.</p>	<p>Children with ASD require systematic presentation of skill steps with consistent and accurate reinforcement of each successive step in order to shape a new behaviour. This can especially be seen with verbal skill development (i.e., articulation skills) where word approximations are slowly shaped to the target form of the word over hundreds of trials (i.e., presentations of the approximation and slow changes to the expected production) with reinforcement provided to motivate the learner and to change/shape the behaviour to a higher form.</p>

<b>ABA Technique</b>	<b>Typical Classroom Learner</b>	<b>Child With ASD</b>
<p>Prompts</p>	<p>Prompting is the use of ‘cues’ or ‘hints’ to allow new learning to occur without initial errors. Teachers automatically use prompts of all types during teaching - textual prompts as examples on tests, verbal prompts when another student provides an answer in class, gestural prompts during gym, model prompts for appropriate classroom behaviour, etc.</p>	<p>Prompting ensures ‘errorless learning’ for the child with ASD. In other words, the child is provided with assistance in order to learn the new skill or task correctly without having to re-teach or correct errors that were inadvertently acquired. However, prompts must be faded in order to demonstrate independent learning and generalization of the skill. A thorough understanding of prompt hierarchies and prompt fading techniques are essential to maximize learning and promote independence.</p>
<p>Modeling or Imitation Training</p>	<p>Teachers are constantly modeling (or using media such as videos, role-playing, etc. to model) all types of behaviours for students within their classrooms - verbal behaviour, physical behaviour, play behaviour, and social behaviours. Typical learners benefit from these models because they come to school with the prerequisite skills: joint attention skills, gross and fine motor skills, and verbal skills.</p>	<p>Learning to imitate motor actions, play, verbal models, and social skills are crucial for children with ASD. Children with ASD can only benefit fully from being included in classrooms if they have mastered imitation. Learning by observation is a core prerequisite skill for almost all other learning. Thus, programming should target imitation skills during early teaching. The use of reinforcement, prompting, and shaping of responses is crucial within imitation training.</p>

<b>ABA Technique</b>	<b>Typical Classroom Learner</b>	<b>Child With ASD</b>
<p><b>Discrete Trial Instruction (DTI/DTT)</b></p>	<p>Some teachers use a discrete trial teaching format (i.e., given instruction ⇒ student responds ⇒ teacher provides feedback). However, the intensity and data tracking components of typical DTI/DTT is often lacking with this format. Some specific instructional programs within our school systems also employ DTI/DTT methodology. These programs are not widespread nor are they mandated in Ontario curriculum but they have been documented as evidenced-based instruction.</p> <ul style="list-style-type: none"> <li>- Edmark Reading Program (Barrier, H.C., 1981)</li> <li>- Picture Exchange Communication System (PECS) (Bondy and Frost, 2001)</li> <li>- DT Trainer software (Smith, 2000)</li> </ul>	<p>DTI/DTT is an evidenced-based methodology for teaching students with ASD. It requires an understanding of the theory and basic principles behind ABA. It is not a quick 'cookbook' approach but rather an effective application of basic principles. Teachers often seek immediate and practical solutions for problems, which demonstrate quick results. However, students who spend more time learning through basic principles demonstrate more competence over time (White, 1977).</p>
<p><b>Natural Environment Teaching (NET)</b></p>	<p>Teachers recognize the value of extending learning into the community or 'natural environment' of the student. Field trips and on-the-spot "teachable moments" are part of most classrooms. These events are important links from the classroom to practical application of skill.</p>	<p>Children with ASD also benefit from learning in the natural environment; however, prerequisite skills are required before learning can transfer to this type of setting. NET teaching must be structured and measured (i.e., data obtained from the specific goals targeted) just as all other teaching is presented.</p>
<p><b>Task Analysis and Chaining</b></p>	<p>Task analysis and chains are less often used with typical learners. However, some tasks require sequential chaining. Mathematical operations such as long division and research skills (i.e., research organization and methodology) are presented as chains where each step must be completed before moving to the next step.</p>	<p>Task analysis and chaining methods are heavily employed in the ABA programs of children with ASD. Many elementary and secondary-aged children continue to require intensive intervention and training to independently master self-help skills such as dressing/undressing, toileting routines, grooming skills, and activities of daily living (i.e., housekeeping skills).</p>

Although the use of ABA principles and methodologies are employed in many classrooms and for many learners, and increase learning and motivation, these techniques are clearly not as critical for typical elementary and secondary students as they are for students with ASD.

Learners with ASD often demonstrate unique challenges:

- Differences in motivation
- Decreased or absent background knowledge and skill to benefit from typical learning environments (i.e., lack of foundation skills, lack of imitation skills, lack of communication)
- Uneven profile of strengths and weaknesses (these are different for each child with ASD)
- Need for intensive instruction with increased repetition and effective programming to learn
- Challenging behaviours that often interfere with learning and socialization

### **Where does ABA Currently Occur?**

Currently within Ontario, ABA or IBI programs are delivered within:

- government-funded pre-school programs (which may extend beyond a child's sixth birthday)
- privately-funded pre-school programs (i.e., private ABA schools/centres)
- government-funded programs for children beyond the age of six - separate from the child's school program (i.e., IBI takes place within an IBI centre-based program or within the home setting)
- government-funded programs for children beyond the age of six - in conjunction with the child's school program (i.e., IBI takes place within the school setting and sometimes within the classroom itself)
- privately-funded school-aged programs (i.e., private ABA schools/programs)

ABA is currently coexisting and at times, intertwined, with 'regular' education within our schools in Ontario. These programs have followed the guidelines for education, training, and supervision and have assisted the classroom teacher and Educational Assistant/Teacher Assistant in extending their skills, developing appropriate and measurable goals for the student, and generalizing specific goals into the larger group setting and natural environment of the classroom. Is this happening everywhere? No. Is it benefiting the children and school personnel where it is occurring? Yes.

### **Who delivers ABA?**

ABA should be implemented by trained individuals. Many of the techniques outline here appear simple and have been implemented by teachers and other school/classroom personnel in varying degrees. However, if these methods and principles are not adequately understood then there is room for misuse and the erroneous assumption that the lack of progress is due to an ineffective procedure or technique rather than to poor or incorrect ABA.

In many of our schools, we currently have a variety of professionals with extensive education and experience that work to support the classroom curriculum and teach students--Psychologists, Psychological Associates, Speech-Language Pathologists, Communication Disorders Assistants, Occupational Therapists, and Occupational Therapy Assistants. Each of these professions has strict requirements in terms of education, internships/placements prior to graduation, Colleges for monitoring standards and ethics, supervision requirements, and strict role descriptions and duties. The field of ABA is no exception. Specific courses in ABA should be completed which encompass field placements and supervision. Supervision should occur on an ongoing basis when implementing ABA in any setting.

Ongoing supervision will ensure appropriate program development, analysis of data to determine program revision, assessment and remediation of challenging behaviours, and supervision and coaching of staff to maintain competency.

### How Can ABA in Schools help?

ABA principles and methods that are effectively applied within an educational setting can lead to:

- Accurate assessment of skill levels in all areas of functioning (i.e., skill levels that are often much below that of students entering Junior Kindergarten)
- Individualized curriculum for systematic skill development in all areas—play, motor skills, communication, speech, behaviour, academic skills, and social interaction
  - What to teach
  - Why specific goals are targeted
  - How to teach and measure learning (data collection and analysis)
  - When to generalize skills
  - Where to go next (next steps)
- Detailed assessment and remediation of challenging behaviours (including self-stimulatory behaviour, self-injurious behaviour, and aggressive behaviours)
- Generalization of skills and independent learning

When ABA is employed to teach students with ASD then there is no need for a cookbook of ‘recipes’ for every problem where a one-approach-fits-all. Rather, Individual Education Plans (IEPs) are developed specific to that child and contain measurable target goals laid out in a systematic developmental progression. ABA incorporates many strategies, methods, techniques, and principles to improve people’s abilities and quality of life. Often a combination of strategies and techniques (that have research support) are necessary.

All aspects of ABA can be individualized and not all procedures or methodology work for all students with ASD. Again, careful and consistent supervision and assessment (data collection and analysis) will guide the program development and service delivery for each student with ASD; in much the same way as traditional education occurs (delivered by the classroom teacher who is qualified to teach and assess) for typical students. Collaboration between professionals and teamwork can only strengthen the educational experience for students with ASD and ensure cost effective and evidenced-based programs, which meet the mandate of our educational systems.

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