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Supporting Students with Autism Spectrum Disorders  
In Inclusive Settings: Rethinking Instruction and Design

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### **Abstract**

The prevalence rate of children with autism spectrum disorder (ASD) has grown more than ten-fold in the past two decades and is now estimated at about 1 in 88 children. These prevalence rates place increased demands on teachers to address core features and highlight the need for targeted supports. In addition, children with ASD are increasingly served in general education classrooms and teachers may not be prepared to meet their needs. Research-based supports can be used with an entire classroom within a Universal Design for Learning (UDL) framework in order to the needs of students with ASD in inclusive settings. This paper aims to provide suggestions for practical UDL support recommendations to enhance the utilization of research-based practices to promote academic achievement through multiple forms of engagement, representation, and expression for children with ASD.

## Supporting Students with Autism Spectrum Disorders In Inclusive Settings: Rethinking Instruction and Design

The prevalence rate of children with autism spectrum disorders (ASD) has grown more than ten-fold in the past two decades and is now estimated at about 1 in 88 children (CDC, 2012). In addition, a recent estimate suggests that the percentage of students with ASD participating in the general education setting for at least 80% of the school day increased from 9% in 1992-93 to 31% in 2005-06 (USDOE, 2010). This represents an overall increase of 244%. To meet this demand educators need additional information about how to address the unique instructional needs of students with ASD in inclusive settings (USDOE, 2010).

### **Unique Needs of Students with Autism Spectrum Disorders**

The specific needs of students with ASD may affect their success in inclusive settings in multiple ways. First, they can have challenges engaging in the classroom (Keen, 2009). This may include understanding and effectively working within the classroom environment due to challenges related to filtering unnecessary information (Wainwright-Sharp & Bryson, 1996), selective attention or shifts in focus (Ochs, Kremer-Sadlik, Solomon, & Sirota, 2001), and difficulty attending to meaningful aspects of the learning environment, especially when it's not explicitly stated (Klin, 2000). Another concern, lack of motivation, may be seen in task avoidance and disruptive behavior (e.g., crying, running away). Evidence suggests that the ability to gain and maintain attention for effective classroom participation predicts achievement in preschool and elementary students (Alexander, Entwisle, & Dauber, 1993). Second, students with ASD may have challenges learning new material in the classroom. This may be apparent when tasks place demands on cognitive flexibility or processing speed (Goldstein, Johnson, &

Mineshew, 2001). Third, students with ASD may have difficulty successfully completing work in the classroom (Koegel, Singh, & Koegel, 2010). This may include completing, submitting, and understanding expectations for assignments. One challenge with assignment completion may be related to executive functioning deficits in children with ASD (Ozonoff & Strayer, 2001). Executive functioning relates to the ability for individuals to coordinate goal-directed behavior and includes: (a) inhibition, (b) set shifting (e.g., ability to shift one's attention and action), (c) planning, (d) working memory, and (e) self-monitoring (Ozonoff & Strayer, 2001). Specifically, individuals with ASD may have difficulty learning rules and strategies, and breaking down information (Goldstein et al., 2001). One way to provide support for these needs is to adapt evidence-based practices using the principles of Universal Design for Learning (UDL).

### **Universal Design for Learning**

The intention of UDL “is to create products and/or environments that are designed, from the outset, to accommodate individuals with a wider range of abilities and disabilities than can be accommodated by traditional applications” (Rose, Hasselbring, Stahl, & Zabala, 2005, p. 508). Research-based instructional practices and materials that promote the use of classroom-wide instructional methods can be used within a UDL framework and still allow for individualization.

The three core features of UDL include multiple means of engagement, representation, and expression (Hall, Strangman, & Meyer, 2003). Multiple means of engagement are the hooks that draw students into class activities. For example, teachers can adapt materials or the structure of the class to help increase interest and an understanding of the classroom routine (e.g., Mancil & Pearl, 2008). Multiple means of representation involves ways to present information to more efficiently and effectively support student learning. For example, learning may be enhanced

when content is made more concrete through visual or hands-on materials (e.g., Roberts & Joiner, 2007). Finally, multiple means of expression involves ways that students can effectively demonstrate their knowledge. For example, students can show what they know in different ways (e.g., photo essays, poetry, and movies; Ishag, 2011). See Table 1 for definitions and examples of UDL supports.

Educators and policy makers have demonstrated interest in the philosophy behind UDL to meet the needs of diverse learners (Higher Education Opportunity Act, 2007; Department of Education, Office of Educational Technology, 2010). Since it is mostly theoretical in nature, however, researchers have been concerned about the evidence base for UDL (Edyburn, 2010). While UDL can serve as a guideline for educators, the instructional interventions and environmental supports that it promotes are evidence based (Edyburn, 2010). General educators may currently offer recommended instructional strategies to children diagnosed with ASD in the classroom, however, using them for all students at the classroom level is a relatively new concept. The development of instructional materials and the use of effective instructional practices that can support students with ASD, across the classroom, are necessary (Edyburn, 2010). Therefore, it is important to consider how educators can gain additional knowledge about effective practices that can be used effectively in inclusive environments within a UDL framework.

### **Characteristics of Effective Inclusive Environments**

There are three key ideas that promote effective inclusion and fit into a UDL framework. First, according to McLeskey and Waldron (2007) the goal of successful inclusion should be supporting all students in the classroom in ways that are a “natural and unobtrusive” part of the

school day (p. 163). Second, research suggests that teachers will continue to use supports that fit into their daily classroom routine, are perceived by teachers as effective for all students, and enhance the teacher's repertoire of instructional methods (e.g., Gersten, Chard, & Baker, 2000). Third, changing what happens in the classroom is a crucial component to creating a successful inclusive environment so students with ASD can receive instruction within a supportive environment (McLeskey & Waldron, 2007). A major concern is that classroom practices are currently set to support the "norm" and teachers are reluctant to modify instruction in ways that extend to students who differ from that norm (Tomlinson, 2004). Today's classrooms are increasingly diverse and teachers need to proactively set-up the environment and instructional methods in ways that support all learners.

The purpose of this article is to highlight effective instructional strategies that can be implemented in inclusive settings within a UDL framework to support students with ASD. These include strategies that enhance engagement, representation, and expression (see Table 2 for a summary of strategies).

### **Applications for the Classroom**

#### **Multiple Means of Engagement**

**Schedules.** Schedules help students plan for the day's events, provide a visual warning prior to transitions (Banda, Grimmert, & Hart, 2009), and improve student's understanding of the expectations (Mesibov, Shea, & Shopler, 2005). This advanced notice may help reduce anxiety, allow students time to prepare for an activity, and may help students attend more to the material (Massey & Wheeler, 2000). Teachers can use schedules in the classroom in multiple ways in efforts to provide UDL friendly instruction by enhancing representation. First, consider the

format. Teachers can develop schedules using objects that represent each activity, photographs or symbols of activities paired with words, or with words on their own (Quill, 1997). Then, list the order of activities to be completed during the school day (e.g., math, reading) and post the schedule at the front of the classroom or in a visible place (Quill, 1997). Organize the schedule sequentially and refer to it after each activity is completed (Cohen & Sloan, 2007; Mesibov et al., 2005). Teachers should also use schedules to highlight changes to the routine. For example, let students know in advance if the class has a substitute for a special class (e.g., art, music) or if a change is occurring during the day for a preferred activity. This will allow time for the student with ASD to prepare and will help reduce stress during the activity (Massey & Wheeler, 2000). Surprises may create challenges for students with ASD. Another idea is to create mini-schedules by writing down each activity within a lesson or class in the correct order (e.g., circle time, math). It can be as simple as deciding upon main activities for the lesson, and then writing them on a piece of paper placed on the student's desk or listing them on the board for the whole class. The teacher then refers to the activities and checks off each as it is completed.

**Routines and procedures.** Procedures are how teachers want things done in the classroom and routines are what students do without prompting or supervision (Wong & Wong, 2009). UDL supports for routines and procedures can increase both representation and expression during the school day. Routines and procedures can improve task completion and behavior for students with ASD by providing consistency and clarity for classroom expectations (McIntosh, Herman, Sanford, McGraw, & Florence, 2004). Teachers need to make procedures explicit by teaching the behavioral expectations to students (McIntosh et al., 2004). Procedures should be developed and taught similarly to academic content or behavioral expectations (Wong



& Wong, 2009). First, provide a rationale for the procedure. Next, clearly explain the procedure using a written example of the steps and demonstrate how each step is completed. Then, practice the procedure with the class multiple times. The goal is mastery. Finally, monitor the procedure through feedback, reinforcement of attempts, and reteaching when needed. Example procedures could include: (a) beginning a class, (b) handing in homework, or (c) lining up to leave the room.

**Priming.** Priming is providing access to material and letting students know what will happen during an activity in advance (Koegel, Koegel, Frea, & Green-Hopkins, 2003). This can help students with ASD in multiple ways. First, it can help activate prior knowledge and help students create connections with new class content (Gately, 2008). Priming may also increase the comfort level and familiarity with materials for students with ASD, and thereby increase their likelihood of attention, work completion, and appropriate responses (O'Connor & Klein, 2004). During priming, teachers provide access to materials, such as textbooks or handouts in either traditional hard copy or digital formats, prior to classroom instruction to increase representation and support later expression and engagement. Materials can be sent home or made easily accessible in the classroom. Teachers can also show selected supplemental materials, such as pre-reading questions or an advanced organizer, that highlight relevant information prior to instruction (Gately, 2008). Since students with ASD may actually focus on irrelevant or inaccurate information, strategies such as an advanced organizer that highlights key points may help clarify relevant details (O'Connor & Klein, 2004). Finally, when the day starts teachers can discuss the plan for the day or for selected classes to help kids get organized.

**Special interests.** Recent research has demonstrated ways to take advantage of the inherent ability of special interests to increase motivation and create change in academic,

behavioral, and social needs for students with ASD (Koegel et al., 2010; Mancil & Pearl, 2008; Winter-Messiers, Herr, Wood, Brooks-Gates, Houston, & Tingstad, 2007). Benefits for students include increased engagement, increased interest, starting assignments more quickly, and increased writing or math work completion (e.g., Koegel et al., 2010). There are multiple ways teachers can imbed student's special interests into the classroom. First, teachers should talk to students to find out more about their special interest to provide possible ideas for applying it in the classroom (Winter-Messier et al., 2012). Once teachers have an understanding of the interests in their room, and it's likely that many will overlap, they can incorporate the special interests into classroom readings or activities. Teachers can also build assignments so that students choose their special interests or a closely related area as the main topic. Teachers should decide the goal for each assignment and then be flexible enough to consider alternative ways to reach that goal (Winter-Messier et al., 2012). For some students this may involve helping them see how their interest would fit into the assignment. Older students could be supported to integrate special interests into class essays or projects (Mancil & Pearl, 2008). Lastly, teachers could allow students to have access to readings or materials related to the special interest after the student completes classwork. These could be checked out from the school library or accessed from the Internet.

### **Multiple Means of Representation**

**Visuals and organization tools.** Visuals are educational tools used to assist individuals with ASD to organize information for processing and recall (Roberts & Joiner, 2007), understand how concepts relate (Ganz, 2007), and are often infused into classroom instruction. They can enhance representation and expression within the UDL framework. Types of visuals can include

graphic organizers, semantic maps, and web-based tools. Graphic organizers are effective tools for making facts more concrete (Rao & Gagie, 2006), and can easily be used across multiple settings. For example, students can create visual representations of how concepts work (e.g., the five senses). Then when asked to recall information they can refer to the visual. Semantic maps are another form of visual that allow students to expand and elaborate on their ideas for enhanced recall and comprehension (Mastropieri & Scuggs, 2007). For example, when discussing transportation, a semantic map can be created for each type of transportation (e.g., land, water, air). Supporting students understanding of how concepts interrelate will increase their ability to recall information and discuss or write about important concepts (Mastropieri & Scuggs, 2007). Lastly, web-based tools offer digital features that can enhance organization, scaffolding, and comprehension of context (Englet, Zhao, Dunsmore, Collings, & Wolberg, 2007). Students can use pictures or words to develop visuals using web-based tools and then use them in multiple settings for the following purposes: (a) completing homework at home, (b) understanding content in the general classroom, and (c) promoting independence when completing assignments.

**Strategy instruction.** Teachers can implement instructional interventions, such as self-regulated strategy development (SRSD) in their classrooms (Harris & Graham, 1996). This strategy can be incorporated into any existing curriculum and has been used across grade levels with students with ASD (e.g., Hagaman & Reid, 2008; Asaro-Saddler & Saddler, 2010). Teachers first need to explicitly teach the steps of SRSD to the class. These include: (a) developing background knowledge on the strategy, (b) describing the strategy, (c) modeling the strategy, (d) memorizing the steps and any accompanying mnemonic, (e) supporting the strategy, and (f) promoting independent use by the students (Harris & Graham, 1996). There are many

ways teachers can infuse strategy instruction into the inclusive classroom on a consistent basis. One idea is to use SRSD to support reading comprehension through explicit instruction of a mnemonic device, such as RAP (Hagaman & Reid, 2008). There are three parts to the RAP strategy. First, students *read* the paragraph. Then they *ask* themselves about the main idea and two details. Finally, students *paraphrase* the paragraph by putting it into their own words. As students acquire proficiency with one paragraph, longer paragraphs can be used. Students with ASD could benefit from strategy instruction due to the structured nature of the intervention that provides a clear direction to accomplish the task. Teachers could also explore using other strategies with embedded mnemonics (Asaro-Saddler & Saddler, 2010).

### **Multiple Means of Expression**

**Structured assignments and task analyses.** Explicit directions and procedures provide students with the tools, guidelines, and supports for completing tasks and assignments (Franzone, 2009). Large assignments (e.g., essays, projects) should be broken down into smaller parts in a task-analysis in efforts to promote comprehension and work completion (Parker & Kamps, 2011). These parts are then taught explicitly through modeling and guided practice, and teachers can provide reminders to support completion (Hall et al., 2003). Teachers can present explicit instructions in multiple formats (e.g., written, auditory) to ensure comprehension. Another way to integrate structure into an assignment is through the use of clear performance rubrics (Flash, 2009). Teachers should explain the expectations based upon the rubric, teach students how their work can conform to those expectations, and provide high quality examples of assignments.

**Choice.** Choice in general, and especially choice using a high-interest topic or on how to present learned information to the class (e.g., photo essay, visual map, written test), can be

highly motivating and increase the likelihood of task completion (Koegel et al., 2010). Choices can also be used to offer multiple formats for assessment including written tests, presentations, journals, and portfolios. By allowing students opportunities to be assessed using multiple formats of expression, teachers can capitalize on individual student strengths, special interests, and increase motivation (Greenspan, Wieder, & Simons, 1998). Tic-Tac-Toe lessons are one way to enhance expression and engagement for students with ASD. This form of lesson offers choices for students using differentiated instruction and assessment that can connect with their special interests. In this case, students choose the activity they complete for the assessment from a teacher created array (Ishag, 2011).

### **Conclusion**

There are multiple ways to increase forms of engagement, representation, and expression to better support students with ASD using UDL principles. These include supports for routines and procedures, priming, and special interests to enhance engagement; the use of visual organizers and strategy tools for increasing representation; and finally, the use of structured assignments, task analyses, and choice to improve expression. When these strategies are used in inclusive settings and included in everyday lesson plans, teachers may gain better results within the classroom, require less “on the fly” adaptations, and continue to supports students on the autism spectrum. Including the suggested supports in the inclusive classroom may also increase engagement, learning, and work completion, and decrease the extent to which educators need to specifically modify instruction for a student with ASD. In summary, it is important that teachers consider UDL supports for students with ASD if they aim to promote understanding, independence, and academic achievement.

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Table 1

*UDL Supports for Inclusive Classrooms*

Type of Supports	Descriptions	Examples
Engagement	The “why” of learning. Focus on increasing interest, maintaining effort and persistence, and developing self-regulation	Video-modeling Interest based lesson
Representation	The “how” of learning”. Guide information processing and manipulation to enhance comprehension; support differences in perception; Customize displays to include visual and auditory supports	T-chart Main idea webs Vocabulary charts
Expression	The “what” of learning. Allow various methods of communication and responses; provide multiple tools and supports for expression of content knowledge; support deficits in executive functioning	Oral report Photo Essay

Table 2

*Summary of Evidence-Based Strategies for Inclusive Classrooms Organized by Universal Design for Learning Features*

UDL Feature	Type of Support	Research	Examples
Engagement	Schedules	Banda, Grimmert, & Hart, 2009	- Daily schedules - Activity schedules
		Massey & Wheeler, 2000	- Mini schedules
		McIntosh, Herman, Sanford, McGraw & Florence, 2004	- Establish rules and expectations - Review procedures using visuals or written words
	Priming	Koegel, Koegel, Frea, & Green-Hopkins, 2003 Gately, 2008	- Access to materials prior to instruction - Review plan for day
	Special Interests	Mancil & Pearl, 2008 Winter-Messiers, Herr, Wood, Brooks, Gates, Houston, & Tingstad, 2007	- Find out about the student's special interests - Incorporate interests into activities and readings - Integrate interests into assignments and essays

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Representation	Visuals and	Rao & Gagie, 2006	- Visual map
	organizational	Roberts & Joiner, 2007	- Inspiration & Kidspiration
	tools		- Venn diagrams
			- Organization and processing
	Strategy	Asaro-Saddler & Saddler,	- Self-regulated strategy
	Instruction	2011	development
		Hagaman & Reid, 2008	- Use multiple strategies
			- Mnemonics

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Expression	Structured	Franzone, 2009	- Explicit directions
	Assignments	Parker & Kamps, 2011	- Break down large
	and Task		assignments
	Analyses		- Modeling and guided
			practice
			- Performance rubrics
	Choice	Koegel, Koegel, Frea, &	- Multiple formats to
		Green-Hopkins, 2010	demonstrate mastery
		Ishag, 2011	- Incorporate special interests
			- Tic-Tac-Toe lessons

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