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## Leveling Up

Earn CE certificates via many of these free and low-cost webinars, courses, and seminars. See [edWeb.net](http://edWeb.net), [mits.cenmi.org](http://mits.cenmi.org), [Kent County ISDs](http://KentCountyISDs.org), [PD Hub](http://PDHub.org), [MATN Webinar Series](http://MATNWebinarSeries.org), and [ADDitudemag.com](http://ADDitudemag.com) for additional instruction.

- **Student Game Jams**, Thurs., Jan. 7, at 4 p.m. EST on [edWeb.net](http://edWeb.net).
- **Finding Your Go-To Educational Resources Online**,

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## New communication tools for students with special needs

*EDITOR'S NOTE:* The following article was inspired by an [edWeb.net](http://edWeb.net) webinar entitled [Current and Emerging Technology for Individuals with Autism: Building Communication & Education Skills](#).

Getting the attention of students and helping them communicate is a continual goal of every teacher. This can be particularly challenging when working with students with special needs. But there is helpful current and new technology, highlighted in an edWeb.net webinar given in December 2015 by Howard C. Shane, Ph.D, of Harvard Medical School and director of the Autism Language Program in Boston Children's Hospital, and Christian Karter, educational technology specialist at Monarch Center for Autism in Cleveland, Ohio.

### Projection devices

Some classrooms have Smart Boards, and these are useful for large group activities and displaying information such as a daily classroom schedule, which helps students follow along and anticipate activities. But teachers may want to work with smaller groups or one-on-one, and there is a projector perfect for this too. Called a [Mini Projector or Pico Projector](#), it is hand-size, can connect to an iPad or Android device, and can play video and images from an SD card. Prices range from about \$40 to \$350, significantly cheaper than a Smart Board.



Mini projector

### Tablets

Tablets were discussed in the webinar, and it was noted that most the big names in AAC (alternative augmentative communication) still make apps only for iPad. iPads can be used as smartboards, educational apps, visuals such as schedules and token boards, and for data collection, photography and video capturing.

Other tablets include Android devices and Windows Surface. It is expected

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Tues., Jan. 12 at 5 p.m. EST on [edWeb.net](#).

- **Ensuring Success for AI: Strategies for Bringing Out the Best in Students in Poverty, and Students Who Struggle with Language and Learning**, Mon., Jan. 18 at 4 p.m. EST on [edWeb.net](#).
- **Number Sense Essentials Part 1: Using Counters, Rekenreks and Ten Frames to Develop Number Sense through Counting**, Tues., Jan. 19 at 4 p.m. EST on [edWeb.net](#).
- **Creating Your Own Digital Content for Students**, Tues., Jan. 19 at 5 p.m. EST on [edWeb.net](#).
- **Six Terrific Tools to Transform Your 2016**, Wed., Jan. 20 at 4 p.m. EST on [edWeb.net](#).
- **You CAN Win Grants for Your School: Secrets and Strategies from a Pro (Part 1)**, Mon., Jan. 25 at 4 p.m. EST on [edWeb.net](#).
- **FILMS BYKIDS: Inspire Learning with Cinematic Journeys**, Wed., Jan. 27, at 4 p.m. EST on [edWeb.net](#).
- **Teaching Numeracy to Young Children: A Responsive and Differentiated Approach**, Thurs., Jan. 28, at 2 p.m. EST on [edWeb.net](#).
- **Developmentally Appropriate Practice and Music Learning**, Thurs., Jan. 28, at 3 p.m. EST on [edWeb.net](#).

### About *Special Ed Tech* / Subscriptions

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# Math Tech: Osmo and Tiggly

by Kate Fanelli



Kate Fanelli

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*“The combination of low- and high-tech interactions with mathematics strengthens the connections between concrete, representational, and abstract mathematics, and also provides flexibility in instruction.”*

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A new hybrid use for tablets combines the use of a tablet-based app and real-life physical manipulatives. Two products, Osmo and Tiggly, have math-based apps for early numeracy skills.

The combination of low- and high-tech interactions with mathematics strengthens the connections between concrete, representational, and abstract mathematics, and also provides flexibility in instruction. For example, students can work with the physical manipulatives face-to-face with teachers and peers, and then use the same manipulatives to practice with the app.

[Osmo, by Tangible Play](#), currently available only on iOS, includes a physical base, in which the user places the iPad in its vertical position, and a red mirror that slides over the camera. Osmo apps are free, and Osmo manipulatives (and the base and mirror) are available for purchase at the website. Osmo also offers a curriculum guide for teachers using Osmo in the classroom.

The [Osmo Numbers](#) app includes durable cardboard tiles with both dots and digits and has students constructing, deconstructing, counting, adding, and multiplying values. For some games, red and yellow counters can be used in addition to, or instead of, the tiles. One draw back within the Numbers app is that, depending on the game, sometimes placing two digit tiles side by side results in a two digit number, and sometimes creates a multiplication. I wish the use of side-by-side placement was consistent throughout. However, the app uses multiple representations and flexibility with number providing ample, conceptual practice for students using both quantity (dots) and digits (numbers).

The [Osmo Tangram](#) app allows students to see physical tangrams, that they are manipulating, fill a shape that is shown on the app. Tangram provides opportunities for students to develop spatial sense and to begin to talk about shapes and space.

Although not math-related, the [Osmo Words](#) app allows teachers to build their own vocabulary lists with verbal and picture clues. Students use letter tiles to spell the word defined or pictured on the screen. Math vocabulary would be a good fit for this app.

Also not directly math-related is the [Osmo Newton](#) app. Students draw diagrams in the physical world using any pencil and paper. The drawing shows up on the screen and a ball rolls along the lines in the diagram in the real time. As students add to the drawing, the ball is forced in different directions. The objective is to keep the ball from falling through to the bottom of the page. This app has great potential for enhancing a mathematics discussion of increasing and decreasing directions or slope, and angles.

[Tiggly apps](#), available for iOS and Google, are free and can be used with the Tiggly math interactive toys (available for purchase): 5 rubber bars with 1 to 5 connected “circles” that can be “stamped” onto the tablet screen to match



*Please see [Osmo & Tiggly](#) on next page*

*Osmo & Tiggly, continued from previous page*

and create quantities. Tiggly integrates visual, auditory, and kinesthetic sensory experiences to build mathematical understanding of quantity, number, and basic operations. Users may also use their fingers as stamps instead of the interactive toys, although for some students, this may be physically challenging.

[Tiggly Chef](#) is an addition app that has students use quantity and flexible thinking about quantity to help the chef use the right amount of ingredients in his crazy recipes.

[Tiggly Cardtoon](#) is a counting app where students identify quantities and watch whimsical “cardtoons” form and re-form.

[Tiggly Adventure](#) is a number line app where students must help build a path for creatures to cross the screen.

Various aspects of number sense, including counting, operations, and skip counting, are utilized through a variety of representations to build mathematical understanding and get the creatures to the other side of the screen.

For students with special needs, and their peers without special needs, apps that integrate real life, physical manipulatives that can be touched, felt, and moved along with the benefits of a digital app such as instant feedback, descriptive graphics, and interactivity, can meet a variety of physical and cognitive needs in the mathematics classroom.

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## Recognizing and responding to students with sensory issues (SPD)

*EDITOR'S NOTE: The following article was inspired by an [edWeb.net](http://edWeb.net) webinar entitled [Sensory Integration: Recognizing and Responding to Young Children with Sensory Issues](#), presented by Christy Isbell, PH.D OTR/L, and sponsored by Kaplan Early Learning Company.*

Do you have students in your classroom who can't seem to sit still? Or those who can't stand to be touched? This might be indicative of sensory processing disorder (SPD). Over 5 percent of children aged 4 to 8 suffer from this, and over 90 percent of students with autism have SPD, said Christy Isbell, author and pediatric occupational therapist, during a December 2015 [edWeb.net](http://edWeb.net) webinar.

Nearly all of us have some sort of sensory issue -- for example, an aversion to fingers on the chalkboard, or the way clothing tags feel, or disliking a certain texture of food. But those with SPD have such strong reactions that they cannot function normally.

There are actually seven senses which affect SPD. There are the five most recognized (sight, smell, taste, touch, hearing). And there are two more: vestibular, involving movement and balance (located in the inner ear), which tells you when you are moving in space, and proprioception (brought in through our joints, ligaments, muscles, and tendons), which makes you aware of body position, so that you can use your hands and do things like touch your nose with your eyes closed.

SPD sufferers come in two categories: sensory seekers, who crave more and more input, and sensory avoiders, who equate input with pain. Some children are both seekers and avoiders, seeking one sense and avoiding another.

There are two categories of SPD most recognizable by teachers: a vestibular (movement/balance) seeker, and tactile (touch) avoider.

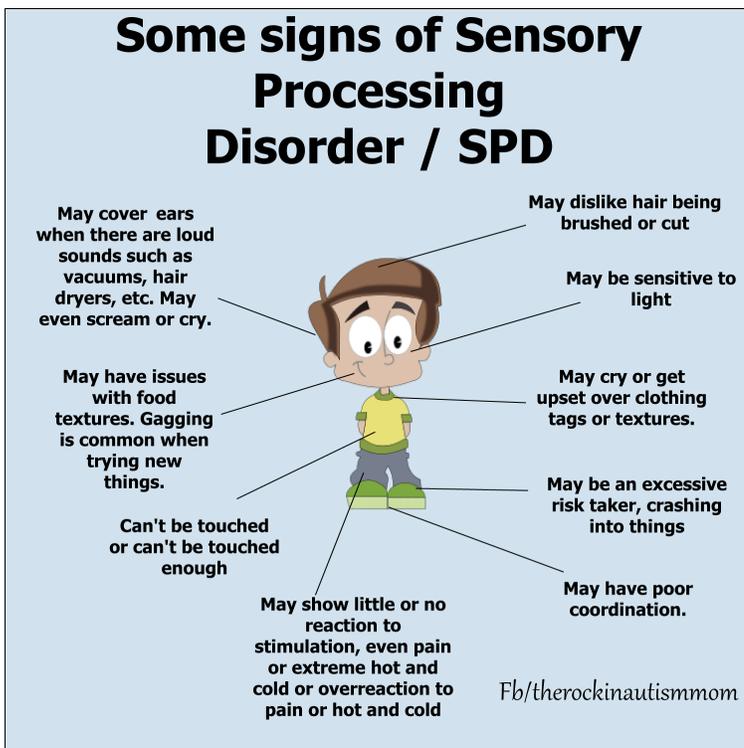
Vestibular seekers are sometimes misdiagnosed as having ADHD because they can't seem to sit still. Although nearly every child likes to move around, these ones want 10 to 20 times as much movement as other children. They are in constant motion, take safety risks, are impulsive, and run instead of walk.

Tactile avoiders say "Ouch!" to everyday touch experiences. These children may respond to light or unexpected touch with an excessive negative response such as screaming, running away, or hitting or biting, which leads to fights. They avoid messy experiences. They might be extremely picky eaters. They refuse to hold hands and don't like to be kissed or hugged.

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As teacher, your role is to be sensory-aware, prevent problems, and respect

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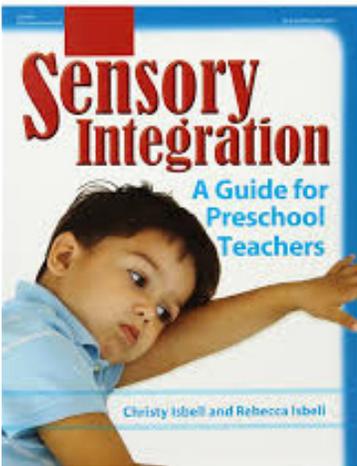
the child's emotions. Here are some practical ideas for dealing with SPD.

### Vestibular seekers

- Provide more movement throughout the day -- at least one hour total of large motor activity, inside as well as outside with things such as a small trampoline, therapy ball, or balance beam.
- Give the child a standing table so he or she can stand instead of sit while learning, and put tape on the floor as a visual boulder of where to stand.
- When the child must sit, provide a child-sized rocking chair, pillow, or ball to sit on. (One teacher made pillows in a variety of shapes and colors and used them as a learning tool.)
- Alternate active and quiet learning activities. Understand that if a child is sitting, even if having a lunch or snack, it's a quiet activity.

### Tactile avoiders

- Do not force the child to touch! This is like force-feeding someone and does not build trust.
- Tell the child before a touch is going to occur (for example, "I'm going to help you wash your hands" or "I'm going to take your hand to walk down the hall.")
- Prevent unexpected touches when possible and do not put the child in the middle of other children. Instead, make the child a line leader or follower, or have him or her sit next to an adult.
- Allow the child to initiate touch.
- Look for other ways to allow the child to participate in learning activities, such as using tools instead of hands, or watching first then touching later. Some kids may progress gradually after watching other kids. Be patient.
- Create a quiet corner, where the child can go if overwhelmed by sensory input. The space should be very small but easily reachable.



Christy Isbell speaks on SPD and other related early childhood topics on her website, [ChristyIsbell.com](http://ChristyIsbell.com). You can also read Ms. Isbell's book, *Sensory Integration: A Guide for Preschool Teachers*, available from [www.gryphonhouse.com](http://www.gryphonhouse.com) and [www.amazon.com](http://www.amazon.com).

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that as time passes, more apps will become available for every device.

## Wearable technology



Apple Watch

Wearable technology is trending now. For students who don't mind wearing them, teachers can use devices such as a [Pebble Watch](#) (\$80 to \$250) or [Apple Watch](#) (\$250 to \$700) for a variety of uses without disrupting the classroom, such as prompting a student to do a task or improve behavior. Prompts can be physical (vibration), visual (images or messages), or verbal/audio (from built-in speakers). Apple Watch, which offers more features, has sensors to monitor things such as heart rate, which help track data or let students know when they are getting upset. Apple Watches can also send images for "just-in-time" support for students, so they can see what they are supposed to do next.

## Speech synthesis

Computer-generated speech has advanced greatly, and you can now personalize it to match your own voice. This can be useful for both teachers and students. Leading manufacturers are [Acapela Group](#) and [ModelTalker](#).



Amazon Echo

## Artificial Intelligence (AI)

AI takes input from a person and converts it to text, then performs a keyword search and provides a related response. Popular AI devices include [Siri for iOS](#), [Google Now for Android devices](#), and [Cortana for Windows 10](#). They can answer questions such as "What is the weather outside?"

AI can be used as therapy assistance in several ways. Studies show that AI often motivates students to enunciate more clearly to help the AI device understand their speech. AI also simulates human social interaction, which is helpful to some students. One mother wrote an article called ["To Siri, with Love"](#), about how AI "befriended" her son with autism.

A new AI device called [Amazon Echo](#), which looks like a speaker and costs about \$180, does a good job of hearing voices. It can be placed anywhere and acts as a personal assistant. It can answer questions, turn lights on and off, play music, set alarms, tell time, and has an ever-growing list of functions.

## Tips on selecting and getting stuff

- [Bridgingapps.org](#) and the [AAC Evaluation Genie](#) are good sources of information about apps and how they might be helpful.
- Ask the manufacturer for a sample for evaluation purposes. After you send it back, you can then talk about how the device was used in your classroom when asking for grant funding.
- Always use a trial version of an app before buying it.
- When getting Medicaid to pay for a device, it's important to say that it will be used "for communication purposes."

For more information about this topic, including news about emerging technology, [view the webinar here](#). 