

# Smart Inclusion for the 21<sup>st</sup> Century Classroom

## Integrating SMART Boards with Assistive Technology

By Alex Dunn and Alison Inglis

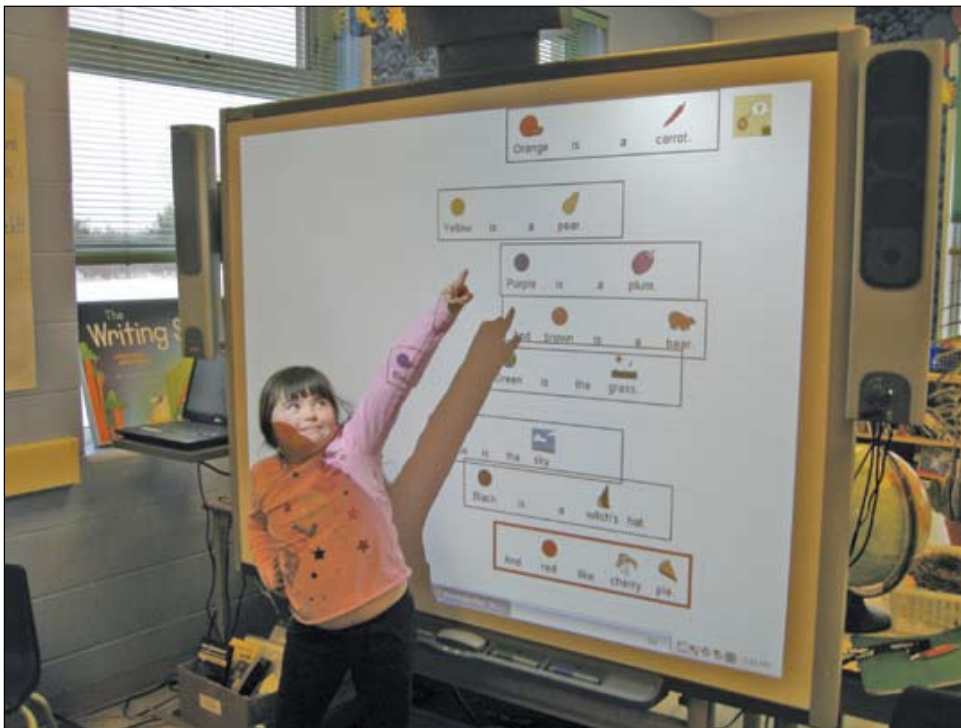
**PARTICIPATION** in education involves going beyond access. It implies learning alongside others and collaborating with them in shared lessons. It involves active engagement with what is learned and taught, and having a say in how education is experienced. But participation also involves being recognized for oneself and being accepted for oneself. I participate with you when you recognize me as a person yourself, and accept me for who I am. (Booth and Ainscow (2002))

Welcome to Mrs. Curry's Grade 1 class. Today the goal for this literacy lesson is to sequence lines in a poem. Prior to Smart Inclusion, some days, Paula would have slowly made her way to the back of the classroom to work on her literacy program on her own computer with "special" software. Sometimes Paula was even

encouraged to put on headphones because she needed assistance reading the material and this was often viewed as distracting to the other students in the classroom. Other days, her classmates would all say "goodbye" to Paula as she missed the literacy block altogether to help make popcorn for the school fundraiser.



**ALEX DUNN** (Speech Language Pathologist) and **ALISON INGLIS** (Chief Psychologist) represent a team of people that consists of speech-language services staff, special education resource teachers, learning consultants, teachers and Principals at the UCDSB. The team also acknowledges the contributions of the following in their work: UCDSB's IT department, SMART Technologies, Bridges Canada, Advanced Presentation Products, Cambium Learning Technologies, Nintendo and Dynavox Mayer-Johnson, and the work and advice of Dr. Donna McGhie-Richmond from the University of Victoria. For further information about Smart Inclusion visit [www.smartinclusion.wikispaces.com](http://www.smartinclusion.wikispaces.com). Alexandra Dunn may be reached at [alexandra.dunn@ucdsb.on.ca](mailto:alexandra.dunn@ucdsb.on.ca); Alison Inglis may be reached at [alison.inglis@ucdsb.on.ca](mailto:alison.inglis@ucdsb.on.ca) or. [@SMARTInclusion](https://twitter.com/SMARTInclusion)



A SMART Inclusion student proudly pointing out her contribution during whole group instruction.

Now, as part of one of more than 30 schools in Upper Canada District School Board practicing Smart Inclusion, Paula is able to engage with peers as an active participant in her class, learning academic content while also working to meet her individual learning needs and goals; this is in essence the meaning of inclusive education. Paula's classroom teacher is using a SMART Board ([www.smarttech.com](http://www.smarttech.com)) with some of the software and hardware that Paula used to use alone or with an assistant at the back of the class and she is using these for group instruction. Therefore, technology that is necessary for Paula has become good for all. Interactive whiteboard technology, when paired with assistive technology, has made it possible for teachers to offer TRUE Universal Design for Learning – multiple means of representation, expression and engagement so that ALL students have access to an education.

## INTRODUCTION

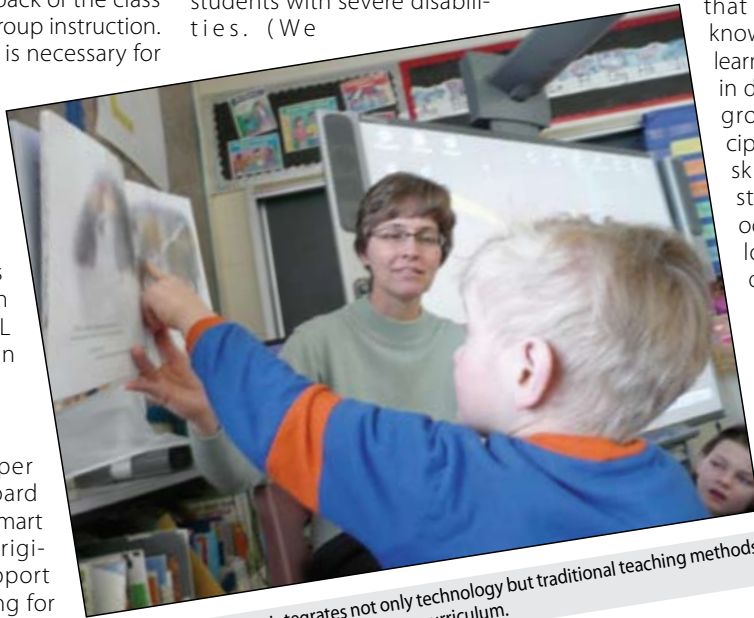
In 2008-2009, the Upper Canada District School Board (UCDSB) team developed Smart Inclusion, an idea that originated as a method to support inclusion and programming for 12 students with severe communication challenges. The Trillium Lakelands District School Board had done work in the year prior to the Smart Inclusion pilot using Smart Boards for students who use AAC. They felt that integrating AAC with the Smart Boards provided an unexpected experience of creating a language-literacy and communication immersion environment for the whole class, not just the non-verbal student. (Clinker, M. & Moore, B. 2008)

This initiative examined the use of SMART Boards with what has historically been thought of as "special needs software," set within a theoretical framework, including Universal Design for Learning (UDL; Turnbull et al., 2002) and the Participation Model (PM; Rosenberg & Beukelman, 1987; Beukelman & Mirenda, 1998). The goal was to support communication and participation for students with significant communication challenges and inclusive educational programming. In this article we will discuss the positive outcomes of this grassroots initiative. UCDSB teams continue to monitor implementation and effects of Smart Inclusion, using action research principles, as more and more classrooms, schools and districts, look to support students with

significant challenges and their typically developing peers.

## PROCESS

In May of 2008, Paula, as well as 11 other students with severe communication challenges, in classrooms from kindergarten to high school, were identified as eligible for an Ontario Ministry of Education Special Equipment Allowance (SEA) grant to purchase specialized equipment and software for students with severe disabilities. (We



The classroom teacher integrates not only technology but traditional teaching methods to ensure ALL students have access to the curriculum.

unable to secure consents for two of the students to proceed with complete data collection; therefore this paper is based on data from 10 of the 12 original students selected for this pilot.) This equipment included a SMART Board, along with a variety of application software and augmentative and alternative communication (AAC) tools. For most of these students, AAC and some specialized software was already in use, purchased under previous SEA grants. Based on the Smart Inclusion framework, these tools were considered essential to augment and assist not only communication, but meaningful educational and social participation in the classroom setting for the student with severe disabilities.

Tools were put into place for September of 2008. Extensive training and coaching on the theories, practices and technology behind Smart Inclusion were provided to classroom teachers, educational assistants and special education school-based resource teachers (learning resource coaches (LRCs) at UCDSB). Training was provided by UCDSB Smart Inclusion team, Bridges Canada ([www.bridges-canada.com](http://www.bridges-canada.com)), SMART Technolo-

gies ([www.smarttech.com](http://www.smarttech.com)), and Advanced Presentation Products ([www.advanced-inc.com](http://www.advanced-inc.com)) at 2008 Summer Institutes and throughout the 2008-09 school year.

## THE THEORIES ... "INCLUSION WITHOUT PARTICIPATION IS NOT INCLUSION AT ALL."

**Universal Design for Learning (UDL) and Differentiated Instruction (DI)** provide frameworks for designing curricula that enable ALL individuals to gain knowledge, skills, and enthusiasm for learning. UDL principles assist teachers in designing instruction for a diverse group of students, while DI principles allow them to address specific skills and challenges for individual students. (See [http://www.ontariodirectors.ca/L4All/L4A\\_en\\_downloads/LearningforAll%20K-12%20draft%20J.pdf](http://www.ontariodirectors.ca/L4All/L4A_en_downloads/LearningforAll%20K-12%20draft%20J.pdf))

UDL and DI overlap and provide a range of instructional strategies, resources, activities and assessment tools to meet the strengths, needs, readiness and learning styles or preferences of a wide range of individuals in a class. They guide the development of flexible learning environments through multiple means of representation, expression and engagement in order to increase access to learning by reducing physical, cognitive, intellectual and organizational barriers to learning, as well as other obstacles, while maintaining high achievement standards for all. (See [www.cast.org](http://www.cast.org))

Teachers, like Mrs. Curry, understand how to cast the UDL net in an attempt to teach and reach ALL students. Mrs. Curry has discovered that this is made easier through the use of a SMART Board interactive whiteboard and specialized software. She recognizes that auditory representation (e.g. voice, speech output from computer, sound effects), visual representation (picture communication symbols, printed words, graphics) and incorporating kinesthetic modalities (e.g. touching, adding to and moving information on the IWB) are necessary to "capture" and engage her students in learning. However, despite her best efforts, there are some students who sometimes fall through the UDL net and so the Participation Model also helps Mrs. Curry (and other educators!) to engage all of her students.

**The Participation Model (PM)** provides a framework for supporting academic and social participation. This model captures those students who fall through the UDL net by addressing how to identify environmental and student barriers to participation that

continue to exist, so that even those students with severe communication impairments are able to participate in a meaningful way in classroom activities. The philosophy behind the Participation Model is that students with special needs, including those who use assistive technology and/or augmentative alternative communication (AAC) tools, can participate in the same classroom activities as peers, while still meeting their individual learning needs and goals. Programming for students with special needs, within the PM framework, is collaborative. The process includes teachers, educational assistants, speech-language pathologists and parents in setting academic and social goals.

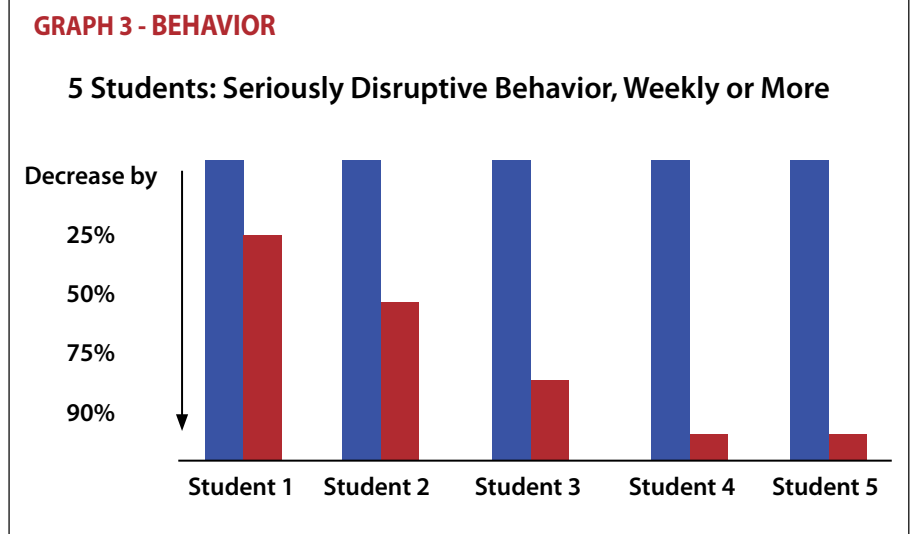
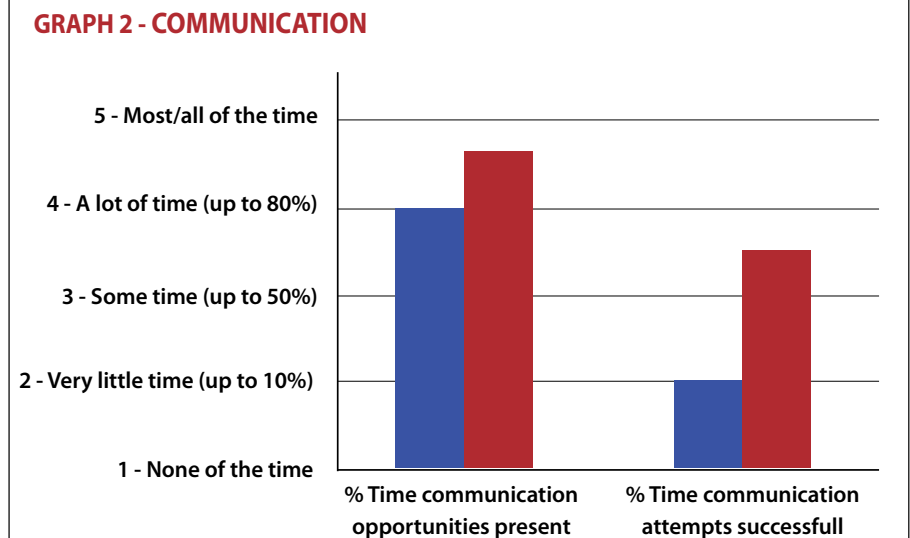
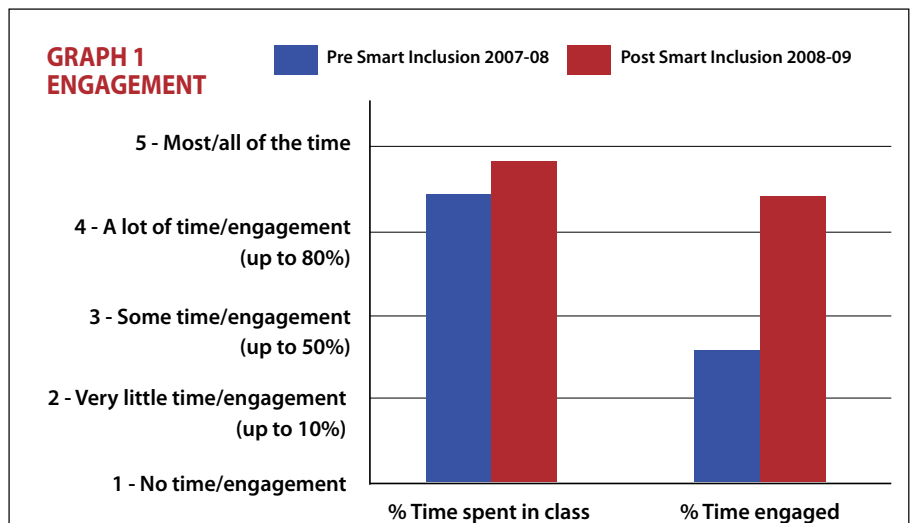
The Participation Model begins by identifying current levels of academic participation, social participation, integration and independence within the learning environment. For example, students' level of participation in an activity may be involved, active, competitive or none, and where integration with peers during the activity may be full, selective or none, and with a level of independence that could be characterized as assisted, with set up, or fully independent.

The next step is to identify barriers that may be preventing a student from more active participation, integration and increasing independence in any classroom learning activity. It then focuses on designing interventions to address the barriers, thereby optimizing academic and social participation, integration and independence. Finally, the levels of participation, integration and independence are re-assessed to evaluate the effectiveness of program and interventions in helping students reach their goals.

### THE TECHNOLOGY

Prior to May 2008, some of the students selected for our work were already using a computer and assistive technology. However, the technology was frequently used by an individual student in isolation from peers, resulting in minimal opportunities for academic and social participation. This sometimes looked like educational assistants working with students at the back of a classroom (or even outside of classrooms) on individual learning goals that were not always well connected to the subject matter being addressed at any given moment within the classroom as a whole.

To promote engagement with peers in classroom instruction, we created a "toolkit" by integrating the students' assistive technology with a SMART Board for use during group instruction. We selected SMART Boards over other interactive whiteboards (IWB) because other IWB require a pen for interactivity. This can be a barrier to participation for some of our students who have physical



access challenges. The SMART Board interactive whiteboard overcomes this environmental barrier by allowing students to interact with the lesson using a finger, an elbow, their head or any object that they can get their fingers around. It was also critical to have as close to zero shadowing as possible. The positioning of the body required to reduce shadowing with many IWB can pose difficulties for some students due to cognitive and other challenges, so in year one, we chose Gen2 integrated SMART Boards. We have since moved on to using the 685ix SMART Board in our effort to move closer to boards that offer zero shadowing. Assistive Technology ranged from software, like Boardmaker Plus, Classroom Suite 4, Notebook, Symwriter, Kurzweil and Inspiration, to complex hardware, including alternative access keyboards, switches and voice output devices like V and Vanguard. (For more specific information on how to have voice output devices interact through the computer with the SMART Board visit us at [smartinclusion.wikispaces.com](http://smartinclusion.wikispaces.com).) While the assistive technology was originally deemed essential for one student (our Smart Inclusion target student), many students within the classroom benefited from its use; "necessary for some, good for all."

## EVALUATION AND RESULTS

At UCDSB, during the 2008-2009 school year, pre and post data was collected on the 12 students for whom the SEA claims were pursued. The data sources included classroom observations, surveys (completed by school teams), speech-language assessments, review of IEPs and report cards, and interviews with teachers and principals. Qualitative and quantitative data was gathered on academic participation, social participation, communication skills,



A student can interact with websites with a touch of a finger on the SMARTBoard.

**TABLE 1 - ACADEMIC PARTICIPATION / SOCIAL PARTICIPATION**

Participation Levels Language Arts	Pre Smart Inclusion 2007-08 (# Students)	Post Smart Inclusion 2008-09 (# Students)
<b>None:</b> Alternative expectations not on topic or participating with class; may be out of classroom; may be working on other curriculum areas in the classroom.	2	0
<b>Involved:</b> Alternative but on topic or alternative expectations but participating in the activity with class; alternative expectations may include OT, PT, SLP, Behavior, Social, life skills, daily living skills, etc.	5	1
<b>Active:</b> Modified curriculum	1	7
<b>Competitive:</b> Same expectations as everyone else; may have some accommodations – working with peers	0	0
Participation Levels Mathematics	Pre Smart Inclusion 2007-08 (# Students)	Post Smart Inclusion 2008-09 (# Students)
<b>None:</b> Alternative expectations not on topic or participating with class; may be out of classroom; may be working on other curriculum areas in the classroom.	2	0
<b>Involved:</b> Alternative but on topic or alternative expectations but participating in the activity with class; alternative expectations may include OT, PT, SLP, Behavior, Social, life skills, daily living skills, etc.	4	1
<b>Active:</b> Modified curriculum	1	5
<b>Competitive:</b> Same expectations as everyone else; may have some accommodations – working with peers	1	2
Social Participation	Pre Smart Inclusion 2007-08 (# Students)	Post Smart Inclusion 2008-09 (# Students)
<b>No friends</b>	5	0
<b>1 or 2 friends</b>	3	5
<b>A few to many friends</b>	0	3

behaviors, learning skills and inclusion. It should be noted that with support from UCDSB, the London District Catholic School Board (LDCSB) implemented SMART Inclusion during the 2009-2010 school year and was able to replicate the findings from the UCDSB. (For more information on results from the London District Catholic District School Board please visit [smartinclusion.wikispaces.com](http://smartinclusion.wikispaces.com).)

The following results are based on the surveys completed by school teams at UCDSB during the 2008-2009 school year. The surveys provided pre and post measures for students with special needs in the areas of Engagement, Independence, Communi-

cation, Behavior and Academic and Social participation.

By the end of the Smart Inclusion year (2008-09 school year), **target students were spending more time in class and were engaged more often in learning activities with peers** compared to time in class and engagement in the prior school year (2007-08), as reported by 2007-08 teachers (retrospectively in September 2008) and 2008-09 teachers (at end of school year, June 2009).

By the end of the Smart Inclusion year (2008-09 school year), **target students were being provided more communication opportunities and were successful in more of their communication attempts**



compared to the prior school year (2007-08), as reported by 2007-08 teachers (retrospectively in September 2008) and 2008-09 teachers (at end of school year, June 2009).

Standardized language assessment pre and post data available for eight students revealed that all students demonstrated growth in their speech and language skills; all students' communication skills had improved to a greater degree over the course of the 2008-09 school year when compared to growth over previous years. All Smart Inclusion students have been on SLP caseloads for several years. Details on these results available from Dr. Alison Inglis, Chief Psychologist.

## SUMMARY AND CONCLUSIONS

### Outcomes – Students with Special Needs

- Students with special needs were not only more engaged and participating more fully in classroom programming with peers, but they were meeting their IEP goals and more. Teachers had to increase learning expectations exponentially.
- Students with severe communication challenges became more active social participants in their classrooms.
- Significant negative behaviors decreased, thus optimizing positive engagement in classroom communities.
- Improved attendance for students with special needs was reported.

### Outcomes – Whole Class

- All students were more engaged.
- Assistive Technology was being used for whole class instruction.
- More teaching and less behavior management were reported.

### Outcomes - School Community

- The Participation Model adopted beyond the Smart Inclusion classrooms.
- Principals implementing Smart Inclusion theory and technology into other classrooms, and some School Success Plans now include the Participation Model and Assistive Technology
- Two Smart Inclusion schools were created to further evolve models for "best practice" in inclusion and technology.

## SMART INCLUSION: WHAT NEXT?

Smart Inclusion is now in its third year and has grown beyond a pilot project to bring 70 classrooms under the Smart Inclusion umbrella at UCDSB. We are also working very closely with two schools in a two-year research project where the focus is on "Inclusion for the 21st Century." These schools have equipped every classroom with SMART Technology and software (Classroom Suite 4; Boardmaker Plus; Clicker 5; Inspiration; Kurz-

weil; WordQ/Speak Q) and have paired assistive technology and training with support for effective inclusive classroom practice.

Our students are the true stars of Smart Inclusion and have become educational leaders as more and more classrooms, schools and districts look to support students with significant challenges and their typically developing peers. That's something to talk about.

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