Smart Inclusion in the 21st Century Classroom
Integrating SMART Boards with Assistive Technology

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Summary

In 2008-2009 Upper Canada District School Board undertook the Smart Inclusion Pilot project in several classrooms throughout the board. The pilot examined the use of interactive whiteboards (i.e., SMART technology) integrated with special needs software, set within a framework of Universal Design for Learning (UDL), Differentiated Instruction (DI), Aided Language Stimulation, and the Participation Model (PM) to support (1) communication and participation for students with significant communication disabilities, and (2) inclusive educational programming. In this paper we discuss the positive outcomes of the pilot, that have led to a grassroots "ripple effect" throughout schools and the district, and moving out into other areas of the province. UCDSB teams continue to monitor implementation and effects of Smart Inclusion, using action research principles, as more and more classrooms look to support program for students with significant disabilities *and* their typically developing peers. We are particularly interested in how teachers' adoption of technology evolves along with their beliefs about inclusion and their teaching practices with respect to participation and inclusion for *all* students.

Introduction

Inclusive education involves students from diverse backgrounds and with a wide range of abilities learning with their peers in regular schools and classrooms. It is the schools, rather than the students, that adapt the way they work in order to meet the needs of all students. Inclusive education policies have been evident in provincial and territorial education authorities across Canada for at least the past decade. This means that today's regular education classrooms are characterized by a diverse range of student learning characteristics and needs. Ontario's Equity and Inclusive Education strategy "…is designed to support an education system where all students in our

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publicly funded schools have the opportunity to achieve their highest potential."[3] However, despite policies, international recognition, and mounting evidence that inclusive education is the standard for teaching students with special needs, inclusion by definition and in practice remains elusive (Cole, Waldron, & Majd, 2004; Demeris, Childs, & Jordan, 2008; Loreman, 2007; Thomas & Vaughan, 2004).

A 2008 community poll conducted by Queens University in southeastern Ontario (Burge, Ouellette-Kuntz & Hutchinson, 2008) revealed that just 52% of respondents were positive about inclusion of students with intellectual disabilities in regular classroom settings. On the other hand, 42% of respondents believed that education in specialized settings (segregation) was best. Respondents reported that inclusion in regular classrooms would lead to discipline challenges; learning would be more difficult for all other students; schools would over extend resources; and teachers would not be prepared. Considerable research evidence demonstrates a different reality however. There is evidence that innovations introduced into regular classrooms to accommodate students with mild disabilities directly benefit typically developing students (Manset & Semmell, 1997). When schools have access to a variety of supports and teaching strategies, they can be effective both in inclusion and in sustaining high levels of student achievement (Florian & Rouse, 2001), and teachers who are effective at including students with special needs in their classrooms are effective teachers overall and may generate more instructional time than those in less effective classrooms (Jordan, Lindsay, & Stanovich, 1997; Jordan & Stanovich, 2004;). Following a recent review conducted by Dolmage et al (2009), the authors concluded, "What emerges from this literature is a varied landscape whereby best practices for the education of all students are inextricably linked to inclusive education for students with disabilities" (p. 2).

Effective Inclusive Teaching Practices

Currently, school systems are building their practice in Universal Design for Learning (UDL) and Differentiated Instruction (DI) to meet the needs of a diverse group of learners; see for example the "Learning for All K-12" Ministry of Education draft document[4]. It is important to note that we feel it is implicit in these practices the notion that students must be *active participants* in learning academic content in relevant areas (i.e., reading, spelling, writing, math, physical education, music, etc.) while also working to meet individual needs and goals. Therefore, if students with special needs are *included* in regular education classroom activities they must *not* simply be *present*, working only on alternative and/or individual programs; they must be actively participating in activities along with their peers. Moreover, they must acquire relevant, functional skills in non-academic areas and be afforded opportunities to form social relationships and friendships with peers. *The goal for all students is meaningful educational and social participation.*

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[3] http://www.edu.gov.on.ca/eng/policyfunding/EquityQuickFacts.pdf

[4] http://www.ontariodirectors.ca/L4All/L4A_en.html

Inclusion without participation is not inclusion at all. Even by universally designing a regular education classroom environment and learning activities, and differentiating instruction and assessment, there will be some students whose needs may remain unmet. Much of the time students with special education needs, including those who use assistive technology (AT) and Alternative and Augmentative Communication (AAC) tools, can participate at some level with varying degrees of assistance in the same classroom activities as their typical peers while also being engaged in learning activities that meet their particular needs and goals. This is the essence of inclusive education and the philosophy that underlies the Participation Model (PM) that was originally developed by Rosenberg and Beukelman (1987); revised by Beukelman and Mirenda (1998). The PM is a problem-solving framework for systematically examining and supporting student participation and by definition, inclusion. Programming for students with special needs by using the PM framework is collaborative. The process includes teachers, educational assistants, professional services staff, students and parents in setting academic and social goals. It is student-centred, goal focused, and process-oriented. The model begins with identifying barriers that are preventing a student from participating in any classroom learning activity and setting. It then focuses on implementing instructional methods and tools to remove or circumvent the barriers, thus enabling and optimizing student participation. The model extends UDL and DI approaches and strategies, so that even those students who present with the most "disabling" or "challenging" characteristics are able to be with peers, participating at some level in classroom activities, while working towards varying levels of independence. The PM captures those who fall through the UDL and DI net by addressing how to identify the barriers to participation that may still exist, despite UDL and DI. Smart Inclusion provides school teams with both the theoretical underpinnings and implementation strategies of UDL, DI, and the PM[5] along with the technological and training supports necessary for successful inclusion of all students.

The Role of Technology

The use of AT and AAC for students with disabilities is not new. Technology that facilitates inclusion of students who have significant learning challenges is typically purchased for individual student use. However, this can result in barriers to effective implementation within the classroom. There is often stigma around being the only student in a regular education classroom who uses a particular type of technology (and that technology is not used or understood by those around the "identified" student). Teachers have difficulty finding the time to learn how to harness the potential of a student's individual technology and to support its use within the classroom curriculum. The student does not receive modeling in its use and is not made accountable with regards to its use to support learning (Kintsch & DePaula, 2002).

As more traditional instructional approaches to teaching, learning, and technology use are enhanced by approaches in line with 21st century knowledge

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[5] The principles of differentiated communication and aided language stimulation are also incorporated into our framework to address the needs and goals of students with severe communication challenges.

building and skill, *new* digital technologies are becoming more readily available. Students have increased opportunities to learn new technologies that are deemed important for future economic productivity and teachers need to evaluate how and when to use new technologies within the activities of the classroom. The active application of subject knowledge for solving real world problems within more collaborative, project based learning environments demands the introduction of digital technologies that link the classroom with the world beyond the classroom walls. Activities that emphasize knowledge creation and innovation require the introduction of yet other technologies in the classroom. (ICT Competency Standards for Teachers, 2008).

Futuresource[6] states that 1 in 5 classrooms worldwide will be using SMART technology by the end of 2013. The use of interactive whiteboard (IWB) technology in schools is not new[7], and the renewed focus on interactive whiteboards as a tool for 21st century classroom instruction may hold the promise to overcoming some of the difficulties encountered with technology in the past. Though the IWB simply functions as a touch screen, it forces the use of computer technology in large and smaller group instruction. This facilitates a UDL approach to instruction – multiple means of representation, expression and engagement. Use of multiple formats for representing concepts and text is made easier, including visual, auditory and kinesthetic modalities. It also allows teachers to easily incorporate the principles of natural/aided language stimulation (Goossens, 2000; Goossens, Crain & Elder, 1992) within group instruction. This can be accomplished through the integration of assistive technologies with regular education technologies and/or by using a student's assistive technology during group instruction. While this technology was originally deemed essential for one student, all students within the classroom can often benefit from its use. In addition to the benefits it affords for representing language and new concepts, an IWB allows students who use alternate access hardware to participate in shared activities by interfacing their technology with the laptop attached to the IWB. Students who were unable to manipulate traditional objects or write on a blackboard are able to actively participate along with their peers. Finally, the use of IWBs has proven to increase the attention and engagement of all students, but especially those who have special needs (see McClaskey and Welch, 2009).

The appeal and increasing popularity of interactive whiteboards, and our experience supporting AAC and other AT for students with disabilities, prompted the UCDSB team to (1) use technological assists as *leverage* to promote inclusive classroom practices by *integrating* SMART technology with special needs software, while (2) framing these within best practices from Speech Language Pathology and Education, and (3) providing the training and support necessary to enable participation and inclusion of students with severe disabilities. The UCDSB recognizes that while technology itself can be useful for supporting student learning goals and achievement, indeed may be essential for some, it should not be confused with or take precedence

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[6] See www.Smarttech.com - recent media releases.

[7] See BECTA for the experiences of the education authority in the U.K. www.becta.org.uk.

over the practices, approaches, and beliefs that underlie and guide effective instruction; technology is a tool. In addition, while specific tools and strategies can be successfully implemented with students who have disabilities it is important to consider that how we think about and treat these students should be consistent with how we think about and treat *all* students. As Booth and Ainscow (2002) assert:

> 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 recognise me as a person yourself, and accept me for who I am.

As innovative technology enters schools, school teams need to understand the theoretical underpinnings and strategies that guide effective instruction and inclusion *and* be provided with the education and training support necessary to consider and implement technology that is accessible to *all* students. That some students have significant learning "challenges" is not the point. Rather, the true "challenges" lie with us – to universally design classrooms, school communities, and pedagogical practice that reach and teach all students. Effective inclusion is akin to effective teaching practices overall, and enhancing inclusive practices will benefit all students (Jordan, Schwartz, McGhie-Richmond, 2009). The Upper Canada District School Board's Smart Inclusion pilot project provided a framework for "pushing and pulling" pedagogy and school reform at the critical juncture of technological advancement, inclusion focus, and effective teaching practices in schools.

Smart Inclusion Pilot Project - Summary of Findings

In 2008-2009 the UCDSB (1) developed demonstration classrooms for best practices in AAC/Technology use in inclusive learning environments, and more specifically, (2) used UDL, DI, Aided Language Stimulation (Cafiero, 1998; 2008; Goossen, 2000; Goossens et al, 1992), and the Participation Model as frameworks within which teachers examined and adjusted their instructional practices and programs to maximize the participation of students who use AAC and/or AT.[8]

In May of 2008, 10 students with severe communication disabilities were identified as eligible for a Ministry of Education Special Equipment Allowance (SEA) grant to purchase equipment for the fall. This equipment included a SMART Board

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[8] 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). *Smartboards, literacy, and differentiated communication: Out of the box integration.* Presentation at the 2008 Bridges to Learning Conference. May 2008, Toronto, ON. "Necessary for some, good for all" in best practice.

along with a variety of application software and AAC tools[9]. This equipment was considered essential to augment and assist not only communication, but *meaningful educational and social participation in the classroom setting for the student with a severe disability*.

Student achievement and participation with peers in large and small group instruction were tracked from September 2008. In addition to the 10 students who had been identified for SEA grants, data were collected on an additional 6 students in those same classrooms who also had significant learning challenges. Teachers, related school staff, and administrators were interviewed and completed questionnaires designed to capture classroom and school-wide practices and experiences with this pilot. Questionnaires were completed by students' 2007-08 teachers (in June 2008 - Pre) and by their 2008-09 teachers in June 2009 (Post). Speech Language Pathologists, who had completed formal speech-language assessments on students in the 2007-2008 school year (prior to the implementation of Smart Inclusion), have now completed post-assessments.

The findings to date reveal the following[10]:

- Special needs students participated with peers in small and large group classroom activities to a greater degree in 2008-2009 compared to the previous school year.
- *All* students in the classrooms were highly engaged in classroom activities using Assistive and SMART Technology. Engagement was defined by teachers as "attentive, interested in activities, not disruptive, excited about learning."
- Teachers reported that they were doing "more teaching, less behaviour management" *with the entire class.* There were significant decreases in referrals to the school office and serious behavioural incidents for several students (including some of the Smart Inclusion target students) whose behaviour had significantly impacted classroom participation and learning in previous years.
- Special needs students were not only more engaged and participating to a greater extent in classroom activities with peers, but teachers felt students were meeting their Individual Education Program (IEP) goals sooner than expected*.* Some teachers made more adjustments to the IEPs than they felt was typical compared to their past practice.
- Standardized language assessment pre- and post-data available for 8 students to date reveal that all students demonstrated growth in their speech and language skills; all students' communication skills had improved to a greater degree when compared to growth over previous years[11].
- Teachers felt that diagnostic and on-the-spot assessments were enabled and helped inform their programming (i.e., precision teaching).

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[9] For most of these students, AAC and some specialized software was already in use, purchased under a previous SEA grant.

[10] For a more detailed review of results, please contact Alison Inglis or Alexandra Dunn @ucdsb.on.ca.

[11] All Smart Inclusion students have been on SLP caseloads for several years.

- Classroom teachers began using what was previously thought to be "special needs" software with *all* students during both small *and* large group instruction.
- Principals reported in interview that piloting the project in a small number of classrooms throughout the district created "proof of concept", enabling them to plan on taking "the calculated risk" of integrating Smart Inclusion theory and technology into more classrooms within their schools.

Inclusion is a school reform issue, not a special education issue. Indeed effective schools seem to develop, "an ecology of inclusion" (Dyson, Polat, & Farrell, 2004; p. 14). The Smart Inclusion project seems to be developing effective and inclusive pedagogy within participating classrooms. Moreover, the project is "infecting" or having a ripple effect on other classrooms within and across schools. In many cases entire schools have begun to talk about pedagogy, participation, and inclusion. Teams are working collaboratively to transform schools into educational settings that "welcome everyone, all of the time, everywhere."

Smart Inclusion: What Next?

The results of the Smart Inclusion pilot project raised a number of important questions worthy of further investigation:

1. Understanding and adopting technology (i.e., SMART board, AT, AAC) by teachers in inclusive classrooms appears to lie along a continuum. What is the nature of this continuum? What are the characteristics of each step in the continuum? What factors contribute to teacher movement from one step to the next along the technology adoption continuum.
2. The Participation Model includes identifying levels of student participation, integration, and independence[12]. Teacher understanding and identification of these levels lies along continuums. What is the nature of these continuums? What are the characteristics of each step in the continuums and how are the continuums related? What factors contribute to teachers' decisions to move students from one level to another along these continuums?
3. What is the relationship or interaction between these continuums (i.e., teacher's understanding and adoption of technology and levels of student participation within their learning communities)?
4. What is the role of teacher beliefs about disability and inclusion in adopting technology and supporting student's optimum participation in developing inclusive classrooms? How are these beliefs evidenced? What factors lead to change in teacher beliefs?

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[12] 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.

5. What education and training approaches and practices contribute to the movement of classrooms and schools along these continuums (technology; participation/inclusion; attitudes/beliefs)
6. How do these practices contribute to the development of supportive school communities where "everyone is welcome everywhere all the time"?

We are now following 38 more students under the Smart Inclusion "umbrella" but it is time to move beyond the pilot of one or two classrooms within a school, to whole schools whose focus is on "Inclusion for the 21st Century". We will be working closely with two schools who have equipped every classroom with SMART Technology and special needs software[13], to address some of the questions posed above. We will continue to focus on pairing assistive technology and training with support for effective inclusive classroom practice.

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[13] Classroom Suite 4; Boardmaker Plus; Clicker 5; Inspiration; Kurzweil; WordQ/Speak Q.

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