SMART™

White Paper

Reducing stress in the classroom
How interactive whiteboards and solution-based integration improve teacher quality of life

Introduction

While few would deny that teaching is a demanding profession, many would be surprised at how acutely stressed today's teachers have become. Current research paints a fairly bleak picture of the working conditions they face, despite efforts on several fronts to address workload and performance pressures. The causes of stress, however, are many and diverse. Like the aggregation of a ton of feathers, a multitude of contributing factors weighs heavily on the shoulders of today's teachers.

With stressors coming from all directions, no single panacea can entirely ease the burden on classroom teachers. However, current research shows that effectively integrated information and communication technology (ICT) may help alleviate some pressure related to task loads. Specifically, use of interactive whiteboards has been shown to positively influence the planning, delivery and revision of lesson material, resulting in decreased task times and workload, reduced anxiety and increased opportunities for teachers to pool scarce resources.

A comprehensive, solution-based approach to interactive whiteboard integration is necessary to ensure successful adoption and maximize benefits to teachers and students. In many cases, inadequate integration strategies exacerbate the very issues the interactive whiteboard was intended to resolve, by increasing pressure on individual teachers to learn and use new tools in an unsupportive environment. As with any ICT investment, appropriate training, resources and support are necessary to fully realize the inherent benefits of interactive whiteboards.

This paper draws on research from North America, Europe, Asia and Australia to evaluate teacher working conditions, to demonstrate the positive impact a well-integrated interactive whiteboard solution has on teacher workloads and stress and to share best practices for successful interactive whiteboard adoption within schools.

Stress in the classroom

While limited amounts of stress can have a positive influence on motivation and creativity, excessive pressure has an overwhelming and debilitating effect (Selye, 1974, as cited in Wilson, 2002). Unfortunately, classroom teachers experience far greater pressure than is beneficial.

Kyriacou defines teacher stress as "the experience by teachers of unpleasant, negative emotions, such as anger, anxiety, tension, frustration or depression, resulting from some aspect of their work as a teacher" (Kyriacou, 2001, p. 28).

The incidence of teachers experiencing high levels of stress is both a common and a widespread concern. Of the respondents to a 1995 teacher survey in Hong Kong, 61 percent reported teaching to be stressful (Oi-Ling, 1995). In Canada, 15–45 percent of teachers reported feelings of excessive stress and burnout (Leithwood, 2006). In the UK, 30 percent of teachers felt they had no time for a social life due to the demands of their work, 85 percent said excessive workloads were negatively affecting their home lives and 35 percent reported that their workloads left them exhausted and stressed on a daily basis (Bubb and Earley, 2004). In Scotland, 71 percent of teachers believed their jobs were ruining their health, causing symptoms such as mood swings and poor sleep patterns (Hill, 2008).

The high cost of stress

Occupational stress results in a variety of negative effects, including absenteeism, stress-related illness, high staff turnover and early retirement. With over half of all teachers in the UK having considered leaving due to stress (Hill, 2008), its effects have a huge impact not only on their quality of life, but on education planning and budgets as well. In 2004, a UK schools advisory service estimated that teachers missing work due to stress cost £19 million (Hill, 2008). Teacher turnover is also expensive, with estimated recruitment and induction costs for each new teacher at approximately £4,000 (Bubb and Earley, 2004).

Similarly in the United States, teachers disenchanted by stressful working conditions are taxing the education system (Dillon, 2007). As a result, an estimated 22 percent of new teachers leave the profession within three years (ED.gov, n.d.). According to the National Commission on Teaching and America's Future, the annual cost of high teacher turnover is estimated at US$7 billion (Carroll, n.d.).

Causes of teacher stress

Too much work and not enough time to meet the needs of all students are two constant themes in any examination of teacher stress. Most teachers are intrinsically conscientious and dutiful in meeting their students' learning needs, which drives them harder than all other external pressures (Forlin, 1998). The British Columbia Teachers' Federation in Canada lists the top five causes of teacher stress as "unmet needs of students, class composition, size of workload, attitudes of provincial government, and the inclusion of students with special needs" (Naylor, 2001, p.3). Similarly, a study of 900 secondary teachers in Ireland found the most-often-reported causes of stress were "workload, teaching classes with a wide ability range, and not having enough time to spend with individual students" (Irish Examiner Times, 2007). The UK's National Union of Teachers reported three of the top-reported causes of teacher stress were excessive working hours, excessive workload and increasing class sizes (NUT, 1999).

Not reaching every student
The perception of their inability to meet the needs of all their students is a common stressor for teachers, so any efforts to personalize or differentiate instruction while reducing preparation time will have a positive impact on reducing teacher stress.

While classrooms become increasingly diverse in terms of learning abilities and learning styles, first languages spoken, socio-economic status, cultural backgrounds and mental, physical and behavioral challenges, teachers are simultaneously challenged to assume greater responsibility for the customized education of each student (Forlin, 1998). Government legislation and achievement standards heap additional layers of responsibility and pressure to the day-to-day responsibilities of all educators, including classroom teachers. Further, the more schools are expected to demonstrate progress and meet specific targets for achievement, the heavier the demand on teachers' time (Naylor, 2001).

Heavy workload

Teachers generally work more than 50 hours per week, with averages of 50 hours per week in the U.S. (NEA, n.d.), 51.8 and 50.8 hours per week, respectively, for primary and secondary teachers in the UK (Bubb and Earley, 2004), and 55.6 hours per week in Canada (Price, 2005). In the UK, teachers spend an average of 12.9 to 14.8 hours per week on lesson preparation and marking, with an additional 3.6 to 6.1 hours on general administrative duties. Approximately 25 percent of teachers' work time occurs outside the standard workday (Bubb and Earley, 2004). In Canada, teacher workdays are close to double the hours of the regular school day (Naylor, 2001).

Ineffective technology-integration strategies

In addition to the rigors of classroom teaching and lesson preparation, it is important to note that without sufficient training, resources and support, even the most helpful technologies can cause additional stress for busy teachers. While any kind of change brings with it a degree of apprehension and anxiety, according to Bitner and Bitner, "using technology as a teaching and learning tool in the classroom does so to an even greater extent since it involves both changes in classroom procedures and the use of often-unfamiliar technologies" (Bitner and Bitner, 2002, p. 96). Without adequate training, access to resources, professional development, technical assistance and supportive leadership within the school, adding the time and effort to learn about and use a new technology is a daunting task for teachers with already heavy workloads.

How interactive whiteboards help reduce teacher stress

Current research does suggest that, when integrated effectively, technology can reduce teacher stress. In general, access to online resources, saving and revising digital lessons and sharing them with other teachers are, in many cases, reducing planning and preparation time for teachers, particularly those in primary schools (Kitchen, Finch and Sinclair, 2007). Additionally, while interactive whiteboards provide time-saving benefits in lesson planning, preparation and delivery, they also help teachers differentiate instruction by focusing on the unique needs of individual students. In a study conducted at the University of Virginia, interactive whiteboards were also shown to relieve stress and anxiety in pre-service mathematic teachers (Fraser, Garofalo and Juersivich, n.d.).

Shorter preparation time

In a setting in which the majority of teachers report spending 84 percent more time on records and 64 percent more time on preparation than ever before (Wilson, 2002), teachers widely acknowledge that ICT has a positive effect on productive time, notes the British Educational Communications and Technology Agency (BECTA) in its *Harnessing Technology in Schools Survey 2007* (Kitchen, Finch and Sinclair, 2007). The report notes that 74 percent of primary teachers felt ICT saved time in lesson planning, and 54 percent felt it also saved time during lesson delivery. About half of secondary teachers reported time savings using ICT in lesson planning and delivery (Kitchen, Finch and Sinclair, 2007).

More specifically, roughly half of the respondents surveyed felt they saved time using online resources, with an additional 15 percent of primary teachers and 11 percent of secondary teachers reporting that these resources saved them more than two hours per week. And 55 percent of primary teachers and 44 percent of secondary teachers felt interactive whiteboards saved them time, with 15 percent in both groups reporting that interactive whiteboards saved them more than two hours per week (Kitchen, Finch and Sinclair, 2007).

	Lesson planning (%)		Lesson delivery (%)		Assessment (%)		Record keeping (%)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Save more than 2 hours	22	16	10	11	8	8	5	9
Save 1–2 hours	26	13	18	15	12	12	12	11
Save up to 1 hour	27	19	26	24	26	24	28	22
Does not make a difference	17	33	40	44	48	42	49	40
Lose up to 1 hour	5	7	5	4	5	9	5	12
Lose 1–2 hours	2	7	*	2	1	3	1	4
Lose more than 2 hours	2	6	1	1	1	2	1	2
Total: save time	**74**	**47**	**54**	**50**	**45**	**44**	**45**	**42**
Total: lose time	**9**	**19**	**6**	**6**	**7**	**14**	**7**	**18**
Base: all teachers who used ICT for each task	598	1,111	596	1,119	541	997	546	1,062

Time currently saved or lost by using ICT for different tasks (Kitchen, Finch and Sinclair, 2007, p. 98).

Also within the report are findings on teachers' expectations of time savings or losses through the use of ICT over the next 12 months. While the results demonstrate positive expectations of ICT from both primary and secondary teachers, primary teachers were somewhat more optimistic than their counterparts in secondary school, with 64 percent of primary teachers and 53 percent of secondary teachers expecting online resources to save them time. Only 9 and 12 percent of the same groups, respectively, expected to lose time by using these resources. Similarly, 62 percent of primary teachers and 41 percent of secondary teachers expected time savings through using interactive whiteboards, while just 10 and 11 percent of respondents, respectively, felt they would lose time (Kitchen, Finch and Sinclair, 2007).

Simplified resource sharing

In *Managing Teacher Workload: Work-Life Balance and Wellbeing* (2004), authors Bubb and Earley recommend sharing online and peer-created lessons as a starting point for saving time in lesson preparation. They note that when teachers teaching the same grade take a team approach to lesson planning with ICT, the results reduce workload and produce better ideas (Bubb and Earley, 2004). They provide the following as one example of how it can work:

> Kemnal Manor in Bromley has interactive whiteboards (IWBs) in each classroom. The IWBs are connected to the Internet and the teacher's laptop. The teacher prepares all their lessons on their laptop and saves the lessons on a shared drive. This saves teacher time by sharing resources and planning. For example, there are 12 science teachers but each teacher only has to prepare one in 12 lessons as they are all shared (Bubb and Earley, 2004, p. 82).

In teaching environments that incorporate interactive whiteboards, teachers' ability to save and revise lessons year after year provides a key advantage in saving time and increasing the quality and efficiency of lesson planning. In a two-year study of 12 secondary mathematics departments, researchers in the UK noted that saving lesson materials "meant that basic lessons could be refined from class-to-class or year-to-year, in light of changing pupil need and context" (Miller, Averis, Door and Glover, 2005, p. 16). The participants also shared the general view that interactive whiteboards gave them the ability to "generate

efficient and more effective learning [through] tighter planning and the implementation of lesson plans" (Miller, Averis, Door and Glover, 2005, p. 13). This advance planning was felt by the teachers surveyed to provide "greater freedom to attend to individual needs during [lessons]" (Miller, Averis, Door and Glover, 2005, p. 13), helping teachers reach their students more effectively.

A study entitled *Enhancing lesson planning and the quality of classroom life: A study of mathematics student teachers' use of technology* (Fraser, Garofalo and Juersivich, n.d.) conducted at the University of Virginia on the use of SMART Board™ interactive whiteboards among pre-service mathematics teachers (PSMTs) drew similar conclusions:

> Because the lesson is digital, re-ordering or correcting aspects of the lesson is easy and not very time consuming. The ease of putting comments in the lesson for future reference is also an advantage. A second advantage is being able to easily update and adjust lessons accordingly to how students responded and to annotate for other teachers to use. Adding slides, as well as reordering slides to accommodate different classes is quick and efficient. All of these advantages deal with the edit-ability of digital media (Fraser, Garofalo and Juersivich, n.d., p.14).

The PSMTs used interactive whiteboards to reuse and share complete lessons, noting both the ease of use that storyboarded lessons afforded and finding them easier to store and locate than non-digital materials. They used the interactive whiteboards to set up and solve equations once, reusing the examples for several periods of the same class. Later, these examples could be saved and posted to the network for absent students and for use by the other teachers. The PSMTs reported that this feature saved them significant time (Fraser, Garofalo and Juersivich, n.d., p.13–14).

Reaching students more effectively

While preparing interactive whiteboard lessons in advance and sharing lessons and resources with their peers may free up teacher time to meet the needs of individual students, the ability of the technology to facilitate the inclusion of various types of media within a lesson also addresses the needs of multiple learning styles and abilities. The multimedia capabilities of interactive whiteboards simplify the creation of a "multimodal port, giving teachers the potential to use still images, moving images and sound, and when used this way, it can address the needs of learners who find text difficult as the only mode of communication" (Somekh, et al., 2007, p. 6). So not only do teachers have more time to spend with individual students, but they can be more confident that their interactive, multimedia-rich lessons better meet the needs of the various learning styles and capabilities within their classrooms.

The PSMTs at the University of Virginia reported on the ease with which they were able to use SMART Notebook software to incorporate a variety of resources into a single file (Fraser, Garofalo and Juersivich, n.d.). This encouraged the creation of comprehensive lesson plans that included image files, videos, links, diagrams and other objects pasted into the software.

One of the student teachers used Notebook software to insert photos of local neighborhood roofs to provide context for a lesson on slope (Fraser, Garofalo and Juersivich, n.d.).
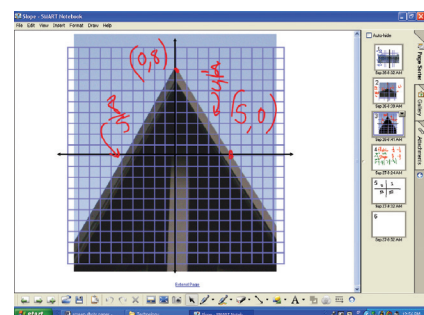
Lesson on slope presented using SMART Notebook software (Fraser, Garofalo and Juersivich, n.d.)

Another PSMT, in a lesson on the law of sine and cosine, incorporated a video clip from the TV show Lost into a lesson created using Notebook software:

> In the video, the pilot of a downed plane headed from Sydney, Australia to Los Angeles gave information to other surviving crewmembers about the plane's travel time and direction prior to crashing. The pupils' job was to locate the survivors by reconstructing their irregular flight pattern using the information presented in the clip. The PSMT placed a link to a Geometer's Sketchpad file that contained a map of the situation. The PSMT further included internet links (e.g., Expedia and Boeing) that provided realistic data on the plane type and speed used in this travel to help in this computation.... The pupils then used this information and previously learned trigonometry to establish the location of the survivors (Fraser, Garofalo and Juersivich, n.d., p.9).

Because the interactive whiteboard software simplified the inclusion of multiple types of media within a single lesson file, the participants had greater freedom to address different kinds of content within the lesson. Being able to keep all their digital resources literally at their fingertips enabled teachers to switch between sources quickly and easily (Fraser, Garofalo and Juersivich, n.d.).

Increased sequencing flexibility and pace
Interactive whiteboards can facilitate differentiation through the sequencing flexibility they provide in lesson delivery. SMART Notebook software enables teachers to tailor their instruction to the needs of students at any given point in a lesson. Should students grasp a concept quickly, teachers can cycle more rapidly through lesson slides to progress. If the converse is true, teachers can adjust the pace accordingly or go back to an earlier slide to provide additional explanation or review concepts. Notes and examples saved in digital ink remain visible and can be referenced at any time.

In terms of pace, having a variety of digital resources readily accessible at the board enables teachers to increase the tempo of instructional delivery, saving time otherwise spent laboriously writing out notes or switching between various types of media equipment. Transition times between lessons are also reduced, making for a smoother flow of instructional material (Bennett and Lockyer, 2008). By eliminating downtime within lessons and during lesson transitions, teachers increase efficiency and make better use of their classroom time.

Reduced anxiety
New teachers may struggle with aspects of classroom management. Keeping students on task and discussions on track while accomplishing lesson goals can be a challenge to many. Research indicates that using an interactive whiteboard to create and deliver lessons can relieve some of the anxiety of being in front of a class.

The University of Virginia PSMTs reported that having detailed lessons on the interactive whiteboard gave them a sequence to follow and helped maintain their focus while teaching (Fraser, Garofalo and Juersivich, n.d.). Simply having this plan eased the stress of being at the front of the class, and helped the new teachers remember lesson material while keeping students on task. If discussions or disturbances interrupted the planned flow of the lesson, the PSMTs used the interactive whiteboards to regain focus and move forward by tapping on the slides. They therefore viewed the interactive whiteboard as an important tool for coping with their anxiety (Fraser, Garofalo and Juersivich, n.d., p.10).

How solution-based integration ensures successful adoption and reduces stress

While we have seen evidence supporting the assertion that interactive whiteboards reduce several key points of stress for teachers, a systematic and thoughtful approach to integrating technology is necessary for educators to adopt interactive whiteboards effectively within their classrooms. Simply installing the board and software is not sufficient, as educators themselves are the "critical agents" who mediate and integrate the technology into the goals of a particular lesson, and ultimately ensure that interactions with the interactive whiteboard are of relevant benefit to students (Armstrong et al, 2005).

Complicating matters further is the multifaceted and complex nature of the technology-adoption curve. For example, the International Society for Technology in Education's Level of Technology Integration framework lists six levels of integration: non-use, awareness, exploration, infusion, integration (mechanical), integration (routine), expansion, and refinement (ISTE, 1995). Progression through these levels is accompanied by changes in instructional curricula, and by a gradual change in instructional focus from teacher-centered to learner-centered as teachers become more sophisticated users of the technology in question (Moersch, 1999).

To be truly successful with interactive whiteboards, teachers require technical training and support, peer mentoring, educational resources and professional development opportunities – in other words, they benefit most from a solution-based approach to interactive whiteboard integration. When elements of the solution are missing, time- and attention-strapped teachers may struggle to integrate even potentially helpful tools into their teaching arsenal.[1]

Key elements of a complete solution

When school administrators consider purchasing or standardizing on a particular type of interactive whiteboard, close examination of several elements prior to decision making can help avoid undue stress and aggravation – and maximize success – later in the integration process.

Strong product

The first consideration, and perhaps the most obvious one, is the product itself. Important features of an interactive whiteboard are high-quality manufacturing and dependable performance, versatile and intuitive operation and compatibility with a range of complementary products, including response systems, software and document cameras. An interactive whiteboard must be easy to learn and use, reducing the need for busy teachers to spend additional time and effort in learning to navigate using an unfamiliar or unintuitive interface. Quality and versatility are also key considerations, as these attributes reduce barriers to adoption and ensure the technology investment continues to succeed over time.

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1 For more information on how to ensure effective interactive whiteboard adoption, see the *Administrator's Guide to Implementing Interactive Whiteboards* (www.smarttech.com/pub/ ImplementationGuide.pdf).

Solid service and support

Accessible and knowledgeable technical support, available in person or via phone, e-mail, chat or online self-service, is another important component of a complete solution, as are solid product warranties, product updates and notifications and online user guides. Manufacturers that offer accessible, helpful technical support and a full complement of user and training materials demonstrate a commitment to assisting new users, and do their part to remove roadblocks to adoption. Finally, a global network of authorized resellers, customer service representatives and specially trained integration consultants provide additional support for complete integration.

High quality content and resources

Interactive whiteboards that come with complete or easily assembled and modifiable lesson templates, correlated to relevant curricula, support teachers as they incorporate the technology into daily lessons and facilitate effective adoption. Products loaded with copyright-cleared images, videos and animation, customizable tools and templates and question sets and quizzes help teachers get up and running with the technology quickly. Interactive whiteboards that are compatible with a wide range of educational software also ease integration by enabling educators to use programs they are already familiar with. Finally, a sophisticated range of publications with classroom ideas and relevant articles afford another avenue for learning and inspiration, increasing teacher confidence and supporting educators as they gain expertise.

Effective professional development and an established user community

Effective training is critical to ensuring the interactive whiteboard will be put to use in the classroom. And, while technical proficiency is important in technology adoption, equally necessary is an understanding of how best to apply the technology to maximize its advantage for students. A manufacturer with a mature and diverse offering of training materials and delivery methods provides the options necessary for busy teachers to fit training and development into their schedules. A wide selection of materials, such as online training resources, exchange forums, TeacherTube and YouTube tutorials, distance and on-site training and peer-education and recognition programs, provide the varied and accessible options necessary for promoting successful integration.

As an established leader in interactive whiteboards for education, SMART offers a full range of resources for educators and administrators.

Benefits of choosing SMART

In 1987, SMART invented the interactive whiteboard and has remained the industry leader ever since. This history has enriched SMART Board interactive whiteboards with more than 20 years of experience in meeting the needs of teachers and students.

SMART Board interactive whiteboards have flexible, intuitive features that help teachers and students adapt to the challenges of today's classroom while enriching learning for all. Through active collaboration with teachers and students, SMART ensures its products provide the best user experience possible, and each new version of hardware and software incorporates the suggestions from classrooms around the world.

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2 For further information on important elements to consider when purchasing technology for schools, see *Your Guide to Buying Educational Technology (*www.smarttech.com/pub/BuyersGuide.pdf).

SMART supports its products through comprehensive training programs and materials, professional development programs and thousands of standards-correlated lesson activities and resources. Technical support is provided to customers 24 hours per day, and SMART products are backed by solid warranties. SMART integration consultants are also available to share their expertise and ensure an investment in SMART products is embraced by teachers and students.

Conclusion

Current research indicates that interactive whiteboards enable teachers to reduce two of the major causes of stress – heavy workloads and the inability to meet the needs of all students. Interactive whiteboards decrease demands on teachers' time by helping them make planning and preparation more efficient and by encouraging resource sharing among peers. Teachers also save time transitioning between lesson resources and topics when using interactive whiteboards to present learning materials.

Because interactive whiteboards appeal to all the senses, facilitate the inclusion of a variety of media and provide the means to edit and adapt digital lesson material quickly and easily, they also help teachers personalize learning and reach more students more effectively. Teachers and their students can further adjust lessons through the added flexibility in sequencing and pacing that interactive whiteboards provide. Having lessons storyboarded on interactive whiteboards for reference may also ease the anxiety new teachers experience when standing in front of classes for the first time.

However, in order to realize these benefits, teachers and administrators must work together to ensure that the adoption of interactive whiteboards is supported by appropriate levels of training and access to resources. Simply installing interactive whiteboards without a support system in place only adds more pressure on teachers to conform to already-high service expectations. Approaching interactive whiteboard purchasing from a solution-based perspective helps ensure that the technology is adopted more rapidly and deeply, resulting in maximum return for both teachers and students.

Further Resources

Your Guide to Buying Educational Technology (www.smarttech.com/pub/BuyersGuide.pdf)

Administrator's Guide to Implementing Interactive Whiteboards (www.smarttech.com/pub/ImplementationGuide.pdf)

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