▲ Billy and the SMART Board™

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Bill is a special-assignment teacher attached to the ITS department of the Hastings and Prince Edward District School Board. His areas of interest are interactive whiteboards and software for mathematics education.

(The principal character, Billy, is a fictional composite of several classroom teachers who have collectively had these revelations. The focus of the article is on how a number of teachers, as personified by the singular 'Billy,' leveraged certain features of interactive whiteboard software to create learning artifacts for later review, reflection, and analysis in order to provide feedback to students and shape future instruction.)

When Billy's SMART Board™ was installed in his room, he was ecstatic. Finally, he could bring the world into his classroom! The Winter Olympics were about to happen, so he quickly found out how he could bring in streaming video to keep his class up-to-date, access and use "Google Earth" for virtual field trips to the Winter Olympics venues, create a collaborative spreadsheet of results with his students, and study Olympic-themed graphs with some cool lessons he found on the "SMART Exchange." But he became interested in how to use technology to collect information for assessment purposes.

One day, Billy was working with a group of Grade 3 students, looking at ways to represent given amounts of money. He decided to let groups of students make up the amounts of money they wished to represent to keep the question open. To further challenge their thinking, he asked each team to represent its money amount using two different sets of coins.

His learning goal was that students would recognize that there are many ways to represent numbers, in particular, that there were many ways to represent a given amount of money. He created a one-page SMART Notebook™ file, with all of the coins shown (each one once) down the left-hand side of the page. He applied the infinite clone tool to each coin image, so that he could call up as many coins as needed.

Show two ways to make $_____.

He decided it would be useful to duplicate that page. This would yield a page or two for the "minds on" portion of his three-part lesson and his demonstration to the class, as well as an extra page for unexpected events. At the time, he didn't consider that the students would show their solutions on the board as well!
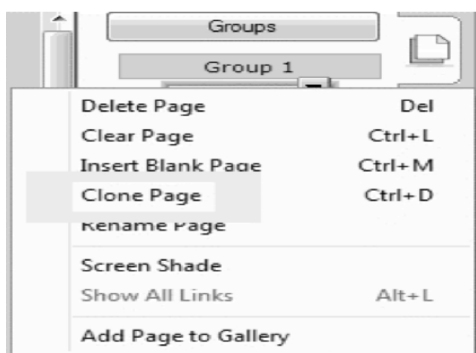
So, he clicked on the thumbnail of that one page (he went to the page sorter, clicked the thumbnail, and accessed the drop-down list). He used the option to "Clone" that page to make an exact duplicate of his first page, with all of the coins in the clone also having the infinite clone option he'd previously set up. This he repeated once again so that he had three identical pages. After saving the file, he was ready to begin.

When the class was gathered, he used page 1 to recall previous learning. Students named the coins, their absolute values (in cents), and their various relative values (e.g., "two nickels have the same value as a dime"). He then went to page 2 to demonstrate the problem for that day. A brief discussion yielded the amount $4.88 as the target value for the problem. Using a "think aloud" technique, he carefully dragged out clones of a couple of toonies, three quarters, a dime, and three pennies. Then he asked the class for suggestions about another way he could represent the same amount. Based on suggestions from various people, he again dragged out various coins to total $4.88, adding aloud as he went.

After a brief pause to reiterate the directions to students, he showed page 3 to them and challenged them to choose an amount of money to represent, and to do so in two ways. Students returned to their desks and worked in pairs with their plastic coin sets to build their solutions.

It hit Billy as they began working: *"Why not clone 'page 3' as many times as I have groups?"* This would then allow each group to show its solutions on the white board. This he quickly did, then moved to supervise and observe student work and conversation. During his math congress, each team had its own opportunity to show its work. Students were delighted they could do the manipulating themselves, doubly so, when they were able to sign their names to their "own" pages. Billy promised them he would print out hard copies of their pages for their portfolios. Excitement that day knew no bounds!

At the end of the period, another revelation struck Billy: *"What if I saved this file so I have an electronic record of what we did today?"* This he did, by simply using *File > Save As...*, and adding a suffix to the original file name with a new date. He reasoned that calling up this particular version of the file next time he taught that group would help students recall the previous day's efforts, and provide a nice bridge into the succeeding lesson.

That evening, when planning the exact details of the next lesson, it struck him that it seemed most groups solved the problem as he'd hoped; however, there was a nagging feeling that he couldn't shake. Yet another light flashed on in his mind: "*Why not access the file I made today to be sure?"* He was able to quickly do so, and in reviewing the students' answers, realized what was nagging him: most had endeavoured to find answers involving the fewest number of coins. While this was fine, he wondered if they had really challenged themselves enough. So, he opened his original file, and removed a few key coins (saving this revised version with its own suffix). This revised file would be used the next day to provide the challenge he'd hoped would have occurred the first day.

What did this have to do with assessment? Because Billy was able to save the students' work quickly and easily, he was also able to access it efficiently and use the artifacts to drive the focus for the next period's instruction and activity. In reviewing his artifacts, he was looking to see how well the students were applying the notion that money amounts had many representations. Here, his assessment was not geared to any particular individual, but to the group as a whole; nonetheless, the

fact that he was able to save and recall artifacts meant his approach was driven by formative assessment.

A little while later, Billy was asked to work with a group of intermediate-level students who needed practice simplifying simple linear equations. It struck him that the white board had some recording tools he could use so that he could obtain artifacts of not only the students' products (i.e., the completed solutions), but also their processes. Being able to capture both the steps taken, as well as the final solutions, without his having to look over their shoulders, would enable him to focus his efforts on facilitating conversation with students. Reviewing the recordings could wait until later that day.

After opening up a blank SMART Notebook™ file, he clicked the "Properties" tab for page 1. There, he had access to a page recorder at the click of a button. After briefly describing the steps for recording a page to the students, he asked for a pair to come up to the board, select an equation, and solve it on the board. The only thing each pair of students had to remember to do was tap the "Start Recording" button before beginning to write, then tap "Stop Recording" when finished (as well as add a new blank page for the next pair).


The class went well: pairs went to the board in turn, each pair recording its entire process on a new blank page. Billy was able to spend his entire time coaching the students at their seats; aside from occasional glances at the white board to see how things were going, he was able to ignore what was being produced and captured on the board. At the end of the period, he saved the file for later assessment for learning.

That afternoon, after dismissal, he retrieved the file, and reviewed each pair's work. Because the "Page Recorder" tool works within SMART Notebook™, everything was in one easy-to-find place. The Notebook file had a recording on each page of the file, one for each team. He opened each page and critically reviewed

what he saw. He noted that one pair, Liam and Will, had a clear, efficient process, but showed a need to take better care with simple calculations. That point was duly noted for mention to them during the next class. Many of the teams had arrived at solutions without showing all steps necessary to clearly show their processes. This Billy also noted, for general discussion with the group as a whole.

Here, again, is an example of how Billy was able to capture artifacts of student learning for later review and timely follow-up with students. The only thing lacking was audio: Billy realized that seeing the process was only part of the picture necessary to fully assess what the students were thinking. The addition of audio to the recording process would allow him to capture math talk, as well as see what was going on.
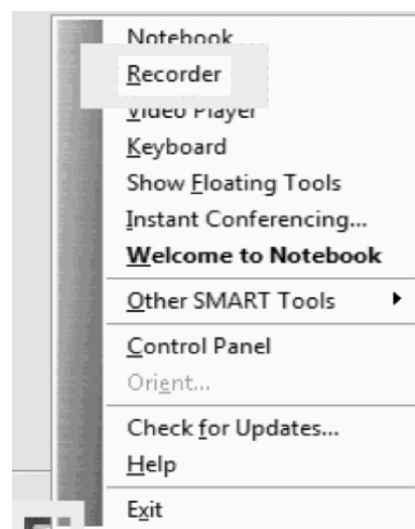
By clicking the "SMART icon" in his system tray (down by the clock) he accessed a pop-up menu, with one feature (the second form the top) being "Recorder." The recorder operated separately from SMART Notebook™ and produced (by default on his system) a .wmv file, playable in one of several media players available to him.

He plugged a long jack cord into the computer running his board; the microphone was hung from the projector arm, so as to be above the students' heads as they worked.

The next day, he was able to provide feedback based on his review of the previous day's artifacts. The only new twist in the class was the use of the recording tool. Each group was shown how to access the "Recorder" from the system tray, and how to save their own recordings. On this occasion, things progressed sufficiently quickly that there was time to play some of the recordings with the students still present.

Having picked one .wmv file at random (or, at least as randomly as possible under the circumstances), he began playing the media file. Within seconds, the students whose video was being shown were asking for a re-recording session, having noted (without teacher prompting) a couple of glaring errors. Billy facilitated a discussion about what errors they noted, and how they could address those errors next time around. Thus, using a media file containing the math talk, as well as the visual record of the process, students were afforded the opportunity to self-assess.

So, in the course of one week, Billy had used his interactive white board tools to produce static, video, and audio/video artifacts of student process and products. This enabled him to efficiently:

- obtain current assessment information about both groups and individuals, so that his student data were reflective of a variety of undertakings in non-paper-pencil fashion
- provide timely feedback to students
- have a comprehensive artifact to share with colleagues

When discussion of the *Growing Success* document began in his school, Billy was already equipped with a few tools to help applying several of its fundamental principles. Having existing skill using SMART Notebook™ capture tools to create learning artifacts helped him provide advice to others in supporting the implementation of this foundational directive.

References

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