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# Capitalizing on Emerging Technologies: A Case Study of Classroom Blogging

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*The challenge many teachers face is how to incorporate new technology into their classrooms that strengthens classroom learning by capitalizing on students' media literacies. Blogs, a new and innovative technological tool, can be used in math and science classrooms to support student learning by capitalizing on students' interests and familiarity with on-line communication. This study explores the emerging blogging practices of one high school mathematics teacher and his class to explore issues of intent, use, and perceived value. Data sources for this case included one year's worth of blog content, an interview with the facilitating teacher, and students' perceptions of classroom blogging practices. Findings indicate that (1) teachers' intentions focused on creating additional forms of participation as well as increasing student exposure time with content; (2) blogs were used in a wide variety of ways that likely afforded particular benefits; and (3) both teacher and students perceived the greater investment to be worthwhile. The findings are used to critically consider claims made in the literature about the potential of blogging to effectively support classroom learning.*

Mathematics and science education standards (NCTM, 2000; NRC, 1996) call for mathematically- and scientifically-rich curricula where technology is an essential component of the learning environment. Indeed, today many new, unique, and powerful technologies are available for teacher to use in support of their students' learning (e.g. Neiss, 2005; The New Media Consortium, 2007). Among these technologies, web logs ("blogs" hereafter) seem especially promising as tools to support collaborative and reflective learning.

Indeed, the use of blogs for instructional purposes is beginning to emerge in a variety of instructional settings (Richardson, 2003). However, our recent search (August, 2005) for *classroom blogs* (i.e., blogs attached to a specific K-12 class or course) resulted in the identification of only 17 such blogs; furthermore, only 4 of these blogs were developed by high school math or science teachers and showed a high level of students contributions to the blog. It seems important, therefore, to make more math and science teachers aware of the potential, as well as limitations, of blogging to support their pedagogical goals.

The purpose of this case study is to explore the intent, use and perceived value of one high school classroom blog in order to provide concrete images of how blogs have been and therefore can be used in secondary math or science classroom to capitalize on students' comfort and interest in new media communications technology to support their classroom learning.

## Literature Review

Blogs are frequently updated webpages with a series of archived posts, typically in reverse-chronological order. Most blog posts are primarily textual, but they may contain images, photos or other media content. Also most blogs provide hypertext links to other Internet sites, and most allow for audience comments (Nardi, Schiano, & Gumbrecht, 2004). Adolescents make up a large percentage of those who currently have blogs (51.5% of all blogs being developed and maintained by individuals ages 13-19, according to a study by Perseus Development Corporation (Henning, 2003). Knowing that blogging is a potentially engaging and valued means of communication among teens, it seems especially worthwhile to consider the potential of using blogs in secondary school instruction.

Much has been written about the potential of blogs to support learning (e.g. Carlson, 2003; Downes, 2004; Ferdig & Trammell, 2004; Huffaker, 2005; Martindale & Wiley, 2004; Poling, 2005; Richardson, 2003), including their ability to 1) promote reflective thinking; 2) nurture collaboration and relationship-building; 3) increase perceived accountability and therefore quality of student work; 4) encourage peer support for one another; 5) increase opportunities for students to receive feedback; 6) extend learning outside classroom walls; and 7) allow and encourage interactions with experts and others outside of the classroom. These claims and others made in the literature about the learning affordances of classroom blogs will be explored in detail

and critically considered at the close of this manuscript in light of the findings of this study.

Though much has been written, little of what is published is empirically-based and even less of that work has been peer-reviewed. In addition, typical of the trajectories of many technologies as they make their ways into schools, early experimentation has occurred primarily in higher education. Though these claims are thoughtful, insightful and compelling, it is clearly important to consider the implementation issues and impact of classroom blogging that are *unique* to in a high school learning context. The purpose of this case study, therefore is to make this contribution by exploring how one high school mathematics teacher effectively integrated classroom blogging into the central, disciplinary work of the class. Thus, the research question focusing our work is "How does one high school mathematics teacher, Mr. K., capitalize on blogging affordances to enhance classroom-based instruction?" To answer this question we first focus on *use* by describing the variety of activity structures designed and implemented by Mr. K. to capitalize on the affordances of blogging. Second, we focus on both *intent* and *perceived value* of these classroom blogging practices by reporting on the results of an interview with this teacher blogger. Finally, we critically examine the claims made in the literature by comparing them with the findings of this study.

## Methods

### Data Collection

As the focus of this study was to understand how teachers used blogs as pedagogical tools, classroom blogs first had to be located. Several major search engines were used to look for classroom blogs including google.com, yahoo.com, and dogpile.com. A variety of search terms were used to find classroom blogs including classroom blogs, school blogs, teacher blogs, student blogs, education blogs, educational blogs, science blogs, and science classroom blogs. In reviewing literature, several other websites were found that were specific to classroom blogging and those sites were also searched. Those sites included weblogger.com, weblog-ed.com, schoolblogs.com, and blogger.com. The search resulted in the identification of five "classroom blogs." "Classroom blog" was defined as a blog attached to a specific section of a specific class. This extensive search resulted in the identification of 17 classroom blogs. Blogs from this list were selected for potential inclusion in this study based on these criteria:

(1) created and maintained by high school teachers; (2) frequently updated (several times a week); (3) high levels of student contribution and involvement (defined as the students' voice being the predominant voice); and (4) publicly available to afford access to the different ways the blogs were being used. Four classroom blogs met these criteria. The two blogs whose teacher facilitators were available for interview became the focus for the larger study (for findings from the full study, see Luehmann, 2007a; b). One of these two cases was selected for the purposes of the investigation reported in this paper based on three factors: 1) As a veteran teacher and a second semester blogger, this case represented a more advanced considering of blogging practice than the other case; 2) this case represented innovative integration of additional technological tools as part of their blogging practice; and 3) through the interview, the teacher of this case made unexpected yet very valuable student perceptions of classroom blogging available for consideration.

Given the above criteria, the blog chosen as the focus of this study is a mathematics (Pre-Calculus) blog, <http://pc30s.blogspot.com/>, created by Doug Kirk (pseudonym, referred to as Mr. K. hereafter), a veteran teacher in Winnipeg, Manitoba. This blog is for his eleventh grade Pre-Calculus class but he also has blogs for his two other classes, Pre-Calculus (10th grade) and AP Calculus. Once the blog was selected, the entire school year blog posts were read. To afford a more in-depth analysis, Mr. K. was asked to recommend one curricular unit of blogging he felt best represented his diverse classroom uses of the blog. Mr. K's blog for the Analytical Geometry unit lasted 27 days (October 25, 2005-November 20, 2005). In this time period there were 1,292 lines of text written on the blog; 30 posts by students; 11 posts by Mr. K; 26 comments from students; and 3 comments from Mr. K. Each blog was printed out for the given time period to ensure that none of the information could change during the time of analysis.

In addition, a structured interview with Mr. K. was conducted to assess his primary intentions and goals for integrating blogging into his classroom instruction. Interview questions were created based on a brief overview of the blog and the literature reviewed. The interview with Mr. K was conducted on the computer through a program called Skype ([www.skype.com](http://www.skype.com)) on January 12, 2006. Skype allows one to make free long-distance calls though a cable modem. The type of interview was beneficial because Mr. K could direct me

**Wednesday, November 02, 2005**

**Next scribe**

Now I'm going to scribe about what we did in today's class. Today Mr K gave us equations were we had to fin the the intersects of to lines through graphs.

Then he showed us how to solve it algebraically.

$x = y + 3$	L1
$3x + 5y = 7$	L2
$3(y+3) - 5y = 7$	L3 sub. L1 into L2
$3y + 9 - 5y = 7$	L4 solve L3
$-2y = -2$	
$y = 1$	
$x = (1) + 3$	L5 solve L1 w. $y = 1$
$x = 4$	

The lines intercept at (4,1)

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for more complicated equations you would have to add or subtract line 1 from line 2.

$2x + y = 7$	L1
$3x - y = 3$	L2
$3x + 2x + y = 7 + 3$	L3 add L1 & L2
$5x = 10$	L4 solve
$5x / 5 = 10 / 5$	
$x = 2$	
$2(2) + y = 7$	L5 solve L1 w $x = 2$
$y = 7 - 4$	
$y = 3$	

The lines intersect at (2,3)

And for the more compicated stuff I haven't quite got yet so I'm not even going to try and put that in my blog cause who ever reads it will just get confused. so I'm done scribing and tomorrow's is.....Jennie\_s

posted by JonathonJ. @ [11/02/2005 05:15:00 PM](#) [1 comments](#) [links to this post](#)

Figure 1. Sample student scribe post.

to specific pages on his classroom blog or personal blog to further his points on certain topics. This allowed him to give me specific concrete example to back up his thoughts and ideas.

#### Data Analysis

The interview was transcribed including web-based references to resources Mr. K. discussed; then the blog was printed. Following the approach of qualitative data analysis outlined by Bogdan and Biklen (2003), the text was systematically searched and organized around emergent themes and ideas including aspects of 1) teacher intent, 2) classroom use, and 3) perceived value. The data were read through, initial codes were assigned, and data were read at least three more times to determine whether the emergent codes sufficiently and succinctly represented the data. If not, codes were adjusted and modified.

#### Findings from Mr. K's Classroom Blog

At the time of this study (during the 2005-06 school year), Mr. K. had been a high school math teacher for 13 years and was using blogs for the second semester

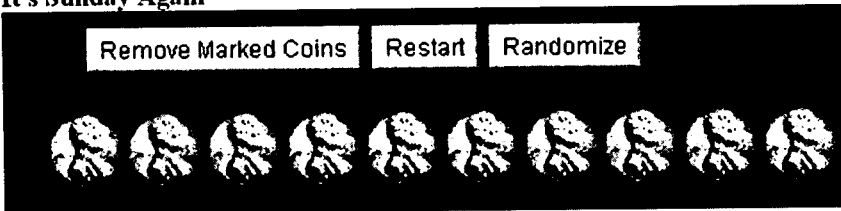
in his classroom. The classroom blog he developed specifically for his 11th grade Pre-Calculus class (which was publicly accessible on the Internet) provided rich examples of diverse ways a teacher could employ classroom blogging to support student learning. Mr. K's blog included the following key features:

*Scribe posts.* Mr.K. required each of his students to take a turn at writing a post that recorded what happened in class that day. Note that though student engagement in this activity was required, the specifics (length, content, style or format) were completely up to the student author's discretion. The resulting student-constructed posts often included notes, example problems, and highlights of class discussions. Student scribe posts for the Analytic Geometry unit range in length from 14 to 138 lines, with an average of 47.23 lines. The average number of embedded images (such as graphs or equations) per post is 3.46, and the average number of student comments per post is 0.85. See Figure 1 for an example of a shorter, less involved student scribe post. These posts were typically addressed to their peers and were replete with embedded graphs

**Posting Up (On time this Time)**  
Well, as this unit comes to a close and the test comes closer, everyone rushes to their computers to post before the test, so I'm taking my turn and doing it now.  
Well this unit has been interesting. The hardest part has probably been the time wasted drawing the outlines for the system solving. haha just kidding Mr. K. I understand that it's very important to do this. As well, we have to describe each step of the process. It's annoying but as the problems get harder the more clear it is that we have to do it. This way the teacher can follow your work easier and know what method your using, but more importantly if you make a mistake, you can go back and see where you messed up. The linear equations and circle problems were very easy.  
I also wanted to remind everyone to SET UP THE OUTLINE, DESCRIBE EACH STEP, and WRITE A SENTENCE for each problem involving systems otherwise Mr. K. won't mark it. So if you forget, the conclusion that Mr. K. can come to is that you didn't read this post.  
Well, good luck to all.  
  
Hope my reminders helped!

Figure 2. Sample student reflection post.

*Sunday, November 06, 2005*  
**It's Sunday Again**



In the game of Kayles a number of pins (or coins) are arranged in separate rows. A legal move consists of knocking down either one pin or two adjacent pins from the same row. This may break up the row into two smaller rows. Whichever player knocks down the last pin wins. What's the winning strategy for the game of Kayles?

[Play here](#). Discuss your winning strategies in the comments to this post ... and have fun doing it!  
posted by Mr. Kuropatwa @ [11/06/2005 05:19:00 PM](#) [2 comments](#) [links to this post](#) \_

[GraemeW](#) said...  
I seem to get beat every time. Is there a winning strategy?  
11/06/2005 9:17 PM


[AichelleS.](#)  
 said...  
that's a hard game lol  
11/06/2005 9:33 PM

Figure 3. Sample Sunday game post.

**Analytic Geometry Assignment**

Here it is!

If you need a little help with this stuff here is another tutorial for you. (Important: Gradient is another word for slope. And the stuff about the area of a polygon is cool, but we don't study that in our course – go ahead and learn it if you like!) If you think you understand this stuff take this quiz from the end of that tutorial.

Also, check out my previous post if you haven't already.

Cheers!

Mr. K.

posted by Mr. Kuropatwa @ 10/31/2005 12:46:00 PM 5 comments links to this post

Anonymous said...

Alright I'm stuck on the first one

10/31/2005 9:45 PM

Mr. Kuropatwa said...

Solve the equation of the line for y like this:

$$y = -2x + 5$$

Then replace the "y" in the equation of the circle with  $-2x + 5$ ; like this:

$$(x-2)^2 + (-2x + 5 + 1)^2 = 25$$

Then solve for x. You'll get two answers. Use the equation of the line ( $y = -2x + 5$ ) to find the corresponding y-coordinate for each x-coordinate.

10/31/2005 10:45 PM

Anonymous said...

ok then, that method tells me the answer but it does not tell me why that is the answer. Why would you put the y to the equation of the line.

11/01/2005 10:28 PM

Anonymous said...

nevermind... I got it as soon as i published that...

11/01/2005 10:29 PM

Anonymous said...

Wow! The first question I didn't get (but now I see how to get it), but the rest i got. Good assignment Mr. K. it really got me thinking!

11/01/2005 10:41 PM

Figure 4. Sample teacher resource post and corresponding comments.

and equations, reminders to peers about potential stumbling blocks, and interspersed with various traces of the student author's personality. The student posting the information for one class would also announce the assigned scribe for the following class – a practice meant to ensure that all students checked the previous day post! Regardless of this gimmick, there was clear evidence that students in Mr. K.'s class regularly read the scribe posts, as they found them a very useful way to review, look up something they did not fully under-

stand in class, or catch up with a lesson they may have missed.

*Reflection Writing.* Mr. K. also used the classroom blog to support students' reflection concerning the process and outcome of their learning over the course of a given unit. Before any unit test they took, he required them to write a reflective post about what they had learned. See Figure 2 for a sample student reflection post.

As you can see, though this was also assigned work,

Our classroom blog is a REALLY big part of my studying. For one if i don't understand what happened in class one day and just read over the scribe post thoroughly. It helps me understand part of the concept and from there I am able to figure out the rest of the concept. To make a long story short, it's like having a Mr. K at home but it's not only him helping me. It's the whole class.

If our blog went offline i'd be really frustrated and annoyed. For one because we've worked so hard on it for the past 4 months, and that hard work helped a lot of people across the world as well as ourselves.

- Posted at 12/13/2005 1:29 PM abr131

Figure 5. Sample student comment to "What if your blog was gone?"

students addressed their reflective posts to their peers, embedding metacognitive considerations as well as reminders and words of encouragement for their classmates' success on upcoming exam.

*The Editor's Initiative.* With respect to classroom blogging, Mr. K. incorporated a feature he called "The Editor's Initiative," which gave his students the opportunity to fulfill their "reflection before the test" assignment by identifying and discussing mistakes or omissions made in the scribe posts for that unit. Students finding and correcting mistakes at other point in time were also given extra credits. When students identified mistakes or omissions they were also expected to work with the author of the original post to update it as needed. (Note: Because the student "editor" was asked by Mr. K. to correct the error without publicly claiming credit for this change, no public evidence of this work is visible on the classroom blog.)

*Sunday Game Post.* Each Sunday night, Mr.K posted a new puzzle or problem solving game to solve. While solving this problem was not a requirement, many students gave it a try and some posted comments related to their attempts.

*Chat Boxes.* Noticing that a large number of student responses to posts were abbreviated comments and questions much like the "talk" that occurs in synchronous communication forums such as text messaging, Mr. K. integrated a Chat Box tool as a feature of their class blog. The Chat Box was located vertically on the side of a blog and allowed bloggers to post comments to each others in a way similar to instant messaging; the comments appear permanently on the chat box and can be read as soon as they are posted. Though he oc-

asionally interacted with students through the chat, Mr. K. added this feature to his blog primarily to facilitate students' communications with each other especially regarding specific class assignments.

*Sharing of resources.* Less frequently than scribe posts or reflective posts, Mr. K also used his blog to provide students with access to math-specific resources such as assignments, reviews, online tutorial or quizzes. Students also contributed links to resources they had found useful.

*Del.icio.us Accounts.* Noticing that some of his students were having difficulty retrieving links to math-related websites that had been included in previous posts, and noticing that students were finding resources they wished to share with their peers, Mr.K asked all of his students to sign up for del.icio.us accounts. Del.icio.us is a social bookmarking service available for free on the Internet in which people can co-construct and share collections of Internet-based resources. This program allowed Mr. K. and his students to collaboratively gather and organize Internet-based links they had collected. Mr. K. linked this *Del.icio.us* resource to the class blog to add to the number and range of learning resources available in this space..

*Visitors' Map.* The goal of classroom blogging, as presented by Mr. K. to the students involved more than supporting each other in successful participation in pre-calculus. In addition, because of Mr. K's discussions with them, students viewed this blogging project as co-constructing "a textbook for the world." Mr. K. enthusiastically and explicitly recognized evidence of a larger impact (e.g. emails he received, awards the blog was nominated for, research projects such as this one

that were studying their work) both *in class* (as explained in his interview) as well as *on the blog*. For example, Mr. K. added a "visitors' map" to the class blog that visually represented the geographic locations of those who log on to the classroom blog site. This interaction with a more global community led to many discussions about appropriate, ethical and safe online participation.

*Digital stories.* Once Mr. K. asked his students to write stories that had mathematical problems woven into the story, and post them on the blog; each student had then to try and solve the problems posed by his/her classmates' stories. Through their comments, students gave each other hints and tips for solving the problems.

*On line class.* Mr. K. used the blog to give an on-line class while he was away, by posting the assignment for the day and having the students work through a tutorial.

Students were free to (and did) post comments (using the blogging *comments* feature) on anything that was published on the blog. It was clear from these published comments as well as from the remarks embedded in student posts, that students were reading and considering each other's work (sharing praise much more often than critique). When asked by Mr. K. to respond to the question, "What would happen if our classroom blog was gone?" many of his students explicitly and enthusiastically commented on the value provided by their peers' explanations (see <http://ole-tango.blogspot.com/2006/01/what-if-your-blog-was-gone.html> for the full collection of student responses.).

As in this example, many commented on the support that peer-constructed scribe posts offered them when they were doing their homework later that night, if they had missed class that day, or when they were studying for a pending exam. Students clearly believed that their learning was being supported through their reading of peer's posts.

*Why do teachers use blogs in their classrooms?*

Understanding why Mr. K. invested valuable resources in blogging can serve to both inform and inspire others about appropriate and effective pedagogical goals for this tool. Several themes emerged as being important to Mr. K's motivation for classroom blogging; he used blogs to: 1) increase collaborative learning and nurture a community of learners; 2) create a student-centered learning environment; 3) provide a place for reflection; and 4) provide enrichment to the class.

*Collaborative learning:* Mr. K. credited blogs for helping students challenge each other's thinking, ask

questions, draw conclusions and provide a forum where students learn content from each other. The blog provided a place outside of structured class time where students could work together and thus have increased exposure to course content. Mr. K. states,

It's something that I really want to emphasize with my students is that one of my overriding goals is that education doesn't just flow from teacher to student, that's not how learning takes place. Its not like pouring liquid from one cup to another, it doesn't flow in one direction. For students to learn they need to construct that knowledge for themselves. I was reading some research that said in order for something to enter your memory, you need to be exposed to it six times. Just listening to me is one time, then a kid writes a scribe post and that's a second time, then it's up to a kids to have their own notes in class, that might be a third time. Somewhere or other they have to work out a way to get three more exposures to what happened in that class on that day because there is a new class coming tomorrow. And this happens through conversations and the connections that kids make through one another.

Mr. K. used blogs to increase socialization between students, as he encouraged students interact with peers through the available chat box on his blog. In addition to becoming a popular place for peer-to-peer interaction, Mr. K used the chat box as a diagnostic tool to inform his teaching. Mr. K stated, "I think this was a success for the kids when on a Saturday night, kids are talking in the chat box and they're talking about math!"

Mr. K. feels he has seen a large increase in interaction between himself and the students, and between students through the use of the blog. Mr. K. states,

By day three [of school] the kids were interacting with me and asking me questions and really, really engaging me because of a post that I had written on the blog about asking questions, that that's what I would really like them to do. Typically that can take weeks before kids reach that comfort level but the kids respond instantaneously to the stuff I post on the blog.

He also said that he had much more classroom participation because students bought into the class much more quickly and he was also able build a rapport with

the students more quickly. By creating an online learning environment, Mr. K stated he was able create a *group* from a bunch of individuals much more quickly than ever in the past. He got to know the students and they got to know each other better through the use of the blog. The blog encouraged students to participate in class that may not usually speak up. "They're afraid to ask questions in class because they're afraid they'll look stupid. But on the blog there is a little room there for them to be anonymous and they can ask their question when no one else is looking," explained Mr. K.

Mr. K's classroom blog is public, meaning that anyone connected to the Internet can visit and comment on it. This allowed students to understand that they were participating in a *global* community of learners. Mr. K states,

I particularly enjoy when others from the outside of the classroom pop in and they do. Our Vice Principal started interacting with the grade 9's on their blog. People, it doesn't happen often, but we have received comments from different places in the world and that's really energizing for the kids. That's part of the fact of exposing them to the fact they are playing in a global learning environment. [Learning] doesn't just happen in these closed silos that we call classrooms. My classroom walls are made of glass. And the world comes in on a daily basis.

Mr. K. students understood that beyond members of their class and their teacher, people from all over the world were reading their blog.

*Student-centered learning environment:* One of Mr. K's goals for his current classroom blog was to have it be more "student-centered." He wanted this space to be "for the students by the students." In his previous classroom blogs (the prior semester), his voice was the dominant voice. He stated that his current blog is different: students' voices dominated and the students really took ownership of the space. This student ownership was evident in the scribe posts that were most commonly addressed to peers (not to the teacher) as well as the chat box which was also dominated primarily by student-student disciplinary conversations.

*Place for reflection:* Blogs provided a forum for reflection by both the teacher and students. Mr. K taught a semester long class and said that it seemed to go by really fast; he was concerned that students didn't have enough "absorption time" of the material. He wanted

to give students time to question what they had learned, wrestle with tough concepts, and talk to their peers about that they had learned. He stated,

Using the blog to reflect on what they're learning and to reflect and extend on the one hour and a bit that we get each day, I was hoping that students would start to reflect on their learning and give them that opportunity for absorption that they may not have.

When dealing with a student who was struggling, the scribe post was an especially effective resource for both teacher and student. Mr. K. writes,

Having the scribe post has allowed me really deep insight into one kids head every day. Usually when you have a struggling student, you ask them if they understand what is going on and their first response is no I don't understand anything. But when the kids has to scribe what happened in class today, their forced to wrestle with the material and try to present the best they can what they do understand.

*Enrichment:* The blog was used to provide enrichment experiences to the classroom. Mr. K posted a game to his blog every Sunday. The games were focused on problem solving; they were intended to make students think, be challenging, and thus help students learn. In addition, Mr. K made a wide variety of additional Web-based concept-specific resources available to students leaving it up to them which they would explore and how.

Clearly, this classroom community experienced benefits from their experiences with blogging, but how do these findings relate to the claims made in the literature regarding the potential of blogs to impact classroom learning?

### Discussion

While classroom blogs like Mr.K.'s are still far from being common, especially in secondary mathematics and science classrooms, a number of instructors using blogs in different instructional contexts have found their experiences very rewarding and wrote about the benefits of blogging for them and their students. Despite the lack of rigorous empirical studies in this emerging literature especially in peer-reviewed journals, these reports can be valuable for K-12 teachers as



they begin to identify *potential* benefits of classroom blogs that may warrant consideration and further exploration.

In what follows, we will report on a number of purported benefits of classroom blogging we found in our literature review, along with the rationale offered for these claims. In addition, we critically examine the extent to which each of these potential benefits was actually realized in the case of Mr. K's blog described in the previous section (and based on the results of a more systematic study of this blog as reported in Luehmann, 2007a; b).

*Blogging allows students to have a real audience, and thus can motivate students to do their best work.* Students posting on a classroom blog know that at the very least their teacher and classmates will be looking at their posts; as most blogs are public spaces, this audience could extend even further, beyond the classroom. Some authors (Carlson, 2003; Downes, 2004; Martindale & Wiley, 2004) have argued that having such an audience makes blogging a more meaningful and motivating activity for students; it may also lead to raising the quality of students' writing, both in terms of content and clarity. This blogging affordance was realized in Mr. K's classroom blog, as there is clear evidence that students read each others' posts, and the blog even attracted a large outside audience of which the students were aware (and quite proud of!). Mr. K emphasized this "audience" both in class and through his own blog posts. In their responses to their perceptions of the value of the blog, many students described their pride in, ownership of and motivation toward co-constructing a "textbook for the world." Clearly, this affordance would not be possible if a teacher chose not to make the blog "public" and searchable on the Internet. This finding suggests that the decisions teachers make about who can have access to the blog, and even more importantly the nature and intrinsic interest of the postings, can be a significant factor on whether or not this benefit of blogging is realized.

*Reading blogs can be a valuable source of learning for students.* Downes (2004) argued that blogging as a practice is more about *reading* than about *writing*. He argues that by reading to inform the construction of posts, students can participate in a virtual community of learners in ways that are closer with the way we learn things outside of the classroom (as we often read about something that interest us, research the topic, and then gather evidence for claims, draw conclusions and reflect on the topic). For most of the students in Mr.

K.'s class, reading their classroom blog regularly became a routine. They had multiple, real reasons for doing so such as learning from the scribe post or resources posted by Mr. K., communicating with their classmates through the Chat Box if they had specific questions or requests for help, or even just finding out if they had been appointed as scribe for the next lesson. One can imagine that if a teacher used the blog in a more isolated assignment-oriented way (i.e. teacher posts a question to which all students respond via comments and the interaction comes to a close), students might have little reason to interact with their peers in this space. These observations suggest the value of structuring classroom blogs in such a way that leads students to read each others' posts – through the design of the activity structure, the content of the posts, or both.

*Blogs allow interactions to occur with people beyond the classroom.* As documented in Richardson's (2003) experience with classroom blogging, blogging can allow interaction between students and outsiders – as in his case, for example, his students experienced the thrill of being able to interact with the author of a book they were reading. This was not a benefit that was evident in our analysis of Mr. K.'s blog. Though the Visitor's Map made it clear that outsiders were visiting (and this presence explicitly emphasized by the teacher and taken up by students who commented on their collective work to author "a textbook for the world,") even if some of the outside readers made their presence felt by commenting on specific scribe posts, it was usually just to praise their quality and value.

*Blogging invites reflection by providing easy access to prior writing.* Ferdig and Trammel (2004) have suggested that blogging can provide an enhanced learning experience because it makes it easier for students to go back to previous works for reflection, revisions and analysis of their work. For example, by having written assignments in electronic form, students can easily edit and revise prior assignments based on new learning. This benefit is even more pronounced when blogging involves writing about a topic over a sustained period of time (Downes, 2004), as this gives students an opportunity to see how their thoughts and feelings may change overtime. "Reflective Writing" at the end of each unit as well as "The Editor's Initiative" opportunities were intended to capitalize on this affordance; though little evidence was found that students systematically reviewed past events in the service of some synthetic work. Instead, the longevity of the blog be-

came a valued resource to students primarily when they needed it to review for an exam.

*Blogging helps students teach each other content.* Poling (2005) also reported on several instances of her students learning content and strategies from each other through blogging, as for example when she asked them to use the classroom blog to share their personal strategies to discover the meaning of words they did not know. The scribe posts in Mr. K's blog provided multiple examples of students' ability to provide in-depth, thorough and multi-modal personal explanations of complex mathematical content and procedures. Students' responses to Mr. K's question, "What would happen if our classroom blog were gone?" repeatedly emphasized how important it was for them to have the interpretations and explanations of their peers.

*Blogs allow for extending reflections and discussions beyond a lesson.* Reporting on his use of a classroom blog to extend the discussions of a book initiated in class, Richardson (2003) points out that doing so enabled the students more time to reflect and wrestle with ideas than what they could have accomplished within the constraints of a class period. Mr. K's use of the classroom blog indeed provided students opportunities to extend the learning and thinking taking place in the classroom by way of time (reading and writing for the blog was done outside of class time), access to a wide range of resources (e.g. tools such as the Chat Box and Del.iciou.us that were not available in class), and new forms of teacher-invited, often student-inspired participation in school mathematics (e.g. "writing a textbook for the world," co-constructing a collection of valuable online resources, and engaging in online Sunday night games). These extensions included both student-student interaction as well as student-teacher interaction.

Finally, one last pedagogical affordance of classroom blogging that has not been written about in the literature emerged as a strong and cross-cutting theme in this case study:

*Blogging capitalizes on students' cultural literacies.* As noted in the beginning of this paper, teenagers have a very large presence on the Internet. This generation of young people is being referred to as "Generation M," 8-18 year olds who are spending an increasing amount of time using "new media" like the Internet (Rideout, Roberts, & Foehr, 2005). Classroom blogging afforded Mr. K. and his students opportunities to bring together and capitalize on the merging of mathematical literacies with students media literacies in a number of powerful ways:

Scribe posts (and other types of posts) constructed by the students allowed them to wrestle with and articulate their mathematical understandings using their choice (or non-choice) of tools (e.g. graphing tools, formatting tools, etc.) and text. Most students employed additional tools to embed sophisticated mathematical representations such as graphs with multi-colored text to represent emotion or personality. Therefore this form of participation allowed, even encouraged, students to bring their media literacies to bear on their mathematics learning.

Mr. K. demonstrated an awareness of students' preferred forms of participation, and responded throughout the course by introducing new tools (i.e. the chat box and the Del.iciou.us accounts) through the blog to allow students' interactions with the mathematics concepts to be as smooth and natural as possible. This awareness of and respect for student competencies informed the unique uses of the blogs that proved beneficial for his students at a given time.

Opportunities to participate in a public space, visited by numerous outsiders from all over the world (see *Visitors' Map*) afforded Mr. K. opportunities to have much needed and important discussions with his students about issues of safety, responsibility, and integrity when communicating online via the Internet (See Luehmann, 2007b for a more detailed analysis of this issue).

### Conclusions

Our study suggests that classroom blogs can indeed provide some unique opportunities to capitalize on teens' interest and facility with on-line communication that could be used to support their learning in mathematics class. At the same time, even the one example considered in this article showed that the *realized* benefits of classroom blogs depended largely on how a teacher choose to structure and use the blog. While these results speak positively to the flexibility of classroom blogging as a pedagogical tool, they should also warn teachers that the benefits purported in the literature will not be automatic but rather will require thoughtful teacher planning and decision-making grounded in an ongoing awareness of students' strengths and needs.

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