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Blogging about Science and Math: Elementary Students' Learning Explorations

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Introduction

Blogging is a technologically “natural” tool – it is widely and well-supported by most of today’s ubiquitous digital devices, particularly laptops and tablets. It is also possible to create classroom-curated blogs in which the teacher has easy access to all content, permitting him or her to monitor and guide content where necessary. For very young writers, the gratification that comes with a response to a post can be very welcome (Author, 2011).

As a result, practically oriented textbooks have begun to appear that can guide teachers in making the most of this practice. Two recent examples for teachers are *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms* (Richardson, 2010) and *Making Connections with Blogging: Authentic Learning for Today’s Classrooms* (Parisi & Crosby, 2012). Richardson’s (2010) text covers a range of technology applications for the classroom, while Parisi and Crosby’s book (2012) concentrates on blogging for content area learning.

However, while the professional practitioner research on classroom blogging in content area instruction has been plentiful (Daniels, 2010; Duplichan, 2009; Rodari, Cerrato & Sustersic, 2013; Sawmiller, 2010; Scales, 2000), in-depth study on blogging in the science and math classroom has only begun to emerge (Luehmann & MacBride, 2009; Luehmann & Frink 2009; MacBride & Luehmann, 2008).

Blogging in the Math and Science Classes

MacBride and Luehmann’s (2008) case study of one high school examined mathematics teachers’ use of class blogs in support of content area instruction. Through content analysis and teacher interviews, the researchers identified the following blog practices that supported math learning: (a) daily reports; (b) reflective writing; (c) resource sharing; (d) communication online using chat boxes and online modules, and (e) other enrichment activities such as game puzzles and digital stories. In making recommendations for other classrooms, the researchers noted that accomplishing positive results is not “automatic”; rather, it is a process that “will require thoughtful teacher planning and decision-making grounded in an ongoing awareness of students' strengths and needs” (p.182).

In the following year, Luehmann and her colleague Frink (2009), examined science teachers’ blog use in support of reform-based science instructional requirements, which include collaborative inquiry, “evidence-based argumentation and explorations,” and “public communication of ideas and work” (p. 276).The study discovered student-centered engagement “when the activities designed by the teachers were, first, aligned with the teachers’ stated goals, and second, actually taken up by students” (p. 288). Teacher response to the students’ extended or modified participation in response to an instructor-designed activity was critical and determined if “that activity was viewed as finished and no further take-up was invited” (p.289).
Other benefits of blogging in content area instruction include critical thought development, reflection and metacognition (Cwilka & Martinez-Cruz, 2003; Tan de Ramos, 2010), and vocabulary expansion (Janzen, 2008).

As a group, these studies highlight the potential of blogging for the content area classroom. They also point to the importance of talk or conversation in support of student discipline specific learning. However, the majority of this research has been undertaken with secondary and even college students or teacher educators. This work contributes to this body of research, by examining the conversations younger writers had about their learning of science and math.

Methodology

The Study and the Participants

This study is part of a larger research project that has explored elementary students’ experiences with blogging (Author, 2011; 2013; 2014). Although the focus of the larger study was not on content area literacy, the aggregate blog data suggested several important findings about learning in the content area classroom. For this article, the researchers revisited these data to examine more closely conversations about learning in science and math in which grade school students were engaged with their readers and commenters.

The participants were fifth-grade students – five boys and ten girls, with diverse ethnic and socioeconomic background and learning needs: nine Caucasians, five Hispanic, one African-American, one student in the special education program and two students in the gifted program. All of these students were new to blogging, although some were familiar with word processing and the Internet. The research site was a Title I school located in a southern state of the United States, with 81% of student population considered economically disadvantaged.

The students participated in blogging activities once a week for four hours over a period of one year. The instruction was held in a computer lab and included activities to introduce the students to blogging and typical blog writing practices such as commenting, report writing, reflecting and questioning. A class blog was created on the Typed (blogging platform) and students set up their own blog accounts to engage in conversations with the audiences from across the states, countries, and continents. Although some topics for blog writing were predetermined such as writing stories to go with photographs provided by the teacher, most topics were self-selected by the students and were tied to what they were learning in the language arts and the content area classroom.

Data Collection and Analysis

The data for this article were these young writers’ posts and their comments posted on other blogs, as well as their readers’ comments, for a total of 659 single-spaced pages of blog scripts. A qualitative content analysis approach (Creswell, 2007) was used to analyze these data in order to identify the codes and clusters of codes (Bogdan & Biklen, 2006) which aimed at identifying specific critical conversations about learning science and math and the writing
assignments that supported these conversations (see Table 1). The critical conversations in Table 1 were selected based on either their frequency or tendency to encompass other critical conversations that were representative of the data across all participants.

Analytical memos were composed throughout the analysis to provide brief descriptions of the emerging themes reported in this study.

**Findings, Discussion, and Implications**

The learning about science (earth science, oceanography, zoology, biology, and physics) and math in which the bloggers engaged in their conversations with the readers and commenters in this study became a truly collaborative process, particularly from a constructivist theory standpoint (Vygotsky, 1978). This is because these learners had the opportunity to “co-construct scientific understanding” (Luehmann & Frink, 2009, p. 275) about the subject matter at hand through conversations about these topics with their wider audience. The process of co-constructing scientific understanding involved developing new scientific concepts along with the terms to describe them (e.g., a student blogger was introduced to the concepts of Pi and Phi). Co-construction also occurred when the students had the opportunity to hone their scientific reasoning and processing skills when they were asked to conduct an experiment.

The readers and commenters played a critical role in supporting these students in actively developing new concepts and ideas. They either augmented the students’ prior knowledge or understanding of certain science concepts (e.g., hereditary traits or dexterity) or invited the students to find more information about these or other new ideas. More importantly, they helped these student bloggers to dispel their misconceptions and build correct understanding when such a need arose (e.g., one commenter challenged one student’s misrepresentation of the facts about squid research and then redirected her thinking in this area). As such, the readers and commenters in this study served as the more knowledgeable other (Vygostky, 1978), who offered direction, resources, and strategies for the students to be able to construct their own discipline-specific understanding, or to correct a misunderstanding.

Students, unlike experts in respective disciplines, must be taught “the reading, writing, and thinking” required of particular disciplines (Shanahan & Shanahan, 2008, p.40). The findings in this study suggest that carefully scaffolded conversations on the blog can facilitate the modelling and monitoring of such thinking and writing for and by the students.
References

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<tr>
<th>Content Area</th>
<th>Critical Conversations</th>
<th>Writing</th>
</tr>
</thead>
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<tr>
<td>Science</td>
<td>Passions/Likes (e.g., science projects; gaming; anti-AIDS campaign)</td>
<td>Personal narrative</td>
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<tr>
<td></td>
<td>Archeology (e.g. pre-historic fish; ancient marsupials)</td>
<td>Reflection</td>
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<td></td>
<td>Geology (e.g. land forms; earthquake eruption)</td>
<td>Reflection</td>
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<td></td>
<td>Physics (e.g. electricity; lightening; snow creation)</td>
<td>Exposition with illustration</td>
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<td></td>
<td>Zoology (e.g., facts about monkeys; red panda)</td>
<td>Exposition with /without illustration</td>
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<td>Botany (e.g., plants, herbs)</td>
<td>Personal reflection</td>
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<td></td>
<td>Biology (e.g., classification; human inherited traits; sleep loss)</td>
<td>Article report</td>
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<tr>
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<td>Geography (e.g., places where the commenters or student bloggers live)</td>
<td>Annotated Google maps</td>
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<td>Oceanology (e.g., giant squid)</td>
<td>Article report</td>
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<td>Math</td>
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<td>Algebra (e.g., fractions; division procedures; measurements of snow depth; Sudoku)</td>
<td>Exposition with illustration</td>
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