Chapter 4
Examining Middle-School Students’ Uses of Diigo Annotations to Engage in Collaborative Argumentative Writing

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ABSTRACT
This chapter explores the ways sixth grade students from a linguistically and culturally diverse classroom used Diigo, an online social bookmarking site, to engage in annotation writing focused on the discussion of science ideas within a text. While the use of apps has rapidly increased in schools, there remains little research on the ways annotation writing can be used to support scientific argumentation. Findings from this study indicate that students used the annotation app to pose questions, formulate claims, and request evidence from peers to answer questions or support claims. These results suggest that the process of collaborative annotation encourages students’ documentation, critique, and refinement of ideas, which can aid learners in close reading of science texts.
INTRODUCTION

Our nation’s future depends on our ability to provide challenging and meaningful educational opportunities to better prepare students for college-level and workplace communication and thinking (ACT, 2010; Carnegie Corporation, 2009, 2010; Graham & Perin, 2007; Lee & Spratley, 2010). While argumentation—generating claims based on evidence and supporting them with reasoning—has been a focus of research in the past two decades (e.g., Driver, Newton, & Osborne, 2000; Kuhn, 1993; McNeill & Krajcik, 2008), its central position in today’s national standards is unprecedented. The Next Generation Science Standards (NGSS) are derived from the three dimensions of the NSTA Framework of K-12 Science: scientific and engineering practices, crosscutting concepts, and core disciplinary ideas. The NSTA Framework outlines ways of thinking about the nature of science that relies heavily on argumentation, evidence, and reasoning to support claims. And, the Common Core State Standards (Common Core State Standards Initiative, 2010) point to argumentation as a key feature of academic discourse in all fields echoing Driver et al.’s (2000) assertion that argumentation is a core activity of scientists.

The purpose of this study was to examine ways middle school students employed the Diigo annotation app to engage in collaborative argumentative writing in response to science texts. The argumentation process engaged students’ ability to clearly state their ideas, illustrate their thinking, and back their claims with evidence. Annotation apps can support the collaborative documentation, critique, and refinement of ideas, which aids learners in developing personal understandings that lead to the co-construction of new knowledge (Beach & O’Brien, in press; Castek & Beach, 2013).

While the use of apps (specialized programs used on mobile computers) has rapidly increased in schools, there remains little research on the ways that apps can be used to support scientific argumentation. This study explores the strategies 6th graders employed to engage in close reading of a science text and the ways that sharing the same digital space supported science inquiry and science understanding through digitally supported argumentation.

Integration of Reading and Writing

One primary focus of writing research has been the importance of integrating reading and writing instruction (Shanahan, 2006). Students use writing to formulate their interpretations of texts, which serves to not only metacognitively focus their attention on formulating their responses to a text, but also to share those interpretations with others. The ability to formulate valid, insightful interpretations, in turn, requires reading comprehension strategies that go beyond simply restating or summarizing texts. However, the 2011 NAEP reading assessment found that only 35% of 8th graders were categorized as “Proficient”—or facile in summarizing main ideas (National Center for Education Statistics, 2012a). An analysis of 46 dyads of 6th and 7th graders’ discussion responses to both print and digital articles found that students most frequently employed process monitoring, summarizing, connecting, and reacting, with the use of word recognition monitoring, summarizing, connecting, and attending to illustrations as predicting text comprehension for the text (Davis & Neitzel, 2012).

Students’ difficulty in reading transfers to difficulty in writing (Graham & Harris, 2013). An analysis of students’ writing on the 2011 NAEP computer-based writing assessment indicated that only 24% of both 8th and 12th graders performed at the “Proficient” level; and only 3% of both 8th and 12th graders performed at the “Advanced” level (National Center for Education Statistics, 2012b). Students’ ability to read science texts requires the ability to understand cause-effect relationships, infer definitions of terms through attributions, and use graphical displays of information as critical visual sources of information (Shanahan, Shanah-
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