Reading Across the Curriculum: Examining Students' Knowledge of Disciplinary Reading Goals and Strategies

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Abstract: To examine the nature of students' extant disciplinary knowledge, students (n = 70) read two texts (one science, one literary) and responded to a series of questions designed to elicit disciplinary knowledge. Participants identified the appropriate discipline for both texts and generated discipline-appropriate comprehension questions. However, they struggled to produce effective comprehension strategies. These results provide preliminary evidence that students can readily identify discipline-specific text features and reading goals, but need further support in applying relevant and effective comprehension strategies.

Introduction

Research in *disciplinary literacy* explores ways to cultivate the knowledge, skills, and strategies that students need to be successful in reading across the curriculum (e.g., Goldman et al., 2016; Moje, 2008). Skilled readers leverage a variety of types of knowledge in order to engage with their communities of practice. This knowledge includes 1) discipline-specific reading goals and 2) discipline-appropriate comprehension strategies (McCarthy, 2015).

In expository science texts, readers often need to understand a causal chain or process. Strategic readers can improve comprehension by generating self-explanations (Chi et al., 1994). In contrast, literary texts invite the reader to reflect on the human experience. Strategic readers examine the specific language in the text and draw upon prior knowledge of common motifs and conventions that might inform them of relevant themes (Lee & Spratley, 2010).

Expert-novice studies indicate that experts readily engage in these strategies, whereas novice readers tend to default to low quality general strategies such as paraphrasing (e.g., Graves & Frederiksen, 1991). However, one limitation of these studies is that they rely on analysis of think-aloud and essay data to find evidence of discipline-specific strategy use rather than explicitly asking readers about their goals and strategies. Thus, it may be the case that students possess relevant disciplinary knowledge, but that they do not view it as task-relevant or it may be that readers have some of this knowledge, but are unable to articulate it in the types of tasks that are traditionally used. This exploratory study asked students to explicitly reflect upon relevant goals and strategies when reading texts from different disciplines.

Method and results

Participants (n = 70, M_{age} = 26.14) read one literary text and one science text. The literary text was *The Flowers* by Alice Walker and the science text, *Flowers and Fertilization,* was adapted from a science textbook. After reading the texts, participants completed four tasks: 1) responded to open-ended questions about what the texts had in common and how they differed; 2) rated (1-4) how likely they would be to encounter that text in a variety of scenarios (e.g., on a blog, in a social studies class); 3) generated three questions a teacher might ask about each text; and 4) generated three comprehension strategies they might suggest to a struggling classmate for each text.

Identifying similarities and differences

Almost all participants identified that the texts shared a similar topic (e.g., *They are both about flowers*). In response to how the two texts differed, a large portion of participants (24%) summarized each text, but did not explicitly state a difference (e.g., *They are different in that one talks about the reproduction process of flowers. The other article talks about a girl and her journey through the forest*). A majority of students (46%), however, commented on genre differences, identifying the science text as "informational" and the literary text as "a story".

Identifying genre

Participants were readily able to identify the appropriate discipline for both texts. Wilcoxon Signed-Ranks tests revealed that the literary text (M = 3.32, SD = .92) was rated more appropriate for an English class than the science text (M = 2.36, SD = 1.05), W = 1294.50, $p < .001$. The science text (M = 3.79, SD = .63) was rated more appropriate for a science class than the literary text (M = 1.99, SD = 1.09), W = 4578.50, $p < .001$.

Generating relevant questions

For the literary text, participants generated questions about the plot (*What did Myop find?*) and setting (*What historical time is the story set in?*) as well as nonliteral aspects of the text (*What might the rose symbolize?)*

Participants included words like “plot”, “symbolism”, and “author” in their questions about the literary text. In contrast science questions included terms like “main idea” and “define”. The science questions were focused on definitions (*What is the male part of a flower?*), compare-and-contrast (*What is the difference between self-pollination and cross-pollination?*), and questions about causation and process (*Write about the process as a sequence of events*). Several participants asked critical thinking questions (*How is plant reproduction similar/different to human reproduction?*). In sum, participants were able to generate relatively sophisticated comprehension questions that reflected discipline-specific reading goals.

Generating comprehension strategies

The suggested strategies for a struggling classmate were coded based on an initial set of common strategies (e.g., highlighting, summarizing) as well as additional codes derived from the responses. Strategies were sorted into three categories: general, literary, and science. The majority of responses cited relatively ineffective general strategies such as rereading. Disciplinary strategies focused on surface level comprehension (understanding vocabulary, imagining the setting) rather than strategies that support a richer, interconnected mental model. Several (14%) participants listed identical strategies for both texts, suggesting that they were unaware of the need to differentiate strategy use across discipline. A majority of students (86%) showed at least some differentiation in strategy use across the two texts, but most of these strategies were relatively shallow. However, some students showed clear differentiation in strategies, which was often in combination with identifying more effective and domain-specific strategies.

Discussion

This exploratory study demonstrated that non-expert readers possess some relevant domain knowledge (genre, reading goals), but struggled to align comprehension strategies to meet these goals. These results will need to be replicated with other texts, disciplines, and populations before generalization can be made. Though preliminary, these results point to a need to better develop students’ discipline-specific reading strategies.

Although instructions never specified the text’s genre, it was anticipated that juxtaposition of the two texts and questions that asked participants to articulate similarities and differences across the texts would help the readers to recognize discipline-specific differences that may not have been obvious if the students were to read only one text. Our future work includes engaging in more deliberate contrastive discussion to make students’ disciplinary knowledge more visible in hopes that they can leverage this knowledge to consider more effective comprehension strategies.

In sum, students’ reading goals and strategies play a critical role in their ability to read and reason in their content courses. This work demonstrates that students likely need more explicit support in developing discipline-specific reading strategies. The objective of this work is to better develop students’ skills and knowledge base so that they can competently and confidently read across the curriculum.

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