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Strategies To Improve Comprehension in College Students: Focus on the Process or the Product?

By: Catherine Bohn-Gettler, Olivia Olson, and Faith Kanneh

Abstract

The purpose of the study was to see whether process-vs. product-oriented instructions, or a combination of both, influence the degree to which readers engage in paraphrasing (restating text in one's own words), comprehension monitoring (reflecting on one's understanding), predicting, self-explaining the content of a text, or other processes (called "special cases") during reading. The materials used for this experiment included a text entitled "How the Piloses Evolved Skinny Noses", and a shortened version of the Conceptual Inventory of Natural Selection (as a measure of prior knowledge). The piloses text was taken from a children's novel that uses text and pictures to introduce the topic of natural selection and evolution. A significant result was found for special cases, such that the control and the product-only group generated more special cases than the process-only and the process-and-product groups. In addition, self-explanation scores for the control and the product-only group were lower than the process-only and the process-and-product groups. There were no differences related to comprehension monitoring and predictions. Finally, there were significant results for subcategories for paraphrasing. Controlling for prior knowledge, the process-only and process-and-product groups engaged in more paraphrasing, and their paraphrases were more lexically similar, more complete, and more accurate. Overall, this study emphasizes the importance of teaching students strategies in order to effectively study rather than simply explaining the end goal.

Introduction

The purpose of the study was to discover whether self-explanation during reading, or knowing what you will be asked to explain after reading, increases learning and comprehension for students. Self-Explanation is a strategy in which readers explain what was read in a way that combines the presented information with background knowledge.

The participants for this study were placed in one of four groups. The groups were the control, process-only, product-only, and the process-and-product. In the control group the students did not receive directions. When doing the think aloud activity, they were told to write down any thoughts they had. The process-only group of students were asked to do the think-aloud using the Self-Explanation Reading Training (SERT) method during reading, which involves reading the text and explaining what they read aloud, with encouragement to use their prior knowledge. The product-only students were told that they would be asked to explain the reasons why the Piloses have skinny noses after reading the text. Lastly, the process-and-product group of students was asked to use SERT during reading, and they were told that they would be asked to explain the reasons why Piloses have skinny noses after reading.

In this project, we examined the strategies of paraphrases, comprehension monitoring, predictions, special cases, and self-explanation quality.

Paraphrases are characterized by the reader restating the text in their own words. Paraphrases facilitate comprehension by improving memory and of main ideas and details in text. (Hagaman and Robert, 2008).

Comprehension Monitoring is when the participant makes a statement regarding their own understanding. This is important, because readers must do a personal check on how well they grasp the concept to identify any gaps in knowledge.

Informed predictions require students to not only to fully comprehend the text that they are reading, but to also understand the big picture well enough to make informed guesses as to what will come next. This process activates prior knowledge and therefore makes the text memorable to the reader.

Special Cases are a situations that do not fit in the following categories: Comprehension Monitoring, Paraphrasing, Bridging Inferences, Elaborations, or Predictions.

A Self-Explanation Score was provided for each response. It considered the relevance of a participant's response to the text, whether it corresponded to the number of main ideas included, and whether participants incorporated relevant ideas from prior knowledge.

Hypothesis: The process-only and process-and-product conditions (as compared to the product-only and control conditions) should increase paraphrasing, comprehension monitoring, predictions, and self-explanation scores during reading. In addition these conditions should likewise result in a decrease in the amount of special cases.

Methods

Materials:

- The text, "How did the Piloses Evolve Skinny Noses" is a short text introducing the topics of natural selection and evolution (Kelemen 2017). The text included words and pictures to describe this process.

Procedure:

- Measure of prior knowledge: Shortened version of the Conceptual Inventory of Natural Selection (McNamara 2004). This assessed the reader's understanding of the theory and controlled for prior knowledge.
- Following that, the participants were given instructions that corresponded with the group they were randomly assigned to were given, along with an opportunity to practice thinking-aloud. The four groups included:
 - Control**: This group of students did not receive directions. When doing the think aloud activity, they were told to write down any thoughts they had.
 - Process-only**: This group of students were asked to do the think-aloud using the Self-Explanation Reading Training (SERT) method *during* reading, which involves reading the text and explaining what they read aloud, with encouragement to use their prior knowledge.
 - Product-only**: This group of students was told that they would be asked to explain the reasons why the Piloses have skinny noses *after* reading the text.
 - Process-and Product**: This group of students was asked to use SERT *during* reading, **and** that they would be asked to explain the reasons why Piloses have skinny noses *after* reading.

Following the random assignment, the students engaged in a think-aloud with Piloses Text and answered comprehension questions.



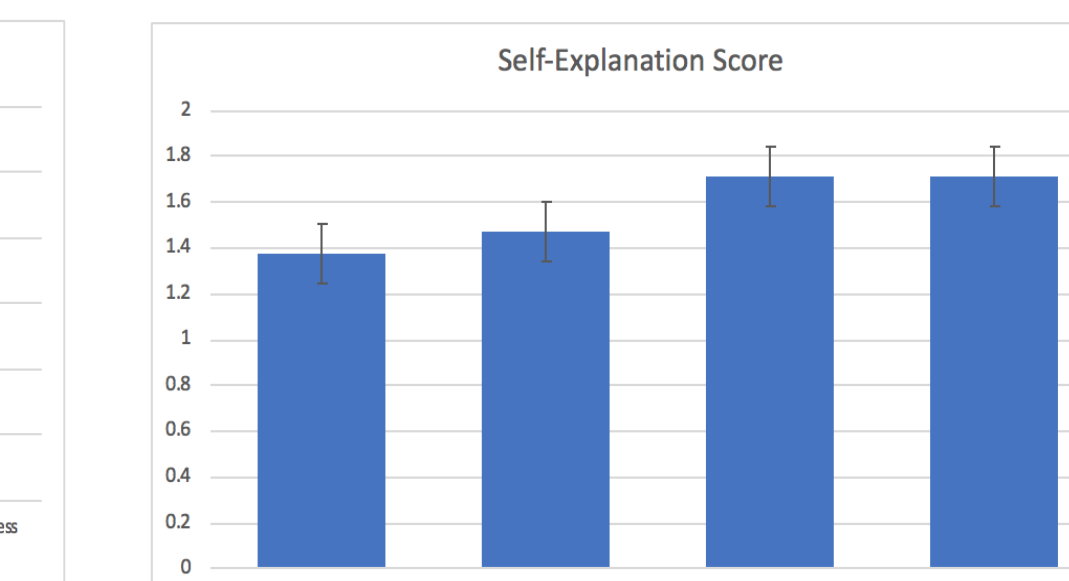
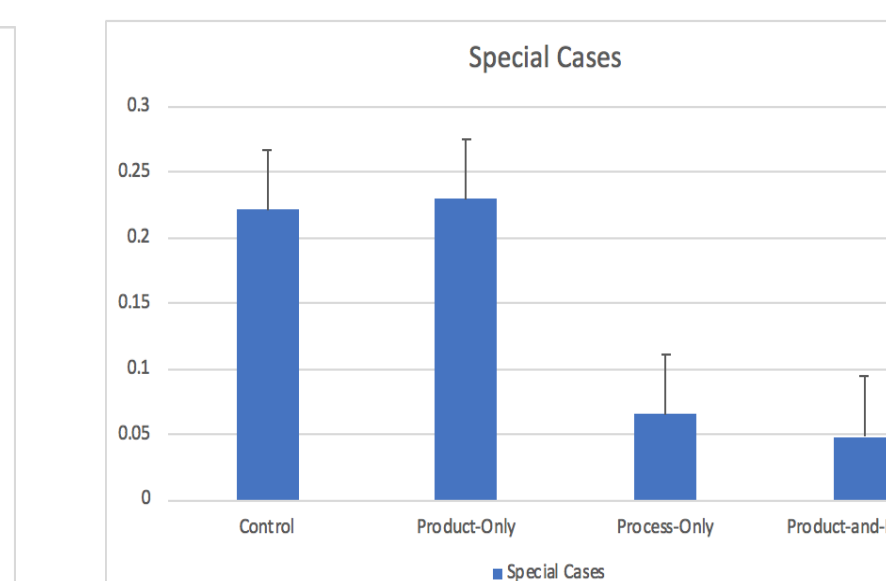
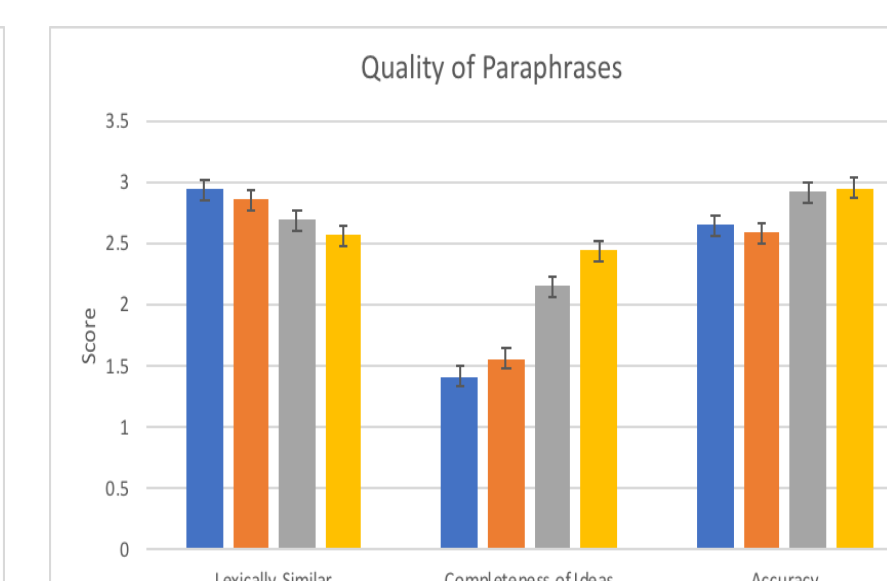
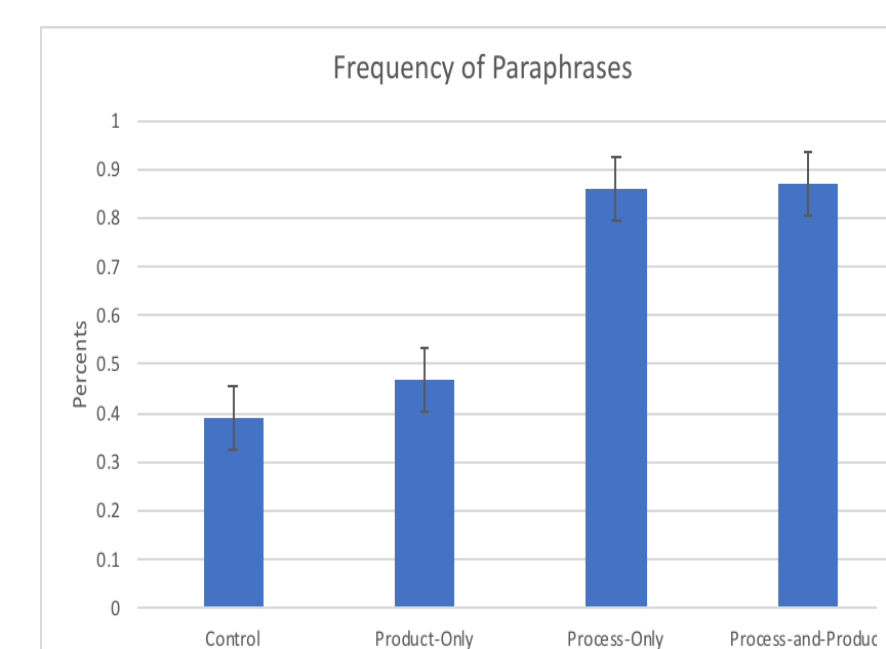
Implications

The process-only had the most impact on the student's learning. In this condition, the student were asked to do the think-aloud using the Self-Explanation Reading Training (SERT) method during reading. The implications for paraphrasing show that readers better comprehend and are able to remember content when they practice processing the information and re-stating in their own words. When the process-and-product only also made an impact on the number of special cases. When these strategies have been implemented, the number of special cases were reduced. Ultimately, when students utilized these strategies, the overall self-explanation score increased. This shows that using process-and-product only can help increase student learning.

From our data, we would tell students it would be a good idea participate in paraphrasing while they are studying. When rephrasing their ideas, it is our assumption through our research they will have a better understanding of the topic.

Results

The CINS prior knowledge score was a covariate in all models. Hence, all results are controlling for prior knowledge. A significant result was found for the process-only and the process-and-product because the participants in the group engaged in more paraphrasing. In addition the process-only and-product conditions had higher quality of paraphrase that were more complete. A significant result was found for special cases, such that the control and the product-only group generated more special cases than the process-only and the process-and-product groups. In addition, self-explanation scores for the control and the product-only group were lower than the process-only and the process-and-product groups



The process-only and the process-and-product conditions engaged in more paraphrasing, $F(3, 91) = 14.94, p < .001, \eta^2 = .33$.

The process-only and process-and-product conditions had higher quality paraphrases that were more complete, $F(3, 82) = 18.5, p < .001, \eta^2 = .404$, accurate, $F(3, 82) = 7.13, p < .001, \eta^2 = .207$, and lexically similar $F(3, 82) = 2.58, p < .059, \eta^2 = .086$.

The process-only and the process-and-product conditions found Special Cases less frequently when compared to the product-only and control group. $F(3, 91) = 3.76, p = .01, \eta^2 = .11$.

The process-only and the process-and-product conditions for Self-Explanation Scores were higher when compared to the product-only and control groups. $F(3, 91) = 1.80, p = .15, \eta^2 = .06$.

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