iSTART: An Automated Reading Strategy Tutor

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This talk will describe iSTART (Interactive Strategy Trainer for Active Reading and Thinking), a reading strategy tutor that we have developed in which animated agents teach students to self-explain text using a variety of active reading strategies. iSTART was developed to help students learn how to more actively process less cohesive, challenging text, particularly science text. The trainer is based on previous experiments which demonstrated that self-explanation coupled with reading strategy training increased comprehension scores and course grades. This training has been particularly effective for low-knowledge readers. This talk will (a) describe the iSTART system and the theoretical motivation for the various components, (b) briefly describe two experiments which have been conducted with college and middle-school students to test the system, and (c) describe the success of several approaches that we have used to analyze the verbal protocols and provide feedback to the user.

The system: iSTART delivers reading strategy training using an interactive and adaptive format. Pedagogical agents interact with each other and with the user to increase active processing and participation by the student. The student first learns about self-explanation and reading strategies (comprehension monitoring, paraphrasing, predictions, elaborations, and bridging inferences). The student then practices self-explanation by typing in explanations to sentences from a science text. The system analyzes the self explanations and provides feedback to the user.

Experiments: Two experiments have been conducted thus far to examine the effectiveness of the system. In the first experiment, college students enrolled in a biology course were either given live SERT (Self-explanation reading training), iSTART training, or no training (control). They were first assessed in terms of reading ability, reading strategy knowledge, domain knowledge, and science comprehension. After training, they read a text and were asked comprehension questions about the text. In the second experiment, middle-school students self-explained a text either after having received iSTART training, or without having received training. The students were given a variety of tests to examine individual differences. The results from these two studies show positive effects from training, which vary as a function of prior domain knowledge and reading ability.

Providing self-explanation feedback: The largest challenge for our system is to provide appropriate feedback to the user concerning self-explanations that are typed by the student during training. In both of the experiments described above, we used a word-

based algorithm which was adjusted according to the target sentence length and importance. The algorithm included number of words, number of content or important words overlapping with the sentence, and number of words which related to content words from the sentence. We have also compared this word-based system to algorithms using Latent Semantic Analysis and combinations of word-based systems and LSA. We have found that the word-based system is more effective than the LSA systems alone. However, the word based system is more difficult to generalize to different texts. This talk will describe these systems as well as our work to combine the various algorithms.

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