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Why fifth- and seventh-graders submit off-task responses to a web-based reading comprehension tutor rather than expected learning responses

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ABSTRACT

Research shows the students improve their reading comprehension with Intelligent Tutoring of the Structure Strategy (ITSS). One problem for ITSS is that some students are producing responses in the on-line instruction that are unrelated to learning and practicing the reading strategy. These types of disengaged responses can be referred to as system active off-task responses ("off-task"). In this study we characterize who produces off-task responses and why. Classification and Regression Trees (C&RT) and logistic regression analyses were used to answer the why question. Variables predicted to relate to gaming included reading strategy and skill variables, motivation, attitude, self-efficacy, and goal orientation variables, demographic variables, and type of computer feedback (simple versus elaborated). C&RT analysis could explain 66% of the variance in off-task responses. Students without off-task responses were higher in motivation to read and worked in ITSS to produce good main ideas. Students with higher off-task responses had low scores on work mastery goals. The highest producers of off-task responses in Grades 5 and 7 (averaging 24 off-task responses over 7 lessons) had low motivation to read and scored over 2 SD below average on recall tasks in ITSS. The logistic regression could explain 42% of the variance in off-task responses. Use of motivational scales prior to starting instruction as well as on-line performance measures could be used to flag students for early intervention to prevent system active off-task responses and increase on-line learning. The C&RT approach may be particularly helpful to designers in making software more appropriate for different types of students.

1. Introduction

The Intelligent Tutoring of the Structure Strategy (ITSS) provides on-line instruction in reading comprehension for upper elementary and middle school students in content area reading. The structure strategy teaches students about five common text structures (e.g., problem-and-solution; comparison) used in expository texts and how to use this knowledge strategically to increase learning, memory, and writing about text ideas. Our ultimate goal for teaching children the structure strategy is that with practice this strategic approach to using text structure will become an automatic skill available for the purpose of close reading of complex expository and persuasive texts. This goal is compatible with Common Core State Standards (2010). These standards list understanding text structures, constructing main ideas, writing summaries, and other skills related to text structure under both English literacy and scientific and technical literacy for upper elementary and middle school students. ITSS was initially designed to provide easily accessible structure strategy instruction via user-friendly web-based training (Meyer & Wijekumar, 2007; see Figs. 1 and 2 for screen shots of ITSS interface).

Research shows that students improve their reading comprehension by using ITSS (Meyer et al., 2010; Meyer, Wijekumar, & Lin, 2011; Wijekumar, Meyer, & Lei, 2012, 2013). However, there are students who do not produce on-task responses and do not work to correct their

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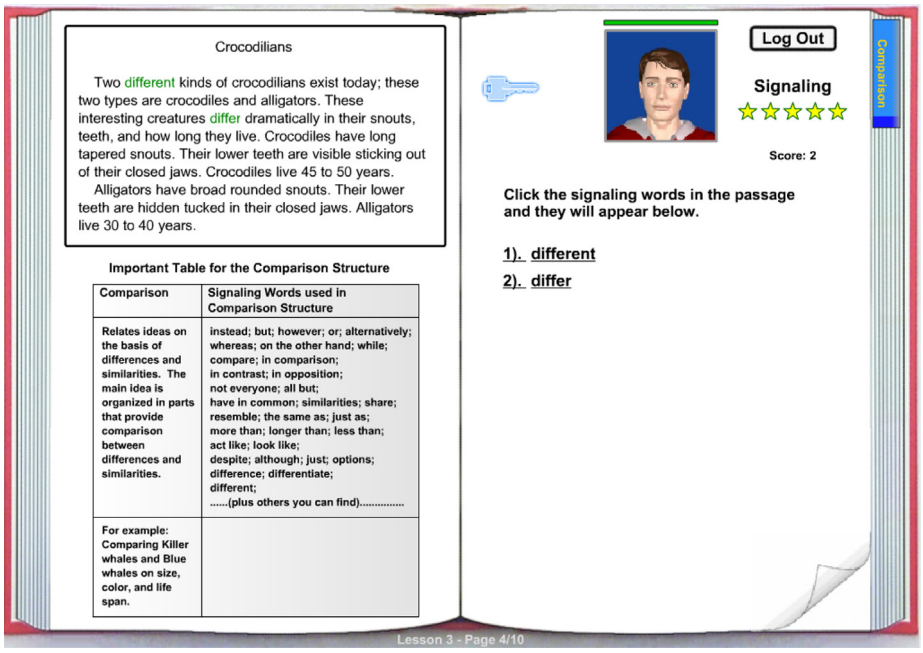

Fig. 1. ITSS interface with instruction about comparison signaling words.

performances via the instruction and feedback provided by ITSS. Students who frequently produce off-task responses while working in the ITSS system miss an opportunity to improve their reading comprehension with expository texts, a critical skill throughout formal schooling and across the lifespan. Such off-task responses are a problem for ITSS and other intelligent tutoring systems in that some students are engaged in avoiding deep thinking about the instruction instead of engaged in learning. Table 1 summaries some of the extant categories used by other researchers to examine disengagement behaviors related to intelligent tutoring systems (ITS). Other categories have been outlined, such as carelessness (Wixon, 2013), but they lack relevance to the problematic responses in the log files from ITSS. The most similar category is listed in the second row of Table 1, responses that are unrelated to the goals of the instruction (Rowe, McQuiggan, Robinson, & Lester, 2009; Wixon, 2013; Wixon, de Baker, Gobert, Ocumpaugh, & Bachmann, 2012). In line with Rowe et al. (2009) and the foundational research by Carroll (1963), we will call these system active, disengaged responses by the term, **off-task responses**. As a step toward reducing such off-task responses, in this study we identify students who produced these off-task responses in a sample of fifth- and seventh-grade students and primarily focus on learner characteristics that may explain why they were engaged in these behaviors rather than learning.

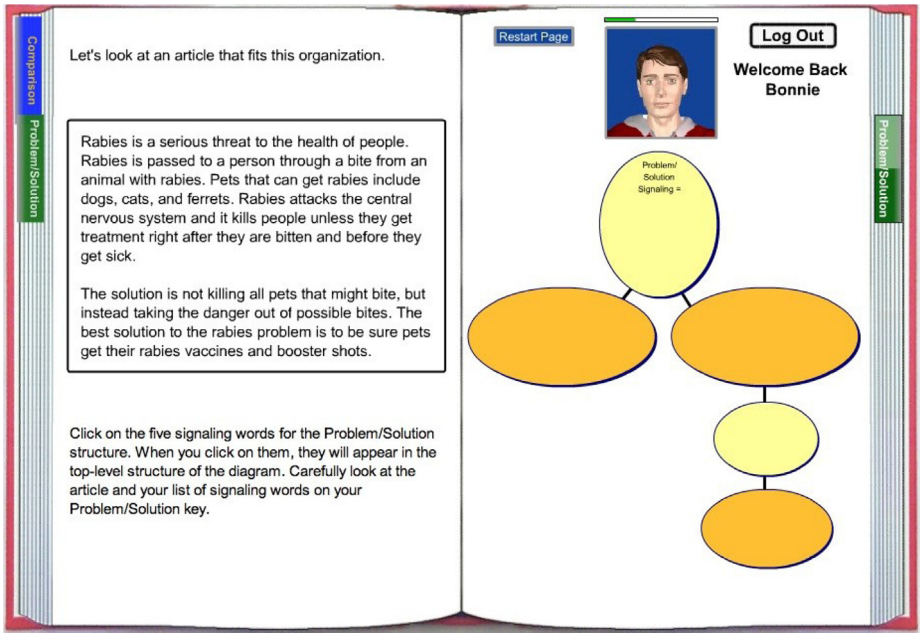

Fig. 2. ITSS interface with instruction about combined top-level structures of problem-solution with comparison.