

Choosing Reading Passages for Vocabulary Learning by Topic to Increase Intrinsic Motivation

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Abstract: Intrinsic motivation has been shown in previous research to lead to better learning. In order to increase intrinsic motivation, REAP, a tutoring system for ESL vocabulary was enhanced to prefer practice readings that match personal interests. In a randomized experiment, students receiving personalized readings indicated higher levels of interest in post-reading questionnaires. Additionally, overall post-test scores were higher (but not significantly) for students with interest-matched practice readings than for students using a previous version of REAP that did not match topics to student interests.

1. Introduction

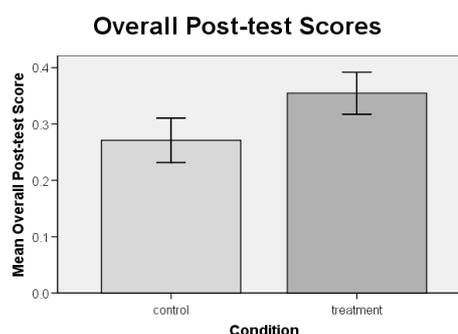
This paper discusses the enhancement of the REAP tutor [1] to allow for personalization of reading materials by topic in order to increase learner interest and intrinsic motivation. In this work, the term “personalization” refers to the selection of practice readings in order to match a student’s interests. The REAP tutor is an intelligent tutoring system for English as a Second Language (ESL) vocabulary and reading practice. It provides contextualized practice on individualized vocabulary lists by selecting reading passages (roughly 1000 words long) from a large corpus of annotated Web documents. There are a variety of constraints that the tutor considers when selecting readings for students, including reading difficulty level, grammaticality, scheduling of practice, the length of a reading, the number of target words in a reading, etc. The tutor selects reading materials from its corpus that contain target words from individualized lists and satisfy these other constraints.

Students work through a series of readings, each of which is followed by practice exercises for the target words in the reading. While reading a passage, students are able to access dictionary definitions for any word in a reading either by clicking on a highlighted target word or by typing a word into a box in the lower-left corner of the screen. The target words in the readings are also highlighted to encourage the coordination of multiple sources of information about a word’s meaning—namely, the implicit context around words and the explicit definitions of words.

Table 1: Post-reading interest responses for students using versions of tutor with or without personalization of readings.

Interest Rating	% of Scores (No Personalization)	% of Scores (Personalization)
1 (least)	6.9	4.1
2	15.0	19.1
3	41.9	32.0
4	30.0	39.7
5 (most)	6.2	5.2

Figure 1: Overall post-test scores by condition. Error bars indicate standard error. Maximum score is 1.0.



2. Text Classification for Personalization of Reading Material

To allow for the personalization of readings, the REAP tutor includes personalization by topic as a factor in its algorithm for choosing optimal readings. Students take a short survey to inform the system about which general topics they are interested in reading about. The system then prefers readings that have been classified as pertaining to those topics.

In order to identify texts that match up with student interests, a text classification system was implemented to classify each potential reading by its general topic. A Support Vector Machine [2] text classifier with a linear kernel was trained on Web pages from the Open Directory Project (ODP, <http://dmoz.org>), which are organized into a hierarchy of topics. SVM-Light [3] was used as the implementation of the Support Vector classifier. The following general topics were manually selected from the set of top-level ODP categories: Arts, Business, Computers, Games, Health, Home, Recreation, Science, Society, and Sports. Web pages with human-assigned topic labels from the ODP (1,000 pages/topic) were used as training data for the classifier.

Post-reading interest questionnaire results indicate that the topic choice system in REAP is effective at improving interest. After each reading, students were asked how interesting the just-completed reading was on a Likert scale from one to five, with five indicating greatest interest. Students in the treatment condition (described below) with personalization of readings by topic responded that they were interested in readings more frequently than did students in the control condition. The distribution of responses is shown in Table 1.

Personalization does not, however, mean that students learn only narrow-coverage words that relate to their topics of interest. Students with different interests practiced similar sets of general-purpose vocabulary from the Academic Word List [4]. For instance, in the study described in this paper, one student interested in arts saw the word “endure” in a text describing an artist’s early career struggles (“For an artist who has *endured* so many years of obscurity...”). Another student interested in business saw the same word used to describe economic hardship (“As California has *endured* a burst tech bubble, costly energy crisis and a staggering burden on its business community...”).

3. Experimental Evaluation of Learning Gains

An experiment was conducted to measure the effects of personalization on learning progress in the REAP tutor. Thirty-five students at the English Language Institute at the University of Pittsburgh participated in this experiment as part of an intermediate English as a Second Language Reading course. The students were randomly assigned to control or treatment conditions. For students in the control condition, the REAP tutor ignored the student interest survey and offered readings to students based on the goals of the curriculum. For students in the treatment condition, the REAP tutor was the same as in the control except that it also preferred readings about topics of personal interest.

At the end of the series of 9 forty-minute training sessions, students took a post-test consisting of cloze questions for the target vocabulary words that were identified as unknown through a self-assessment pre-test. The post-test consisted of forty questions for target words that appeared in at least one passage completed by the student.

The effect of personalization on learning was measured by student performance on the post-test cloze questions for target vocabulary words. Students in the treatment condition performed better on average ($M=35.5\%$, $SD=14.9\%$) in terms of overall post-test scores compared to students in the control condition ($M=27.1\%$, $SD=17.2\%$), as shown in Figure 1. The difference in mean overall post-test scores in the treatment condition was 8.4% (95% CI = -2.8%, 19.5%), which corresponds to a medium effect size of 0.51. However, this difference is not statistically significant ($p=0.14$, two-tailed t-test).

The findings of this work suggest that automatic techniques can be effectively applied to select readings by topic to match student interests. The results for measures of learning are promising and suggest that the effects of personalization of texts for vocabulary practice should be investigated further.

5. Acknowledgements

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