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Exploring Self-regulated Learning Behaviors in a Negotiated Online Reading Assessment

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Abstract: This study designed a negotiated online reading assessment in order to facilitate students' self-monitoring and self-reflection on reading abilities. After taking a reading assessment, students are allowed to negotiate with the system, so that they may further understand their abilities and likely take actions to improve the abilities. This study also conducted a preliminary evaluation to explore the online behaviors of students with different self-regulated learning abilities. For this purpose, a lag sequential analysis approach was applied to identify significant transitions between actions in the negotiation process. The preliminary results showed that low self-regulated learners tended to directly explain their abilities, while high self-regulated learners tended to query the system before explanation. Besides, high self-regulated learners also tended to take the assessment again.

Keywords: Negotiated learner models, self-regulated learning, sequential analysis

1. Background

Open learner models allow learners to view, control and even edit their own learning status (Bull, & Kay, 2010). Furthermore, open learner models may facilitate learners to reflect what they have and have not learnt, improve meta-cognitions, and support active learning. Regarding the design of open learner models, Bull and Kay (2010) indicated the issue of system/learners controls. A learner model mainly under the control of a system only allows learners to inspect their learning status, likely resulting in the problems of low understandability and trusts. Conversely, a learner model mainly under the control of learners allows learners to change the data in the system, likely resulting in low correctness of data. For these reasons, researchers further proposed negotiated learner models (Bull, 2016), which allows learners and the models to persuade each other until reaching agreement or maintaining disagreement (*e.g.* Dimitrova, 2003; Kerly, & Bull, 2008).

When students interact with negotiated learners models, their behaviors may conceal the information of their meta-cognitions. For example, when students negotiate with the system, they need evaluation, reflection, decisions, and argumentations. Therefore, we propose to investigate students' meta-cognitive abilities through behavioral analysis. In our previous studies, we have developed an online reading assessment for primary students, which may help teachers evaluate students' reading comprehension. However, we also found that students could not easily understand their reading abilities, not to mention improvement. In order to facilitate students' self-reflection and self-monitoring, this study designs a negotiated online reading assessment, so that the students may take reading assessment, understand their reading abilities and then take actions to improve the abilities by negotiating with the system.

2. Design

The activities of the assessment and negotiation are illustrated in Figure 1. In the assessment, students participate in an online test to evaluate their reading abilities. In the negotiation, students

may further interact with the system to understand more about their abilities or attempt to change the results of the assessment.

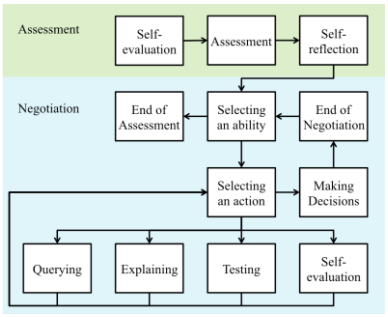


Figure 1. The activities flow.

Figure 2. Negotiating reading abilities.

2.1 Assessment

In the beginning of the assessment, students are required to evaluate their initial perceptions on the reading abilities in terms of five dimensions—retrieval, interpretation, inference, organization, and reflection (Tian, *et al*., 2017). Furthermore, the students have to evaluate all five dimensions of reading abilities by selecting one from five levels (*i.e*. excellent, good, qualified, bad, terrible). They then receive a reading assessment, which includes four articles and 30 multiple-choices questions. After the assessment, the system shows the results of the five dimensions of reading abilities, so that they may compare the results with their initial perceptions.

2.2 Negotiation

From the five dimensions of reading abilities, students may choose one dimension to negotiate with the system. As shown in Figure 2, the students may select an action from a menu, which include querying, explaining, testing, self-evaluating, and making decisions.

(1) Querying: Students ask the system for further evidences to understand the results.
(2) Explaining: Students explain why they overestimate or underestimate their abilities.
(3) Testing: Students take an additional test again, so that the system may take the result into consideration and adjust the evaluation of the abilities.
(4) Self-evaluating: Students evaluate their perception of their reading abilities again.
(5) Making decisions: Students may accept or reject the system's evaluation, or they may also propose a compromise.

3. Preliminary Evaluation

3.1 Settings

In this paper, we explored the negotiation behaviors of students with different self-regulated abilities. This study recruited 35 students (14 boys and 21 girls) from a primary school in China. Before the assessment, the students were required to answer a questionnaire of self-regulated learning (Sha, Looi, Chen, Seow, & Wong, 2012) in order to distinguish high self-regulated students from low ones. They then took the online reading assessments and obtained the initial results. After the assessment, they were encouraged to interact with the system to further understand their results or even change them.

3.2 Results

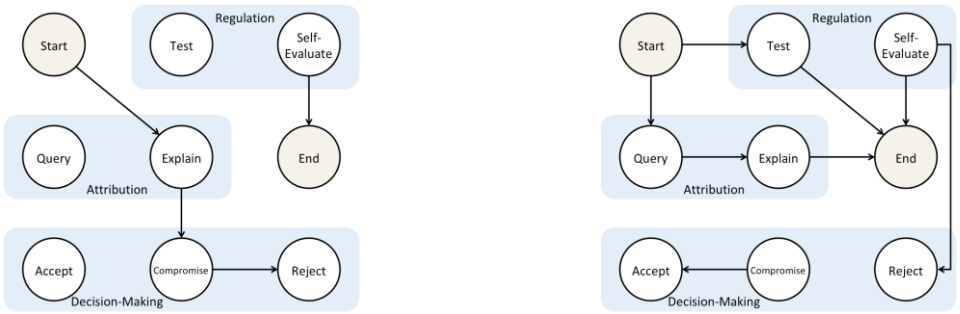
In order to understand students' behavioral patterns, this study adopted a lag sequential analysis approach with the significance level as 0.05. Furthermore, the approach was applied to both high and low self-regulated students. The results are illustrated in Figure 3. A common behavioral pattern

between high and low self-regulated students was that the students tended to evaluate their abilities before the end of negotiation. This may be probably because the students attempted to change their self-evaluation to meet the agreement. However, after self-evaluation, high self-regulated students likely reject the results of the assessment and maintain the disagreement.

As shown in Figure 3(a), the low self-regulated students tended to explain the reasons of their perceptions without querying the system. After explaining, they also tended to propose a compromise and then reject the results of the assessment as their final decisions. In a sense, low self-regulated students might expect that the system should accept their perceptions. In other words, it seemed difficult for low self-regulated students to accept what the system said.

The behavioral patterns of high self-regulated students (Figure 3(b)) appear more diverse then those of low self-regulated students. Furthermore, the high self-regulated students tended to query why they got the results before explaining to the system. As an action of regulation, they also tended to take the tests again to provide evidences that they possessed the reading abilities. This may be probably because the high self-regulated students wanted to know why and how the others evaluated their abilities, and willing to take actions to improve the abilities.

In conclusion, the students with different self-regulated learning abilities demonstrated different behaviors in a negotiated online reading assessment. However, it should be noted that this study involved limited participants and could only provide preliminary evaluation, of which the results should not be over generalized. We will conduct more rigorous analysis in the future.



(a) Low self-regulated students (b) High self-regulated students

Figure 3. The results of sequential analysis.

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