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# Student Modeling for Adaptive Agent to Enhance Interest and Comprehension

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## Introduction

The recent development of teachable agent provides the learner with an active role as a knowledge constructor and focuses on the individualization. Individualized agent provides differential interface and responses adaptively depending on the characteristics of user and its behaviors. The aim of the ‘adaptive agent’ is not only to maximize the learner’s cognitive functions but also to enhance the interests and motivation to learn. To improve adaptiveness and individualization of the agent, it is necessary to assess each user’s specific cognitive and motivational characteristics and ongoing response patterns during learning. In order to establish the relationships among user characteristics and response patterns and to extract the algorithm among variables, we measured the individual characteristics and analyzed logs of the teachable agent named KORI (KOREA university Intelligent agent) through the student modeling.

## Method

### Participants.

Twelve fifth graders (8 males and 4 females) participated in the student modeling.

### Procedure.

All of the participants took the 30 minutes lesson on the ‘Rock Cycle’ which is about the three kinds of rocks and their transformation. Next, participants filled in questionnaires on individual characteristics including self-efficacy, goal orientations, and metacognition. The final step is the 30 - 40 minute interaction with KORI. During this period, the log data were recorded automatically and participant’s behaviors were videotaped. After teaching KORI, participants completed the interest questionnaire and comprehension test.

## Results

A correlation analysis was conducted to identify the relationships among individual characteristics, user responses, and learning outcomes. Among hundreds of possible relationships between numerous variables in three dimensions, nine key user responses were extracted, which were highly correlated with either individual characteristics and learning outcomes (See Figure 1).

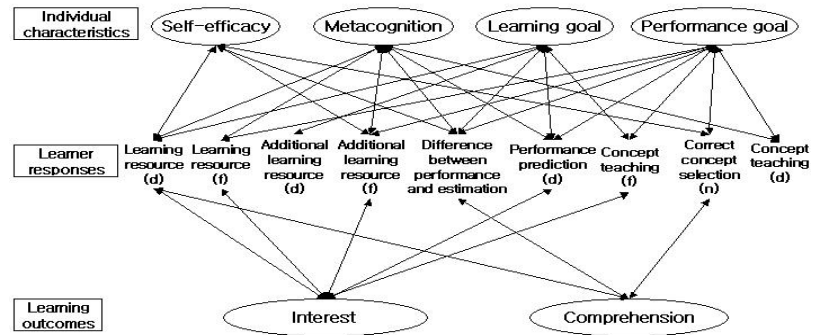


Figure 1: Structure of nodes (d: duration, f: frequency, n: number)

## Conclusion

The results suggest that certain type of learner responses or the combination of the responses would be useful indices to predict the learners’ individual characteristics and ongoing learning outcome. This study proposed a new type of dynamic assessment for individual differences and ongoing cognitive/motivational learning outcomes through the computation of responses without measuring them directly. The individualization is the ultimate goal of developing the learning agent. Thus construction of individualized student model based on the ongoing response pattern of the user that are highly correlated with the individual differences and learning outcome may be the useful methodology to understand the learner’s dynamic change during learning.

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