DEVELOPING AND EVALUATING A DIALOGUE-BASED MATHEMATICAL INTELLIGENT TEAM TUTORING SYSTEM FOR LEARNING NUMBER PATTERNS

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Abstract

The purpose of this study was to construct the dialogue-based math intelligent team tutoring system (ITTS) for learning the "number patterns" unit in the sixth grade of elementary school, and to evaluate the effect of this system on students' mathematical reasoning ability, as well as the feedback of the students on this ITTS. In previous studies, few studies have been published on dialogue-based ITTS for mathematical learning. This study combined teamwork and mathematical conjectures tasks to build a dialogue-based math ITTS. The pairing of real student and student partner agent is heterogeneous grouping in order to cooperate to solve the mathematical conjecture tasks assigned by the system. In order to evaluate the effectiveness of this ITTS, a quasi-experiment design was conducted. The pretest and post-test were parallel tests involving mathematical reasoning. The participants of this research were 114 students in the sixth grade from two elementary schools in Taiwan, which were divided into an experimental group and a control group for learning three lessons. The experimental group was 55 people, and learning with the ITTS designed by this study. The control group consisted of 59 people, and the class didactic teaching was used. The teaching content and time of both groups were the same. The results indicated that compared with the class didactic teaching, the dialogue-based math ITTS can improve students' mathematical reasoning ability significantly. In addition, more than 70% of students in the experimental group believe that the system is attractive and can improve their confidence in learning mathematics.

Keywords: *Dialogue-based math intelligent team tutoring system, finding number patterns, math conjectures, mathematical reasoning ability.*