ANALYSIS OF KINEMATICS GRAPH INTERPRETATION SKILLS USING RAPIDMINER

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INTRODUCTION

Educational data mining (EDM) is a method to extract important patterns and find useful information that can help improve teaching and learning. RapidMiner is a data mining platform that combines data preparation, machine learning and model operations.

METHODOLOGY

Participants were 60 Grade-10 students at Chiang Mai University Demonstration School. A conceptual survey on the Test of Understanding Graphs in Kinematics (TUG-K) was administered to students before and after the instruction. The conceptual survey consisted of 21 multiple-choice questions. Students' video analysis with Tracker skills were measured using authentic assessment and students' attitudes towards learning physics were measured using a questionnaire with 10 items in 5-point Likert-scale. Problem-based learning teaching technique was used to teach students how to analyze high speed videos using Tracker. Students worked in a group of five to record motions of objects in everyday lives. They then used Tracker to track object motions and used physics principles to analyze the motions.

RESULTS

From the statistical results of both pre- and post-test, the paired sample t-test, the mean scores differed statistically at 0.001 levels, indicating that the mean scores after instruction or the post-test (mean = 14.3, SD = 3.7) was significantly higher than the pre-test mean scores (mean = 12.4, SD = 3.2). The effect size was equal to 0.76, which was a value indicating that the post-test scores were quite different from the pre-test scores. Association rules operator in RapidMiner was used to uncover relationships between graph interpretation skills and video motion analysis with Tracker skills, as well as students' attitudes in learning physics.

FURTHER READING

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