Student factors affecting latent transition of mathematics achievement measuring from latent transition analysis with a mixture item response theory measurement model.

Korawan Saengtrakul, Sirichai Kanjanawasee, Nonglak Wiratchai

The first author is grateful for financial support throughout the 90th Anniversary of Chulalongkorn University Fund (The Ratnadaphisekompont Endowment Fund)

The extension of the latent transition analysis (LTA) to include continuous latent variables by incorporating a mixture Rasch (IRT) measurement model (MRM) is applied in the three-time point measurements of students’ model of mathematic achievement affecting by student factors in this study. The two objectives in using the latent transition analysis with a mixture Rasch (item response theory) measurement model (LTA-MRM) are a) to study the three time measures of latent mathematic achievements and their transitions including the probability of those three transitions, and b) to study the effects of the dynamic student factors measuring 3 times on the student latent mathematic achievements and latent transitions.

Methods

This study employs the student factors, consisting of types and duration of activities, as independent variables and the the latent transition analysis results, consisting of the latent mathematic achievement and latent transition, as dependent variables. The Mplus computer program is used to estimate the LTA-MRM.

In data analysis design, the analysis plan starts with the preliminary analysis to compare the different in mathematic achievements across three periods, using descriptive statistical analysis and ANOVA.

Results

The major findings are, a) the effects of student factors on latent mathematic achievements and their transitions varied, each round of measurement; with student factors, in the second round, having the highest transition probabilities of moving latent class; b) the student factors affect latent mathematic achievements and their transitions in all three rounds of measurement. Furthermore, the latent transition analysis results using LTA-MRM shed light on students grouping according to their latent abilities, the characteristics of each latent student group, and the latent transition model for each student.

Conclusion

This research confirms the hypotheses, and the LTA-MRM analysis results not only shows the transition of latent classes but also facilitates the study of what time the organizing activities have most effects on the transition of latent class, which consequently yield information on student factors which involve what types of activities most affect the transition of latent class concerning academic achievement.

References