A LONGITUDINAL STUDY ON THE RELATIONSHIP BETWEEN STUDENTS' MATHEMATICS LEARNING DISPOSITION AND ACHIEVEMENT: LATENT TRANSITION MODEL ANALYSIS

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Numerous studies have shown that students' math performance is related to learning strategies and goal orientation. However, few studies have investigated the association among these variables across students' grades. Due to the difficulty of longitudinal data collection, most studies were mainly cross-sectional with one-time data collection, but this might ignore the time factor and change in the learning process.

This study uses data from a county's 2017, 2018, and 2019 mathematics achievement tests in the Taiwan Education Long-Term Database. Exploring change over time of math achievement, goal orientation, and learning strategies for 1,500 students in grades five through seven. In this study, researchers collectively refer to goal orientations and learning strategies as learning dispositions and conduct a longitudinal study on the relationship between mathematics learning dispositions and achievement. In addition to discussing the number of latent categories for each grade level, this study used a Latent Transition Model Analysis (LTA) to assess the dynamic relationship between learning disposition and mathematics achievement, incorporating the time factor into the estimates (Collins & Lanza, 2009). The study results found that learning disposition can be divided into three potential categories in each grade. Category A is students with positive performance, mastery orientation, and elaborative learning strategies. Category B is students with positive performance, mastery orientation, and control learning strategies. Finally, category C is students giving up in learning or passive performance orientation and taking passive memorization learning strategies. The results of the LTA analysis found that gender was associated with learning disposition, and students with different dispositions had different math achievements. After equating the mathematics achievement scales of the three grades, it showed that the average performance of these three categories was the highest in the sixth grade and showed a downward trend in the seventh grade. It found that their learning disposition changed in lots of students in the cross-grade learning process. This study shows that the longitudinal analysis considering the influence of time is more precise and practical than the cross-sectional data analysis and proposes relevant suggestions for future study and instruction in mathematics education.

References

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