NEWSLETTER

Factors Influencing Mathematics Grades of Junior Secondary Students: An Analysis Based on the Hierarchical Linear Model

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NOWADAYS, How to improve student classroom learning efficiency has always been an important issue in education. Both students' internal factors and the classroom environment, one of the important external factors, affect their academic performance. This study (published in *Educational Research and Experiment*) surveyed eighth-graders from 10 classes of a middle school in Beijing and adopted the hierarchical linear model to explore the factors influencing math grades of junior secondary students. Student math grades were used as the dependent variable and the student individual academic level and the class average academic level as independent variables. The nested model was employed to examine individual and class factors influencing individual math grades. The findings of the study are as follows.

First, there is no significant gender difference in student math grades, but boys' self-concept and academic self-efficacy in math are remarkably higher than girls'. This may be due to girls' identification with gender stereotypes in math learning.

Second, at the individual level, student self-concept and self-efficacy in math can significantly and positively predict their math scores.

Third, at class level, class cooperation positively predicts student math grades, but class competition has no significant effect on student math scores.

Fourth, class cooperation and student self-concept in math have a significant influence on the cross-layer interaction of their math grades. In the class of low-level cooperation, student self-concept in math can significantly affect student math grades, but in the class of high-level cooperation, the effect is not significant.

According to the above research results, encouraging classroom cooperation is a feasible and effective measure for mathematics learning. In the junior secondary stage, students are experiencing a critical phase of the development and transition of individual self-consciousness, and students acquire higher-order emotional experience and self-acceptance based on self-evaluation. In a good class atmosphere, student self-concept in math is easier

to maintain at a high level. At the same time, as the focus of student self-consciousness is undergoing a transition from physiological needs to inner psychological quality and social communication, the sense of belonging to class is better aligned with students' social psychological needs. Therefore, in junior secondary mathematics teaching, cooperative learning should be encouraged to create a good classroom climate.

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