

**ZMATH 2009a.00335**

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**Studying on the effect of solid geometry teaching with vector and synthetic methods.**

J. Math. Educ. (Tianjin) 17, No. 3, 55-57 (2008).

Summary: Vector geometry provides a new method for studying space and figures, and contributes to appreciating the mechanized thought of modern mathematics. Using an ability test, we want to examine the effect of solid geometry teaching that introduces space vectors to deal with some problems concerning metric and positional relations. Through an analysis of written solutions by 368 third grade senior high school students in Shijiazhuang, we found that most students used two methods simultaneously, the students who only used the synthetic method were a few more than those using the vector method. But the grades of V students were higher than the grades of E students. We also analyzed two error types – general error and vector error. Logically invalid inference and misinterpreted language were the most general errors. Most of the errors related to the vector concept were operational mistakes with coordinates.

*Classification:* G70 G40 D70

*Keywords:* research; student errors; three dimensional geometry; vector algebra; analytic geometry; synthetic geometry