To See is to Believe: Why Students Cannot Detect Geometric Properties?

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0152

Geometric properties are important characteristics to identify geometric shapes. The sorting task in geometric shapes is to help students understand the relationship between geometric shapes and properties. Satlow and Newcombe (1998) indicate that students of different ages have different preferences to identify geometric shapes. From the psychological perspective (Emmanuel et al., 2011), people prefer to use one dimension to classify objects. Both studies show that students would use a geometric property or their visual cues to classify geometric shapes. Therefore, this study would like to understand how students classify them. There are two research questions which will be addressed: do students have any preference to classify geometric shapes? If students use geometric properties, which property are used by students for classifying geometric shapes? Geometric shapes in primary schools have two basic attributes which are sides and angles. Triangle shapes are one of the most important concepts in primary schools. Materials in this study will adopt the sorting task in triangle shapes. There are seven kinds of triangle shapes in the Taiwanese textbooks, including obtuse isosceles, obtuse scalene, acute isosceles, acute scalene, right isosceles, right scalene and regular triangles. The sorting task in triangles has 24 geometric shapes. Each triangle shape appears three times. One is a typical type, another one has a different size and the other one has a different orientation. There also exists three non-triangle shapes in this task. The result shows that students have preferences to classify geometric shapes. They prefer to use sides to identify shapes rather than angles.

Emmanuel, M. P., Amotz, P., Todd, M. B., Ken, K., Darren, J. E., Peter, H., & John, V. M. (2011). Measuring category intuitiveness in unconstrained categorization tasks. *Cognition, 121*, 83-100. doi: 10.1016/j.cognition.2011.06.002

Satlow, E., & Newcombe, N. (1998). When is a triangle not a triangle? Young children's developing concepts of geometric shape. *Cognitive Development, 13*(4), 547-559.