

STUDENTS' APPRECIATION OF 3-DIMENSIONAL SOLIDS: A STUDY IN HONG KONG

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ABSTRACT

"Spatial sense" has always been seen as important. This is the case in Hong Kong as well as many other different places in the world. Hong Kong primary students, besides learning simple geometric figures and solids in their mathematics lessons, also have a chance to develop their spatial sense further in their experience of art appreciation in their art lessons. There are opportunities of employing skills such as identifying, describing and classifying 2-dimensional shapes and 3-dimensional solids; intuitive recognition of reflective/symmetrical objects in the visual art curriculum.

A teaching package "Buildings in the future" was developed. The package consisted of three parts. First, different kinds of buildings were presented in screen images and students were asked to recognize the geometric forms and shapes from the screen images. Second, students needed to draw a sketch of a building which they would like to construct. In this part, the students needed to present the concepts in their sketches. Finally, the students constructed models of their own buildings according to their sketches and present their models.

The package lasted for four lessons of 70 minutes each. The package was tried in 4 primary-four classes (age 9) and the lessons were videotaped. The subsequent analysis aimed to find out what roles the students' understanding of the geometric concepts might play in their perception of the buildings in pictures, as well as in the design and construction of models. The framework developed by Gutiérrez (1996), in which visualization is seen as "a kind of reasoning activity based on the use of visual or spatial elements, either mental or physical, performed to solve problems and properties", was used as conceptual tools in the analysis.

Some interesting results have been observed. For example, despite the fact that the students had been taught the basic geometric concepts, they had confusion between the shapes and the forms, prisms and pyramids. Some students made their mental image explicit in the presentation of their own sketches. In constructing their own buildings, a few modified their designs as a result of the difficulties in constructing a particular solid.

REFERENCES:

Gutiérrez, A. (1996). Visualization in 3-dimensional geometry: In search of a framework. *Proceedings of the 20th International Conference for P.M.E.*, 1, 3-19.