Reform movement paper

TEACHING MATHEMATICS AND SCIENCE: IMPACTS BY REFORM MOVEMENTS

The reform movements in education pertaining to teaching science and math regeneratednew methods in making mathematical and science-related concepts concrete, and therefore, more understandable. Teaching for understanding is a concept that embodies the teaching of math and science, referring to instruction that focuses on student thinking, powerful scientific and mathematical ideas, and offers equitable learning opportunities to students (Gamoran, et al., 1992). The key challenges to supporting teaching for understanding include aligning purposes, perceptions, and commitments; providing resources to classroom teachers; and sustaining change (Gamoran, et al., 1992). The reform movements were able to allow teachers and resources to undertake collaborative efforts pertaining to Teaching for understanding science and math.

Contemporary math and science teaching is now focused on children's psychological development that allows for the alignment of their learning capacities. In enabling an easier understanding of math concepts, the teacher must elicit, build upon, connect student knowledge, and be able to build learning paths and networks of knowledge in the classroom (Treaqust, 1996). A constructivist idea in learning math and science is what is being introduced by reform movements in both subject matters. The reform movements gave way to efforts pertaining to investigating students' conceptions, improving teaching and curricula, and enhancing teacher education in science and mathematics contexts (Treaqust, 1996). Unlike the traditional manner of teaching math and science, attention to math and science curricula was not emphasized, as well as concretizing students' learning.

A post-modern conception of teaching math and science through concrete objects that facilitate formation of abstract concepts was developed. Montessori's philosophy has been the ground of several contemporary constructivist theorists pertaining to how since and math can be best taught to children in school. The development of manipulatives has been the result of this, constructed in the notion that before a child is able to reach the abstract and analytical level of learning; he has to go through the concrete stage first. Again, the use of manipulatives was absent in the traditional method of teaching and learning math and science.

Montessori believed that learners construct knowledge and meaning for themselves as they learn individually and socially. Traditional methods did not have this embodiment, as they did not consider that the learning process is one that may be enjoyed and learned socially with fellow learners. Constructivist learning through the formation of abstract concepts is applied in the usage of concrete objects (Edwards 2002), and discovery learning and interest-support are promoted by such usage. It is stated that the usage of concrete objects in math and science must be able to heighten the learner's level of learning, from concrete up to abstract sequence (Howden 1986), a process not seen by traditional methods. When pupils have an understanding of the concrete level of understanding a mathematical concept, they can link this foundation to abstract mathematical learning activities (Gronlund and Helm 2000). They develop tangible understanding of math concepts and skills through the concrete-to representational-to abstract sequence of instruction. When learners are supported to develop a concrete level of understanding for a mathematical or science concept, they can use this foundation to reconcile their representational understanding of math and

science concepts with their abstract understanding.

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