

IMPORTANCE OF SITUATED LEARNING THEORY IN REALIZING CULTURAL AIMS OF MATHEMATICS EDUCATION

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Cultural aims, which aim for students to enjoy, inherit and develop mathematics as culture, are considered part of the aims of mathematics education in Japan. However, they have not been realized yet. One of the reasons would be the lack of Japanese teachers' and researchers' recognition of the goals of mathematics education at the stage of designing lessons. Situated learning theory (Lave & Wenger, 1991), a viewpoint on learning which emphasizes paying attention to 'activity', is considered to have potential to solve this. Focusing on activity requires teachers to have a clear image of ideal students in terms of mathematical activity while designing mathematics lessons. The purpose of this paper is to illustrate the importance of the theory in realizing cultural aims of mathematics education in Japan. General principles of lesson design based on the theory (Imai, 2010) to realize the above-mentioned aims can be interpreted as follows: (1) Choose a mathematical activity from a real situation in the history of mathematics in order to stage it in the classroom. (2) Make students involved in the actual mathematical activity staged by the teacher. Based on these principles, case-study lessons on the trisection of an angle, one of the three famous problems of the ancient Greeks, for three classes of seventh graders (first graders in junior high school in Japan) were conducted by the author of this paper in 2016. Looking back on the history of the problem, the problem attracted significant interest among amateur researchers, who one after another claimed to have found how to do the impossible - construct trisectors, and troubled mathematician even after the proof of impossibility. In the lessons, students worked on the trisection of 90° , 45° and 60° , and many of them could construct the trisector of the former two angles in collaboration with each other. The students' feedback regarding the lessons obtained with the use of a form at the end of the lessons revealed that about 50% of them clearly showed the motivation to explore the problem in the future and about 40% of them described they enjoyed solving the problem. It implies that cultural aims of mathematics education can be expected to be attained by recreating the real situation in the mathematics lessons based on the principles of situated learning.

References

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