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**The influence of 3D representations on students' level of 3D geometrical thinking.**

Liljedahl, Peter (ed.) et al., Proceedings of the 38th conference of the International Group for the Psychology of Mathematics Education “Mathematics education at the edge”, PME 38 held jointly with the 36th conference of PME-NA, Vancouver, Canada, July 15–20, 2014, Vol. 4. [s. 1.]: International Group for the Psychology of Mathematics Education (ISBN 978-0-86491-360-9/set; 978-0-86491-364-7/v.4). 25-32 (2014).

Summary: While representations of 3D shapes are used in the teaching of geometry in lower secondary school, it is known that such representations can provide difficulties for students. In this paper, we report findings from a classroom experiment in which Grade 7 students (aged 12–13) tackled a problem in 3D geometry that was, for them, quite challenging. To analyse students' reasoning about 3D shapes, we constructed a framework of levels of 3D geometrical thinking. We found that students at a lower level of 3D thinking could not manipulate representations effectively, while students operating at a higher level of 3D thinking controlled representations well and could reason correctly.

*Classification:* G43 C33 G23

*Keywords:* geometrical thinking; 3D shapes; representations; difficulties; spatial ability