

COMPONENTS OF THE SPATIAL SENSE IN PISA ACTIVITIES FOR SECONDARY EDUCATION

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Research on geometry education has included spatial thinking and reasoning and visualization in geometry (Jones & Tzekaki, 2016). We present findings related to spatial thinking and visualization skills. Research in the field of spatial skills indicates a low development of the abilities related to spatial orientation, spatial transformations and relationships, as well as the understanding of spatial dimensions and positions.

We present findings that seek to determine the components of spatial sense (NCTM, 1989) that the written assessments proposed by PISA demand, in order to be solved by 15-year-old students in Uruguay. Among the activities aimed at the command of the mathematical culture released by PISA tests, in 2003 and 2012, when Uruguay participated, we analyzed those related to the space and shape content area. To examine the components of the spatial sense, each of the seven activities are solved in detail, and tables that deal with the use of geometrical concepts are designed: concepts of the figures, features of the shapes, geometrical relationships, location and movements, orientation; besides, the visualization skills required to solve them: motor-eye coordination, figure-context perception, conservation of the perception, perception of the position in the space, perception of the spatial relationships, visual discrimination and visual memory. Results emphasize the differentiation between spatial visualization and spatial orientation (Diezmann & Lowrie, 2009). We conclude that the visualization skills needed in the assignments are: figure-context perception, perception of spatial relationships, and conservation of the perception without the spatial orientation.

References

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