Moving to Spatial Thinking through Geometric Modeling: an approach among prospective teachers combining Physical and Digital Resources

Nowadays, while researchers claim for more Science, Technology, Engineering, and Mathematics (STEM) integration, the reality in most schools still keeps being as traditional as ever, with subjects split into different “boxes”. Intending to contribute to the change of this scenario, we have considered the need to promote the integration of STEM subjects already in teacher training courses. Therefore, an intervention was developed in Brazil with prospective teachers using Geometric Modeling Approach combining physical and digital resources. Transferring a register of representation into another can be a sound and worthwhile way of fostering better understanding of mathematical objects. Such a translation demands different perspectives in which meanings can be properly interpreted regarding the resources. In this approach, while hands-on prototypes bound physical barriers, digital representation emphasizes either geometric relationships or algebraic descriptions. Even though the lens in this activity is focused on the geometrical construction, either in a 2D or 3D space, this approach can also be applied to other fields like physics, engineering or programming. The aim of this research is to evaluate how both physical and digital resources can be lead in the classroom. In particular, we are interested in observing which different competencies can emerge from this approach and how both resources can support each other in this sense. As part of the research, prospective teachers had to represent kinesthetic simulations based on real objects’ movements in both physical and digital way. Geometrical constructions in GeoGebra were followed with a special attention to the use of perpendicular lines and symmetry features. The first analysis based on these observations will be discussed and outlined in this work as preliminary findings of this research.