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The Augmented Reality Sandbox as a tool for the education of Hydrology to Civil Engineering students

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ABSTRACT

The introduction of new technological tools in higher education seems to be of outmost importance since it enhances the ability of students to understand the function of natural phenomena or technical structures. Augmented reality tools offer the advantage of actual – or rather virtual - participation increasing the interest of participants and thus, their level of understanding. In this paper, an advanced application of the Augmented Reality Sandbox is presented.

The original A.R. Sandbox was the result of an NSF-funded project on informal science education for freshwater lake and watershed science developed by the UC Davis' W.M. Keck Center for Active Visualization in the Earth Sciences (KeckCAVES), together with the UC Davis Tahoe Environmental Research Center, Lawrence Hall of Science, and ECHO Lake Aquarium and Science Center.

The application developed by the authors is adjusted to the educational needs of teaching hydrology to Civil Engineering students. Several improvements of the A. R. Sandbox have been developed by the authors, in order to provide to Civil Engineering students, the ability to better understand the concept of a watershed, of surface flow, of flooding and of the impact of constructions in the flow regime of rainwater.

The improvements made on the A. R. Sandbox developed at the Division of Hydraulics and Environmental Engineering, of the Department of Civil Engineering at the Aristotle University of Thessaloniki, refer to the introduction of simplified and user-friendly ways to change the scale of the map, the water level, and the intensity and duration of rainfall, the evapotranspiration etc.

Another significant improvement is the introduction of an automated procedure for the development of a 3-dimensional model and its direct transformation in order to be seen through Virtual reality (VR) glasses.