Using Mixed Reality to Bring interactivity to Metabolism Teaching

Vega Garzón, J.C; Magrini, M.L. & Galembeck, E.

Departamento de Bioquímica, Universidade Estadual de Campinas, SP, Brasil.

INTRODUCTION: Visual literacy is the ability to understand (read) and use (write) images and to think and learn regarding images (both static and moving). Visual literacy and visualization are key learning components in the biochemistry because that science uses models of molecules to explain how cells work. Many studies have shown that visualization technologies (VT) can be useful to develop essential visual literacy. The term “mixed reality” can be defined as the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time. The VT taps the brain's inherent ability to process visual information rapidly, identify patterns and sense order in complex situations generally making the complex simpler. **OBJECTIVES:** Design a Mixed Reality (MR) application named VRMET to help the development of visual literacy skills to understand and represent biochemical concepts. **MATERIALS AND METHODS:** VRMET app was developed using Unity3D, Vuforia Augmented Reality SDK and Google VR SDK for Unity. 3D molecules were obtained from Protein Data Bank and ChemSpider and optimized using Blender. VRMET uses a 3D scaled animal cell model. **RESULTS AND DISCUSSION:** VRMET requires a device with a camera. The user can get the App from the Google Play Store. VRMET has two different scenes: the Augmented reality (AR) scene and the Virtual Reality (VR) scene. AR Allows visualizing, from various angles, a scale model of an animal cell. VR allows one to realize a biochemical route within the cellular model, visualizing each one of the organelles and observing each of the reactions of glycolysis and the Krebs cycle. **CONCLUSIONS:** VRMET allows students to visualize the molecular structure of substrates and products, thus perceiving changes in each molecule along the metabolic pathway. It also allows observing where in the cell each metabolic pathway occurs.

Keyword: Metabolic Pathways, Augmented Reality, Virtual Reality.

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