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A self-determination theory approach to a stereochemistry educational escape activity utilising augmented reality

Engagement is frequently correlated with student success. However, this alone does not imply causation. The abiding educational challenge is to engage everyone in an effective and academically credible fashion. To this end, we have created a synergic combination of digital technologies in the form of a flexible escape activity hosting social problem-solving activities appealing to the principles of gamification and utilising both intrinsic and extrinsic motivational drivers. In our most recent example, the narrative environment serves as a context for stereochemical concepts in coordination chemistry and thus dovetails perfectly with our work on augmented reality.

The cognitive challenge of conceptualising the three-dimensional nature of chemistry, encountered by the novice student, is compounded by the arcane symbolism of hashes and wedges so familiar to the expert teacher. No longer does the educator need to make arbitrary judgements about the most effective representation to carry the learning objective to the otherwise passive student. This initiative liberates molecules from the two-dimensional constraints of the page or screen and places active control over the scale and orientation at the fingertips of the individual student. ChemFord was not the first to display molecules. However, it has been built by chemists who understand the value of being able to render multiple molecules to explore superposition or intermolecular packing. We are responsive to suggestions from the user base for additional content.

Herein, we have outlined an engaging, role-based, scalable digital learning experiences that utilises the cognitive benefits of augmented reality technology and context-based problem-solving. This digital learning experience can be easily delivered to large student audiences, with minimal additional facilitation, using our established protocol. Following the success of our pilot study at UEA (which hosted over 80 concurrent students), we hope to introduce educators to the potential of this exercise.

Key words

Augmented Reality, Stereochemistry, Educational Escape Activity, Gamification, Higher Education

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