Student partnered design of Immersive Virtual Reality Simulations

F. Jerry Reen*, Owen Jump, Brian P. McSharry, John Morgan, David Murphy, Niall O'Leary, Billy O'Mahony, Martina Scallan, Grace McEvoy, Christine Walsh, Briony Supple

University College Cork

Findings

Students as co-creators guided the design at module level, grounded in learning theory. Inclusion and partnership from the outset ensured a cohesive student-centred outcome to the simulation development.

Students reported a richer learning experience following the simulations when compared with traditional lectures. This was further enhanced by full immersion using the VR Headsets.

Experiential 'learning by doing' imparts a deeper learning experience. Starting with simple experiential exercises such as making a molecular jigsaw, through to a fully immersive VR experience, the 'learning by doing' and ability to visualize abstract molecular concepts was particularly valued.

Interdisciplinary collaboration across thematic areas has the potential to deliver significant innovation in teaching and learning in the Life Sciences. By placing the students at the centre of these collaborations, we can deliver on the promise of innovative T&L.

Impact

We have created a roadmap for interdisciplinary design and integration of immersive learning approaches at UCC. A key focus of this work was to place pedagogy at the focal point and guide through which to develop the VR simulations.

Dissemination in SoTL journals and symposia has created awareness of the ELEVATE concept. Students have given very positive feedback on the potential of the simulations to facilitate their learning experience, with the student-paced affordance and the ability to revisit and repeat being highlighted as important developments.

Enhancement of student learning through experiential learning and digitalisation of transferrable skills is ongoing and studies such as these are important in guiding future innovations in this space.

A new community of VR innovators who place SoTL and Learning Theory as a focal point ahs emerged from this work and continued investigations will bring new knowledge and understanding so that T&L is at the forefront of technology developments in Higher Education.

Aims

To explore the co-design and implementation of immersive learning approaches for the teaching and learning of challenging molecular concepts.

To develop a pedagogical roadmap for the integration of experiential learning approaches into the curriculum, guided and underpinned by Learning Theory.

Visuals

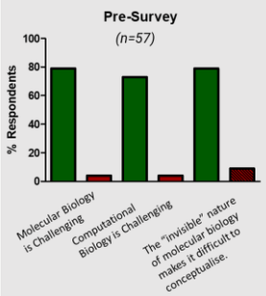

Fig. 1 MolBiol was identified as a challenging topic.

Fig. 2 Students had to interact with the simulation to build the plasmid and then answer a series of MCQ questions on the key components.

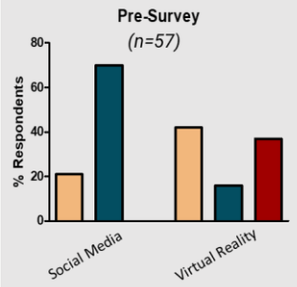

Fig. 3 While confident in Social Media and the Digital Age, students had less experience in Virtual Reality.

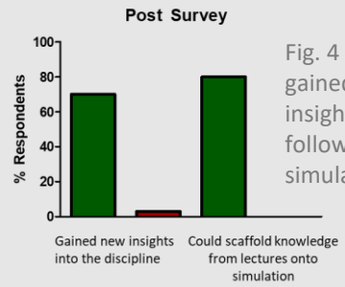

Fig. 4 Students gained a greater insight into MolBiol following the simulation.

Student Quotes

"The Virtual Reality experience was enjoyable, and I do believe it enhanced my understanding of the heterologous expression plasmid greatly"

"In the specific context of molecular biology, being able to visualise complexes forming in 3D and being able to visualise intracellular processes from every angle would greatly help with learning and the ability to recall a mechanism"

References

Reen F.J. *et al*., (2021). *Front. Virtual Real.* doi.org/10.3389/frvir.2021.670909
Blythe T. & Perkins D. (1998). The Teaching for Understanding Guide, (Blythe D, ed.) pp. 9-16. Jossey-Bass, San Francisco
Hines P.J. *et al*., (2013). *Science* **340**: 291-291. doi: 10.1126/science.340.6130.290
Radianti J. *et al*., (2020). *Comput Educ* **147**: 103778. doi.org/10.1016/j.compedu.2019.103778
Tibell L.A.E. & Rundgren C.J. (2010). CBE-Life Sci. Educ. **9**: 25-33. doi: 10.1187/cbe.08-09-0055

VALUING IRELAND'S TEACHING & LEARNING VIT&L
T&L NATIONAL FORUM FOR THE ENHANCEMENT OF TEACHING AND LEARNING IN HIGHER EDUCATION

VIT&L Teaching & Learning Showcase 2021

National Forum SATLE2019