



ROYAL
ACADEMY OF
ENGINEERING

Industry-Academia Partnership Programme



SOUTH AFRICA

Under its remit as a delivery partner of the Newton Fund, the Royal Academy of Engineering has partnered with the Department for Higher Education and Training in South Africa to enhance engineering teaching, research and innovation outcomes in South African universities by building bilateral industry-academia links.

Transforming teaching and learning in engineering through the application of virtual reality (VR) is one of the projects funded through this scheme. It brings together researchers from the University of Johannesburg and Manchester Metropolitan University in a collaboration with South African startup, The Virtual Space.



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“The knowledge acquired through this project will provide a benchmark for adopting the use of VR in education”, Dr Laseinde explains. “A key objective is for new teaching methods to evolve that may result in changes to curricula in terms of practical laboratory processes.”

MODELS OF ENGAGEMENT

Two master’s students have been engaged in the project and Dr Laseinde has used the collaboration to leverage additional funding from his university for equipment. The Virtual Space has provided academics and students with access to its VR systems as well as curating specific content for researchers.

The project is in its early stages, but there are plans to disseminate its outcomes in the future through a tailored public engagement forum and greater industry involvement.

“Our company mission is to ‘Educate Africa through VR’ - this is supported by engaging with academia to develop products and solutions. The connection with academia is influencing the direction of our VR and machine learning software development.”
 Richard McAdam, Founder, The Virtual Space.

BUILDING COLLABORATIVE PARTNERSHIPS

Dr Timothy Laseinde, University of Johannesburg, recognised that international collaboration and close links with industry would broaden the horizons of his research, which lies at the intersections of mechanical engineering, design, automated systems and education. This led him to take part in the Leaders in Innovation programme, organised as part of the Newton Fund to build entrepreneurial capacity in researchers to help them take their innovations to market. This motivated Dr Laseinde to apply for funding through the Industry-Academia Partnership Programme to explore cost-effective ways to bring VR into the future of engineering teaching.

“This type of research requires industry input because most VR use in institutions is entirely driven by industry,” Dr Laseinde explains. This led him to identify The Virtual Space as a partner, a company that fit his criteria of being both approachable and experienced. Researchers at Manchester Metropolitan University were also invited to join the collaboration.

“This project has brought my institution closer to new strategic partners. We have distinctive complementary skills in terms of technical expertise and the exchange of ideas is helping us to forecast future requirements in a rapidly evolving field,” Dr Laseinde says.

IMPACT AND INNOVATION

The project tackles the widening gap between traditional teaching methods and philosophies and emerging, technologically driven techniques. The aim is to develop a roadmap and VR platform for teaching engineering courses.

The VR platform will integrate visual headsets and haptic handheld clickers to enable an augmented reality experience in the classroom or laboratory. Real-time interactive algorithms will support lecturers and students to continuously evaluate the learning experience.

Two pilot mechanical engineering VR labs will be developed for first year undergraduate engineering courses. Data from these pilots will be analysed to refine processes and inform the development of a fully fledged mechanical engineering VR lab in the future.

UK-SOUTH AFRICA INDUSTRY-ACADEMIA PARTNERSHIP

As a Newton Fund delivery partner, the Royal Academy of Engineering has partnered with the Department for Higher Education and Training, South Africa, to co-fund awards that strengthen capacity and develop capabilities within South African engineering higher education and research institutions to carry out excellent teaching, research and innovation-related activities through collaboration with industry and UK counterparts, especially in Historically Disadvantaged Institutions.

NEWTON FUND

This project is supported by the Newton Fund, which is part of the UK’s official development assistance (ODA) and promotes economic development and social welfare by strengthening science and innovation capacity.

For more information

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Above image: VR headset used by South African startup, The Virtual Space.