Enhancement Themes

Resilient Learning Communities

Promoting the Equity of the Student Learning Experience

Case Study 5: An interactive application to conduct dose-response analysis in a self-directed learning environment

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What was the issue?

Pharmacology is an applied discipline; it requires carefully designed experimental approaches and rigorous statistical analysis to interpret and present data and findings. As blended approaches to teaching and learning become more common and practical interactions less frequent amidst the pandemic environment, there is a need for an all-inclusive self-learning environment for dose response analysis aligning with the British Pharmacological Society (BPS) Core Curriculum.

How was it solved?

With the support of two successive teaching grants from the BPS, we developed an interactive user-friendly web-based application called iDRUG (interactive Dose-Response User Guide) to deliver an understanding of practical techniques and detailed data analysis in a dose-response experiment. It integrates key pharmacological concepts and aligns the experimental theories with the underpinning statistical modelling to enhance the teaching and learning experience.

The iDRUG application is a self-learning environment for dose-response analysis that can operate as a standalone exercise or be integrated with practical activities to provide a complete and immersive experience. The application is currently available online (shiny.abdn.ac.uk/Stats/apps/iDRUG) and can be accessed and used on any browser-supported devices including tablets and smartphones meaning it is flexible, inclusive and accessible across the student community, regardless of geographical location or face-to-face/online status.
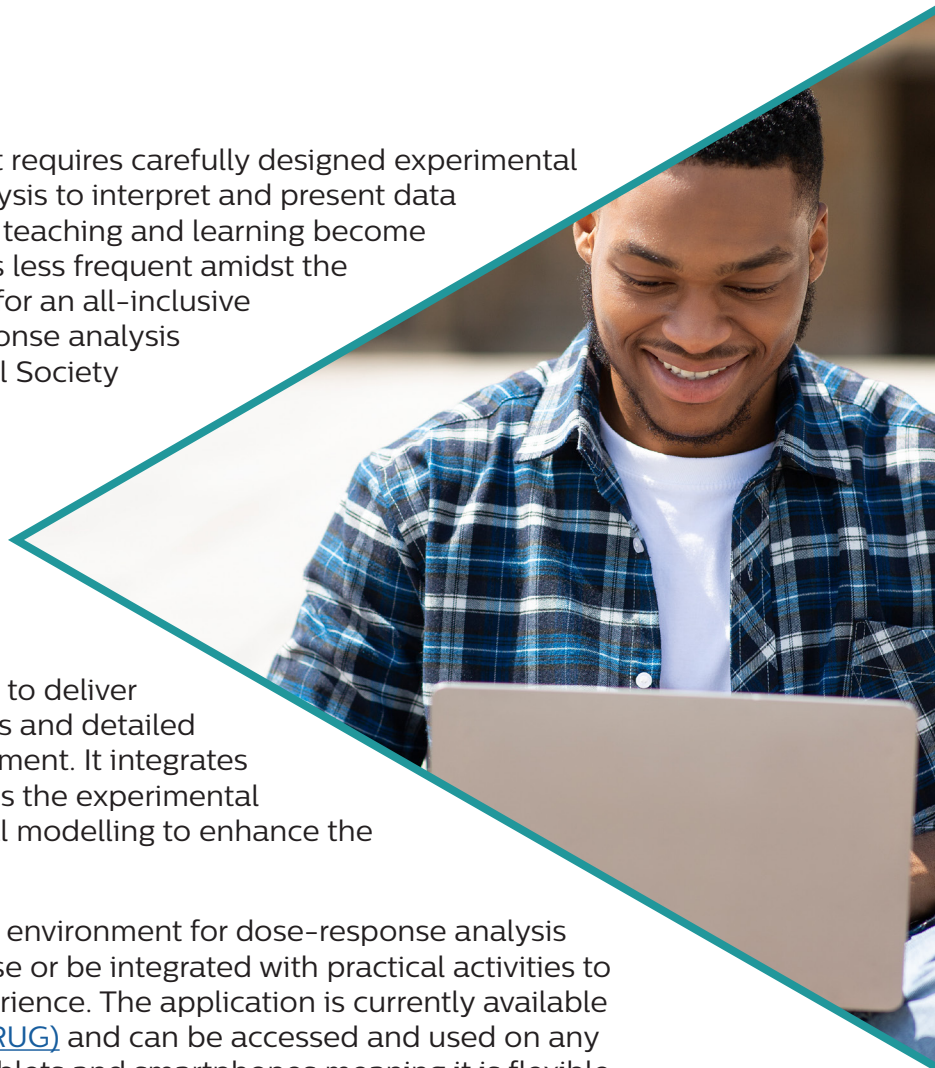
The application is designed into distinct synchronous modules integrating experimental conditions arising from both individual and combined drugs. It includes multiple experiments involving various set-ups and combinations of drugs. The inclusion of multiple scenarios creates the opportunity for learners to visualise and investigate experimental data arising from wide-ranging pharmacological settings, which would otherwise be difficult to replicate in a standard laboratory session. It offers students the opportunity to simulate multiple instances of dose-response experiments and encourages a step-by-step interactive approach to conduct comprehensive statistical modelling.

The application develops the core knowledge in all aspects of scientific methods including qualitative and quantitative approaches. In addition to these methodological elements, it addresses broader societal and scientific responsibilities and ethics due to its 'anyone-anytime-anywhere' approach. Due to the increased demand for online and blended learning resources currently, the resource will also support educators to utilise the application within their courses and programmes in an adaptable and appropriate manner. The application, therefore, aligns well with all the sub-themes: pedagogy, accessibility and digital technologies. At the pedagogy level, it is a novel tool that seamlessly integrates both online and face-to-face environments. The online availability and adaptability of this learning resource enhances its accessibility to wider students' community. The choice of digital technologies across wider platforms supports the education equity as students around the world can access the technology with minimum resources.

What comes next?

Overall, *iDRUG* facilitates the delivery of the curriculum in an effective, flexible, accessible and sustainable format and promotes equitable learning experience for everyone. In future, we plan to integrate the application with the existing course curriculum according to direct student guidance and feedback. The student-led development will explore introduction of new modules to analyse real experimental data, create additional interactive tools and incorporate learning materials to support educators and learners.

University of
St Andrews

Find out more

This case study is one of nine published as part of the 2021-22 Student-led Project from the Resilient Learning Communities Enhancement Theme.

The project in year 2 explored equity and inclusivity in the context of a more blended learning environment and how we can best develop representative systems and student/class representative skills to effectively support all the students they serve.

You can find further case studies and resources on the Enhancement Themes website.