

Instructor uses **Möbius** to enhance learning for first-year engineering students at the University of Birmingham

With growing class sizes, it can be a challenge for instructors teaching complex courses to effectively engage their students. It is essential to find tools that provide an optimal balance between efficiency, interactivity and functionality. For Dr. Tim Jackson, a senior lecturer in the University of Birmingham's School of Engineering, the solution was Möbius, Maplesoft's online courseware environment.

As an instructor in the Electronic and Electrical Systems Engineering department, one of Jackson's classes is a common electrical, mechanical and civil engineering first-year program for 370 students. Some of the new students come in without having studied physics in-depth, and Jackson wanted teaching resources to help those students bridge the gap and understand background concepts more effectively. That's where he relied on Möbius and its ability to help students study more successfully. So far, the results have been positive. "We've gotten very good feedback from students," he said. "They can navigate the Möbius environment easily and learn the tools quickly. I've had no complaints from anyone saying they don't know how to figure it out."

For Jackson, ease of use is a key benefit to using Möbius. In addition to lectures and theory, the first-year course includes a practical lab component. "Before, theory and the lab component were disconnected in students' minds. We were spending a lot of time in labs explaining the theory and teaching the experiments," Jackson explained.

"With Möbius, students get material in advance, they come prepared, which then frees up time for quick practical work in the limited lab hours."

In order to prepare students for class, Jackson and his colleague Dr. Mahvish Nazir developed background materials and pre-lab quizzes in Möbius. The students use the material to study and review on their own time to gain a better understanding of what they will be doing in the labs. Pre-lab quizzes, also developed in Möbius, help to ensure the students have a good grasp of the concepts before they go for their lab classes. These pre-lab materials are optional, but since implementing them, Jackson said he has noticed greater student engagement. "The optional pre-lab work is being completed almost 100%," he said. "We're seeing a good level of competence in students with the lab equipment compared to previous years." Students also complete a summative post-lab quiz using Möbius that goes towards their grade.

Ultimately, Möbius provides a deep and enhanced learning experience for students that allow them to achieve a deeper level of learning, Jackson explained. "Möbius is an environment where students can learn quickly and relate it to their previous experiences," Jackson said. "It provides a great way to understand complex concepts through superior visualizations and animations. We are happy with the way students are able to discover basic subject concepts and develop a deeper understanding of the material."

“ With Möbius, we're not limited by the technology. We're only limited by imagination. ”



Jackson refers to this kind of learning as interactive independent learning. The ability for self-evaluation and self-improvement is a point he emphasises often. He believes technology gives students additional flexibility for studying, and with that comes the responsibility and eagerness to master the material. When concepts are laid out in a variety of interesting ways, it stays top of mind for students. Möbius also allows students to attempt quizzes multiple times, revisiting materials to identify areas of weakness and strengthen their knowledge base. "A lot of universities are now trying to develop strategies for building independent learners; with Möbius, we've found a way to work that into the course framework," he said.

Möbius also allows Jackson to better allocate and maximize his own time. With growing class sizes, Möbius helps Jackson manage a large number of students. No longer encumbered with countless hours of marking assignments and tests, he can interact with students more and provide them with one-on-one support as required.

With such a positive initial response, Jackson soon wants to begin using Möbius to cover more of the syllabus, helping more students bridge the gap between theory and practical application. Using Möbius, he will be able to educate students on how to use a variety of electronic and electrical equipment by constructing virtual lab experiments. He also plans to use Möbius to integrate physics laws into his courses, using math apps to create more in-depth simulations and allow students to solve complex problems.

The University of Birmingham is investing in innovative teaching. The University has a group of interns to help professors develop content using Möbius. These interns, who routinely go on to become highly sought after graduates, were critical in helping Jackson develop his course material quickly and efficiently. "With Möbius it has been possible to demonstrate innovation in teaching, and I am glad the University has recognized that in our work," says Jackson. "With Möbius, we're not limited by the technology. We're only limited by imagination."



www.maplesoft.com | info@maplesoft.com • Toll-free: (US & Canada) 1-800-267-6583 | Direct: 1-519-747-2373

© Maplesoft, a division of Waterloo Maple Inc., 2017. Maplesoft, Maple, and Maple T.A. are trademarks of Waterloo Maple Inc. All other trademarks are the property of their respective owners.