McGraw Hill

Case Study:

Swansea University

Case Study
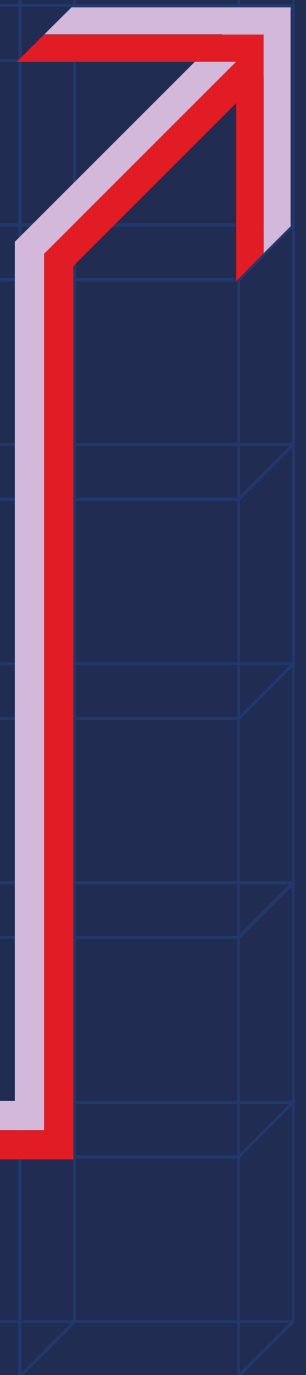
Navigating the Evolution of Engineering Education: A Modern Approach

Like many other Higher Education subjects, Engineering education has undergone a significant transformation in recent years, mirroring the changing landscape of student behaviour, technological advancements, and the inevitable evolution of learning styles.

In this piece, we explore the insights of Dr Francesco Del Giudice, who leads a module at Swansea University. He shines a light on the dynamic nature of Engineering education and the strategies he has employed to engage today's Engineering students effectively.

Dr Francesco Del Giudice is an Associate Professor in Chemical Engineering, and he is a recognised Chartered Chemical Engineer and a Chartered Scientist. Francesco is the head of the Rheological Microfluidic lab at Swansea University Bay Campus.

Changing Dynamics in the Classroom

Reflecting on his own experiences as a student, Francesco recalls much greater formality around lectures. "During my days at university, I recall that we would all stand up when the Professor came in and only sit when instructed. And we were totally silent! Nowadays, the time I have with those I teach is so different. We talk during our time together and they turn up late! Student behaviour has changed so much. The willingness to learn is still there but how they learn is so different."

The Role of Technology

One of the major contributors to this shift is technology. Francesco emphasises that the textbook, once the central linchpin to understanding a subject, has been overshadowed by the influence of social media and the preference for bite-sized information. The challenge for educators is to adapt teaching methods to engage learners effectively in this new era. Francesco acknowledges that while textbooks still serve as a source of information, blending technology with interactive and adaptive tools is crucial for meeting the needs of today's students.

"You have to find the right means to engage with learners," he says.

Adapting to Complex Student Profiles

There are many other factors impacting the student demographic too – with social factors such as the cost of living and the evolving demand for skills in a world where new jobs are emerging all the time and AI takes over or radically alters others – changing student attitudes and behaviours.

With many students forced to work alongside their degrees, they can struggle to give their studies the full time and effort required. At the same time, they are worried about future employability, and no longer convinced that a degree is sufficient in and of itself.

"Our students are more complex than they used to be. They have jobs on account of the cost-of-living crisis, and they know getting a degree is not enough anymore either. They worry about standing out from the crowd," says Francesco.

Francesco also reflected on the adjustments his cohort will be experiencing. "The year prior to university, they were in school where the learning style was really different."

"For many of them, they're also international students and they'll be thinking about how to integrate themselves in their new country."

The Flipped Classroom Methodology

With these factors at the forefront of his mind, Francesco was keen to shift his method of teaching to enhance the experience for his learners.

He shared his rationale for knowing something had to change. "I thought about how students can look when they're being taught. Some are puzzled and aren't engaging."

"I also thought about the time we spent together: how we show them a new concept and have 45 minutes to learn that."

With colleagues, he started learning about flipped classroom methodology and was impressed with research articles that showed it to have a positive impact on outcomes.

With the flipping of the classroom, students prepare for classes by completing readings ahead of time and come to lectures with some prior background on what will be explored.

Francesco shared that the shift has been of benefit because students could now read about a given topic before lecture and in their own time, enabling them to better grasp a concept ahead of the lecture.

"Now, the engagement is higher," he said.

Using Connect to support the move

When Francesco made the decision to move his lecture delivery to align to the flipped classroom, he also begun using McGraw Hill's Connect platform which is funded for the students by the university.

Through Connect, he is able to assign readings through the enhanced eBook product, SmartBook, and to set his learners activities, tasks, and exercises to complete. He can also analyse their efforts, both in terms of engagement and accuracy.

For Francesco, Connect has been hugely valuable.

The functionality, in particular, the way the platform tailors itself around learning objectives that a learner has either grasped or not quite grasped, has helped his learners and has been met with positive acclaim from them too.

"I liked how when you got a question wrong in the reading segment of the weekly workload it would take you to the appropriate section of the textbook and give you apportioning to try again."
– Student

The reporting part of Connect was also highlighted by Francesco as a big advantage.

"With a group of 600 students, this data is so important. The "At Risk" report is so valuable especially for me at the start of the course. Early on, I can now see who isn't engaging and I can step in quickly, not just at the end of the course when it's too late."

Results

Francesco's results using the flipped classroom approach and Connect have been truly insightful. Keen to show that the blend of technology and the shift in teaching approach can only be seen in a positive way, he has moved the messaging and grading of his module around over the course of three years.

To begin with, he incentivised his learners to complete the activities by allocating them a final percentage of their course mark for the work they did in Connect. This saw high levels of engagement and a rise in course success rates.

Graph 1
In the first year with reading incentivised through grade.

Total Students	676
At risk	47
Keep watch	51
Safe	578

86%
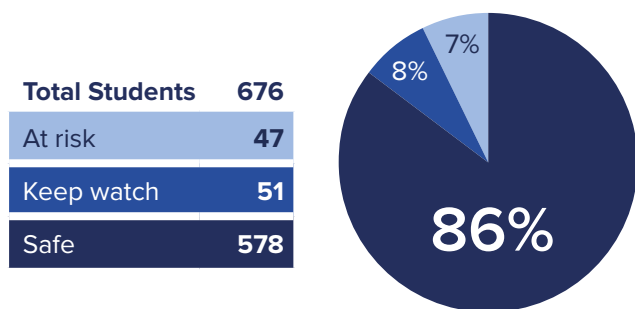
The chart above, from Connect's 'At Risk' report, shows a high percentage of learners were regularly logging into Connect, completing their reading and their assignments.

The next year, keen to see if his approach was the right one, he opted to let his learners decide if they should or should not complete the work he set them.
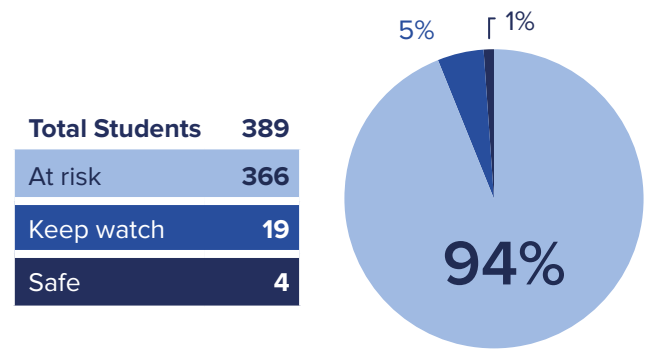
The result? A very large number of learners did not complete the activities or the readings set, with the following chart highlighting an extremely high percentage of learners not logging into Connect, completing the readings or the activities.

Graph 2
In the second year with reading optional.

5%   1%

Total Students	389
At risk	366
Keep watch	19
Safe	4

94%

After that, Francesco was convinced that the method he had put in place the year prior was the right one. Once again, he gave his learners marks that contributed to their final course score based on their work in Connect. Pleasingly, the engagement soared once again.

Technology for Improved Learning Outcomes

For Francesco, technology has not just been an accessory but an essential tool to boost student learning outcomes. Connect has played a pivotal role in implementing the flipped classroom approach, and Francesco is exploring the use of another McGraw Hill platform, ALEKS, further emphasising the importance of technology in modern Engineering education.

Conclusion

As Engineering education continues to evolve, educators like Francesco Del Giudice exemplify the adaptability required to meet the needs of today's students. Embracing technology, customising learning approaches, and staying attuned to the diverse profiles of students are key elements in ensuring a successful educational experience.

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