# Flipped Classroom - Blended Learning in the Laboratory Sciences for Scalability and Student Success

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## Introduction

Over the past decade, the Chemistry Department at RCSI has implemented a flipped classroom blended learning model in response to increased student enrolments across its Medicine, Physiotherapy, MPharm, and ATT programmes.

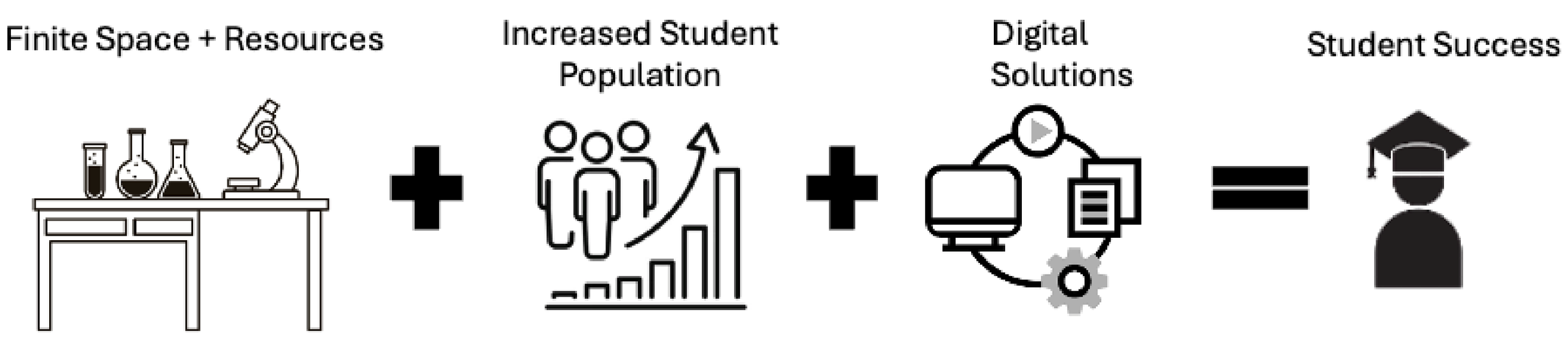
This initiative sought to ensure quality and consistency in laboratory-based education while managing large cohorts effectively. By leveraging digital resources and pre-laboratory preparation, the department has successfully maintained high levels of student engagement and performance amidst rising student numbers.

## Initiative

The Chemistry Department's shift to flipped classroom blended learning involved several key strategies designed to accommodate up to 6,500 students annually, with each session limited to 52 participants. Recognising the limitations of physical lab space, especially during the pandemic, the department optimised space usage and instituted up to 22 lab repetitions per experiment to comply with social distancing. Central to this initiative was a content creation drive, resulting in over 50 laboratory experiments filmed and packaged into Moodle Lessons. This resource bank, which has achieved approximately 250,000 views across YouTube and Panopto, allows students to access experimental procedures and foundational knowledge at their convenience.

The flipped classroom model is centred around pre-practical assignments, peer collaboration via online forums, and video-based lab techniques. These videos specifically support the development of core laboratory skills that students practise in the lab sessions and are especially valuable for the MPharm degree, where students' competencies are further assessed through the Observational Structural Practical Exam (OSPE). This structured approach ensures students are adequately prepared and have a solid understanding of the practical skills essential for laboratory work. Digital Enhanced Learning (DEL) resources further reinforce learning, supporting students through flexible, self-paced content that is easily transferable to other disciplines and campuses.

### Laboratory Teaching Challenge




## Outcome

This model has demonstrated significant success in both student satisfaction and academic performance. Completion rates for Continuous Assessment (CA) tasks increased from 65% in 2014 (n=350) to 96% in 2023 (n=530).

Student satisfaction also reflects a positive trend, with annual feedback ratings—based on responses to survey questions related to overall student experience and satisfaction—averaging between 77% and 92% in recent years . These results underscore the effectiveness of the flipped classroom approach in supporting academic growth and maintaining student success levels despite an increase in student population.

In addition to accommodating a larger student body, this approach fosters a resilient and transferable framework, one that has successfully scaled to meet the demands of a modern laboratory-based curriculum. This initiative not only meets the immediate educational needs of the Chemistry Department but also offers a robust model adaptable to other laboratory sciences, ensuring that RCSI continues to deliver high-quality, student-centred learning experiences.