

# Redefining The Student Learning Experience In A Wet Laboratory Using An Embedded Workstation Environment

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## **Abstract:**

Recent developments with instructor-led management control software and supporting ICT technologies provide universities with the opportunity to redefine the student learning experience in traditional wet laboratory environments. These technologies significantly advance the opportunity for experiential learning within relevant theoretical contexts. This paper reports on the development of a scalable, fifty-student wet laboratory that fully integrates digital learning technologies via the provision of instructor-managed workstations dedicated to each learner. The flexibility conferred by the ICT design has allowed for the definition of a new learning paradigm that utilises the physical laboratory instrumentation in parallel with the delivery of virtual instrumentation to the student workstation. Demonstrations of the use of equipment and the performance of techniques are presented in real time via a webcam to individual student workstations and can be recorded for later review and revision. With instruments that can not be integrated into the computer network but which are computer controlled, screencasts of the acquisition and manipulation of data are recorded and delivered to the students workstation. Practical exercises using biological samples eg, blood and serum, are undertaken and results along with interpretations can be directly entered into electronic workbooks and submitted for instructor review. Students can take online tests either during or at the end of the practical sessions that provide immediate feedback on their understanding of the practical exercises and of the theory that underpins them.

This redesigned learning space has allowed practical sessions to more effectively integrate theory with practice and to engage the students in more active learning processes. The NetOP<sup>®</sup> software suite is used for system management. Implementation has been accompanied by ongoing assessment of the student learning experience. This feedback has been used to refine the delivery methodologies and assist other course teams as they migrate their courses to this new learning space.