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Using an embedded expert to redesign physics undergraduate lab curriculum and build an intellectual community

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The Department of Physics, Engineering Physics and Astronomy at Queen's University has embarked on a journey of transforming its upper year undergraduate lab courses using a backward design strategy. Student learning activities and course assessments have been redeveloped to align with a common set of learning objectives adapted from the recommendations for the Undergraduate Physics Laboratory Curriculum from the American Association of Physics Teachers. Student learning activities and course assessments have been redeveloped giving students a structured way to learn how to design and perform experiments, to analyze data and report on their findings. These activities more closely mimic those of a professional scientist, and lead to improved students satisfaction and performance. This transformation is part of a multi-institution effort to implement and evaluate evidenced-based educational improvement in STEM disciplines. Co-led by an embedded teaching and learning expert and a faculty member, we have built an intellectual community within the department that cares about and frequently shares information on teaching and learning. We describe the approach we used to achieve our transformation goals and share our success stories and lessons learned.

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