

KU Biotechnology Undergraduate Research

Often times undergraduate science students' laboratory exposures are limited to single-day (or otherwise encapsulated) experiences. It's common for students to be given comprehensive, stepwise protocols that provide little encouragement to fully understand why each step is performed. When the experiment is completed and a lab report is turned in, students are left with only a vague understanding of whether their lab 'worked' or not, but don't understand why, nor are they offered the opportunity to revisit any of their work.

This lack of follow-through fails to develop the student's ability to think critically about the skills and laboratory techniques they are expected to learn. Recent pedagogy touts that 'Authentic undergraduate research experiences' are the cure for these cookie-cutter labs. However, the definition of an 'authentic experience,' or how to provide one, remains elusive.

In the KU Edwards Campus Biotechnology program, we have developed a senior capstone research curriculum based on the experience of a graduate student working on their independent research topic. The curriculum consists of one semester of research and planning and one of hands-on experimental work. Students independently conduct a research project of their choice and gain exposure to valuable aspects of scientific research such as budgeting and inventorying their own reagents, scheduling with Gantt charts, and troubleshooting. Throughout the year, weekly lab meetings are designed to keep students moving forward and give them practice in presenting updates on their work. In students' own words, these meetings cultivate an environment where students are inspired by and invested in, not only their own capstone projects, but those of their classmates as well.

While students do not always achieve their initial objectives, the process of working through problems and dealing with unexpected results provides what we believe is the 'authentic undergraduate research experience' that so many have called for.

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