Featured Tale

Considering Cost, Creativity, and Convenience in the Creation of an Open Educational Resource

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It is easy to become entrenched in our same old patterns as educators. In our physiology classrooms at Johnson County Community College (JCCC), we can even become entrenched with the same old equipment—like our pair of ancient hot plates that continue to survive because they actually do heat faster than the newer ones. However, "newer" sometimes really can be "better". Open educational resources (OERs) are an example of a newer development that can be better (OER and Low-Cost Materials at Penn State, n.d.; UOW Library, n.d.). They are futuristic versions of academic textbooks present in our students' reality. Over the past 2 decades, the nitty gritty details of OERs have been taking shape—e.g. licensing, copyrighting, types of resources, and initiatives. OERs truly are for educational purposes; they are teaching materials that exist in the open domain, with no cost for students, and are conveniently available and adaptable for professors.

We wanted to join in the current OER movement, so we began to think with small steps. Research strongly supports the use of OERs in classrooms to increase student learning for a variety of reasons (Hilton, 2016). In addition to tangible student benefits, professors can customize their course content with OERs, built on a platform designed for flexibility, creativity, and opportunities for collaboration. The list is long for OER-related advantages that support both the educator and student. In our human physiology laboratory course, we found ourselves considering the creation of an OER laboratory manual with many of these outcomes in mind.

The Problem

The sticker price of some American colleges has surpassed $100,000. That is $100,000 per year. Such a price tag is a dramatic picture of how education has gotten very costly for students at every institution, not just 4-year colleges and universities.

Lab manuals are a standard, required accessory for laboratory-based courses. The procedure for each experiment is described, and students write their data into old-style paper manuals where they subsequently evaluate their data in a lab report fashion. Writing in a notebook seems archaic for some students in 2024, but in many science, technology, and engineering courses, the practice of putting pen on paper in this way has not yet been retired.

Going into this project, we predicted numerous and diverse challenges associated with writing our lab manual as an OER. Among obstacles that most departments face when taking on a project of this magnitude is recruiting other faculty within the department to fully buy in. Luckily for us, all instructors teaching human physiology within our department at JCCC are like-minded when it comes to reducing student textbook costs as much as possible. Agreeing that an OER physiology lab manual would save our students money was the strongest motivation for our faculty team on this project.

The Process

Another primary challenge for faculty in our department was how to design original content, including carving out enough time in our schedules to accommodate the creative process. With our college being forced fully online during 2020 and 2021, we found time to collaborate and create as we sat at home, eager for a sense of normalcy to return.

Before initiating this project, our department had approximately 8 experiments that had evolved over decades. They were written in Microsoft Word documents and loosely shared between instructors at the beginning of each semester. These experiments worked with our equipment, but they were primitive and unprofessional in their presentation. With their lack of universal formatting/structure, they needed to take shape! For example, some of the labs had a formal introduction, others did not. Some of the labs had pre- and post-lab questions, others did not. Our first task was to add formal introductions and questions for each experiment and to apply universal formatting

when it came to headings, fonts, tables, figures, and the sequencing sections for each laboratory experiment.

Our next challenge involved creating 8 original labs to give us a total of 16 labs, aligned with content to accommodate our 16-week semester. This gave us an opportunity to create experiments that were congruent with our course objectives and our laboratory equipment. If we were to purchase a traditional lab manual from a major publisher, in addition to the outrageous costs, those labs may or may not line up with our course objectives, and they certainly would not be tailored to our specific student population or in-house equipment. Our students are almost entirely pre-healthcare, and we wanted to create clinically focused labs that would help them transition into their healthcare programs. We are proud to say that at least half of the experiments in our physiology laboratory manual are tailored to our pre-nursing students and include important topics such as measuring blood pressure, heart auscultation, electrocardiogram testing, spirometry, and testing of neural reflexes.

Throughout the entire process, we enjoyed the creative aspects. However, this process required mindfulness to avoid copyright infringements. This led us down the path of making our own diagrams, tables, and figures. We took pictures of our students performing the experiments, and also used open-source art from resources such as OpenStax (https://openstax.org/) and government websites. We worked with our college's copyright specialist to ensure the final product was completely void of any potential copyright issues and can be used and modified by anyone else looking to use it as an OER.

The Potential

Not only do laboratory-based science courses require manuals, but also so do math courses such as accounting. The cost of these supplementary materials, in addition to textbooks, contributes to science, technology, engineering and mathematics students being charged more than their peers for their college course materials. The physiology laboratory manual at JCCC was written by us, the faculty, and put on an OER platform to make the manual free to all JCCC physiology students. Furthermore, hosting our lab manual on this site means it is also for anyone across the worldwide web who chooses to use it. Open access. For free. https://scholarspace.jccc.edu/human_physiology/1/

Since 2012, 36.1 million learners have used OpenStax, saving them $2.6b in educational costs (Lederman, 2022). At our institution, our OER laboratory manual for physiology translates into a collective student savings of $36,000 for 400 students enrolled in human physiology each year. We surveyed our students and found that 45% of our students have a budget for textbooks each semester, and the budget for 20% of those students is not enough to fully cover their textbooks. One student told us “My max budget for textbooks is $100.” Nearly 100% of our students surveyed attested that our lab manual is far cheaper than their other science courses.

OERs are on the rise. Use of OER materials by faculty in 2016 was 5% and in 2022 it was 22% (Lederman, 2022). Among the JCCC students we surveyed, around 16% stated they have taken at least one other class that has used an OER. We are proud to be a part of this upward trend.

As faculty, we did not initially set out to create an OER lab manual, but we were pleasantly surprised by the process. We are, quite simply, educators with students at the center of our vision. As faculty, we are also problem-solvers. We consider not only student learning outcomes, but also their finances. When we found ourselves dissatisfied with the available manuals for purchase from publishers, we began to write, tailor, and personalize our own laboratory experiments. With the ultimate creation of an OER, we were pleased with the flexibility and creativity to meet our academic goals, as well as maintaining sensitivity to student budgets. On the OER platform, our laboratory experiments are now available to any faculty, anywhere, to take the seed of our OER and prune our manual in such a way that produces the best growth for their students. Our hope is that this story of our OER journey will provide encouragement for you to do the same.

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