

Project Name

SUNY Geneseo Neuroscience Cyber Technology Laboratory (CTL) Course

Principal Investigator Terence Bazzett

Campus Geneseo, State University College at

Year of Project 2012

Tier Tier One

Overview Summary

Assessment of ERIN (Educational Resources in Neuroscience) to Investigate the utility as an ancillary to primary classroom instruction in a variety of related courses (e.g. Biopsychology, Behavioral Pharmacology, Behavior Genetics).

Outcomes Summary

The Cyber Technology Laboratory Manual is well under development with the authors considering a SUNY Open Textbook. ERIN provides fuller access to learning resources, see [project website](#).

Project Abstract

Geneseo is in the process of developing a new interdisciplinary Neuroscience major. Among our primary goals is to expose students to a wide range of neuroscience technology and laboratory techniques. While in theory providing such experiences to students is an ideal objective, there are many practical obstacles at a primarily undergraduate institution (PUI). Among these are time constraints, lack of expertise in specific techniques, and limited availability of laboratory supplies/equipment. One reasonable alternative is to offer simulated experiences that give students insight into techniques that are otherwise unavailable. For example, experimental procedures that might take weeks or months to execute using expensive equipment and supplies can be summarized in a virtual laboratory experience requiring only hours of a student's time and no laboratory resources. While virtual laboratory exercises are admittedly less-than-ideal in many regards, they may offer some advantages over hands-on laboratory experiences (e.g. experience in techniques that require prohibitively expensive/dangerous substances, experience with unobtainable animal models, generating long term experimental results in an abridged time period, etc.). Virtual laboratory exercises are also typically

developed by technique experts.

With all of these factors considered, the curriculum for the Neuroscience major includes a proposal for a new course that will develop and assess cyber technology laboratory (CTL) experiences. In the proposed course, students will be required to participate in, successfully complete, and then report on, computer-based laboratory experiences. Inspiration for development of the CTL course came largely from a recent initiative by the Society for Neuroscience (SFN), in collaboration with the Faculty for Undergraduate Neuroscience, to develop an expansive educational resource portal allowing open access to virtual laboratory exercises and other teaching resources. The Educational Resources in Neuroscience (ERIN) portal was activated in April of this year and already contains hundreds of resources (<http://erin.sfn.org/>). Access to resources is free and open to the public. Members of SFN may also post feedback and suggest new resources for ERIN. The value of ERIN is expected to grow exponentially as both resources and feedback are added.

Development of our CTL course and critical analysis of ERIN will benefit SUNY colleges with neuroscience majors, minors, or courses, and will also serve as a model for other science courses where innovative uses of existing on-line resources may satisfy critical needs. Our project will also benefit the broader neuroscience education community as well, allowing for improvements to on-line resources, and serving as a national model, particularly for neuroscience programs at PUIs. IITG funding will provide the resources needed to develop and assess this innovative laboratory course and to systematically distribute our work and findings throughout the SUNY system. Among the specific goals that could be accomplished with IITG funding are: 1) Sharing findings on the strengths and limitations of using specific virtual laboratory exercises available on ERIN, and 2) Sharing assessment techniques and results for specific virtual laboratory exercises available on ERIN.

1. Sharing findings on the strengths and limitations of using of specific virtual laboratory exercises available on ERIN: Development of our CTL course is currently ongoing, with individual faculty members from Biology, Chemistry and Psychology reviewing offerings in the ERIN portal. Our objective is to develop at least 15 separate laboratory experiences that are suitable for independent student work. Faculty will then augment on-line materials with appropriate outside readings and will develop a list of questions to be answered by students after they have completed each assignment. Ideally, we will be able to provide input to the ERIN portal regarding the usefulness of each laboratory, as well as offering insight into related readings and testing methods. Materials discovered or developed by our faculty members outside of ERIN may also be recommended to the ERIN board of editors for their consideration. The IITG grant will allow one faculty member to work specifically on sharing relevant information through the SUNY Learning Commons for other SUNY schools to use. This information, while being developed specifically for our neuroscience curriculum, can be readily integrated into courses in biology, chemistry, and psychology at other SUNY institutions. Furthermore, these exercises are ideally suited for distance learning courses in these areas.

2. Sharing assessment techniques and results for specific virtual laboratory exercises available on ERIN: While CTL exercises have numerous advantages over hands-on laboratory experiences, the utility of these virtual labs, and in particular the applicability to real-life laboratory experiences, has not been systematically evaluated. The IITG grant will fund development of a rational and systematic assessment procedure designed to determine the utility of CTL exercises (see Assessment Plan). Similar procedures can then be used to evaluate achievement of learning objectives in hands-on laboratories. Ideally, student learning from both CTL exercises and from hands-on laboratory experiments will be quantified in a similar manner. A direct comparison of these two forms of learning can then be used to determine strengths and weakness in both methods of instruction, ultimately guiding instructors in how best to adapt their teaching methods. After validity and reliability of assessment procedures are established here at Geneseo, relevant information will be shared through the SUNY Learning Commons. These procedures could benefit a wide range of SUNY faculty members teaching in the areas of biology, chemistry and psychology, as well as faculty teaching distance learning courses.

Reports and Resources

- [Cyber Technology Laboratory Manual](#)

Instructional Design

- Gamification (Design)
- Online Education

Instructional Technologies

- Open Educational Resources (OER)