DiscoverLife Research Interns

Introduction – Interest and Performance in Plants, Zoology, and Ecology

GPC Principles of Biology students consistently perform lowest in the categories of Plants, Zoology, and Ecology on standardized assessments (ACAT) given between 2009 and 2011. The areas of Plants and Ecology have been identified as target areas for improvement by the Principles of Biology curriculum committee. While current efforts focus on professional improvement for faculty members, no efforts underway currently target students directly.

Current lab environments created to study these topics are room-restricted and involve little field work. This proposal will involve Biology Majors exiting CHEM 1211 (a pre-requisite to BIOL 2107 and 2108) in extended field research experiences. This pre-course immersion in the topics will enhance information retention in later biology courses. Success in this format will be expanded in future work to involve BIOL 2107L and 2108L students in short-term field research experiences.

It has been shown that investigative learning experiences are more effective at creating deep and lasting learning than didactic lecture or “cookbook” laboratory exercises. This project will test the effectiveness of personal field research as a replacement for the current content delivery methods of lecture and scripted lab activities.

(Prior Work) A prior grant for this work was funded in February of 2012. However, global budget issues terminated funding for the project before necessary project materials were delivered. Preliminary work with student interns continuing on a voluntary basis led to the creation of enhanced training resources (iCollege modules and DiscoverLife videos) and improved species identification (Excel files for plant and moth character scoring).

Literature Review

Numerous studies show that targeting a learning outcome with additional coverage of the topic results in modest gains at best and even reduced learning in some cases (Russell 1984, Boyer 1998). Significant gains in learning are most often achieved by implementing a variety of strategies collectively known as Active Learning (Freeman 2007, Hake 1998, Knight 2005).

While many might consider a laboratory class to be inherently active in nature, the pre-scripted lab environment has been shown to have little effect on deep learning and enduring concepts (Chin 2000, NRC 2000, Trumble 1993). Additionally, students with significant prior exposure to a topic will often self-direct into a study modes that result in deeper learning (Hazel 2002).

Project-based learning provides a real-world context to the otherwise disconnected facts traditionally presented in science classes (reviewed in Thomas 2000). By providing an objective goal (project completion) separate from the learning goal (assessment score), project-based learning has shown learning gains as much as 25% higher than traditional lecture control courses (Ross 1999, Rugen 1994).

Research Plan – Research Internships at Stone Mountain (Service Learning)

The main objective is to provide six research internships for two semesters. The research will focus on the flora in the Stone Mountain song bird habitat and moth populations around student homes. The studies will follow the protocols established as part of DiscoverLife.org. Students will take data during the day on plant bloom cycles and pollinator emergence. Students will take data during the night on moth.
species abundance and phenology. This data will be provided to DiscoverLife for their ongoing research and completion of the Georgia Natural History Survey (Service Learning Component).

Research interns will make periodic visits to the lab of Dr. John Pickering at the University of Georgia for training and to establish research questions and protocols for an individual project. Interns will be required to compose a paper on their research findings and attempt to present their work at the GA Academy of Science annual meeting or in the Georgia Journal of Science.

Participants will be six Biology majors having completed CHEM 1211 with a B or better, but not BIOL 2107. Participants will be chosen from volunteer applications solicited by poster, e-mail, and class visit.

Personnel – All Tenure Track
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Dr. Ilse Rickets  Clarkston Science  irickets@gpc.edu  678-891-3451  (Asst. Prof.)
Dr. John Pickering  UGA Ecology  pick@discoverlife.org  706-542-1115  (Prof.)

Evaluation Plan

Success of interns on Plant, Ecology, and Zoology sections of the ACAT in future biology classes will be compared with GPA-matched controls to track effectiveness. Success in these same categories in classes using intern assistance will be compared to unassisted control classes.

Dissemination of Results

Results will be presented to Principles of Biology curriculum committee, at STEM retreats, and at the National Association of Biology Teachers, Georgia Academy of Sciences, and National Science Teachers Association meetings (depending on location and travel funding). Student results will be presented at the Georgia Academy of Sciences.

Bibliography


