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Thinkfinity Cornerstone III Final Report

December 6, 2011

Erica Kipp, Dyson College of Arts and Sciences

Hands-on Labs (HOL): Using Technology and Web-Based Resources to Transform a Traditional Lab-Based Biology Course into a Distance Learning (DL) Hybrid Course, across schools at Pace University.

A) Original goals:

- To develop an online laboratory portion of Bio 123: Biology and Contemporary Society
    - Incorporating the internet is compatible with student comfort levels and has become a preferred tool of learning
- Keep relevant as a department and as an institute of higher learning by addressing the dynamic learning environment, acknowledging that DL is becoming mainstream not only in terms of individual classes, but degree plans offered by both traditional and virtual campuses.
- Eventually transition this hybrid course into a completely online course (lecture and lab)
    - academic landscape is changing to accommodate technology and web-based resources
- To use at home labs that were NOT virtual in nature, but rather hands on, pedagogically sound, and academically aligned in terms of biological concepts and protocols.
    - Studies show that students understand and retain more information when they are given the opportunity to take ownership of their learning and become personally involved with the learning process
    - using the Labpaq system with a proven track record since 1994, offer our students the experience of a hands-on lab with the convenience of DL
    - address the dynamic learning environment with an increased awareness that students also have to deal with scheduling conflicts and circumstances
- Department impacts

- Alleviate scheduling conflicts that arise due to heavily used laboratory classrooms
- offer full-time faculty flexibility in terms of teaching options
- reallocate funds paid to laboratory technicians for course prep
- be able to evaluate how we teach science and how students learn

B and C) What progress have you made towards your original goals on your project to date? And what has been completed to contribute to meeting these goals?

- developed and administered post-survey for BIO 123 Fall 2010 students and Fall 2011 students
    - secured IRB approval for surveys
- analyzed preliminary data from Fall 2010 pilot post-survey
- developed grading rubric for lab reports
- analyzed lab reports from Fall 2010 and have begun to analyze Fall 2011
- currently teaching designated HOL section of BIO 123 for the Fall 2011
- developed pre and post-surveys for the HOL section in Fall 2011
- developed pre and post-quiz for both traditional and on-line lab students
- Presented at the Faculty Institute, May 25, 2011
- Presented at The National Association of Biology Teachers, October, 2011

D) What activities have not been completed? Why?

- I just completed (Fall 2011) teaching the lecture section of BIO 123 and one of the three lab sections (my one section was on-line and the other two sections were taught traditionally). The next few months will be spent comparing lab reports and exam grades for the 50 students. Once that is completed, I will analyze the data for statistical significance.
- I plan on presenting findings at the Faculty Institute in May 2012 as well as submitting the research for publication.

E) Please outline the outcomes you have received as a result.

- To date, preliminary data suggests that the students in the on-line class have a better average

test score than those in the traditionally taught lab course. While it is too soon to make a statement regarding the lab reports; it is clear that the lab reports are better organized in the on-line lab section.

- Student comments are overwhelmingly in favor of the on-line course in terms of convenience and providing a more hands-on experience than the traditionally taught lab where students are often working in groups.
- I have been able to gather data regarding individual labs in terms of what works, what needs improvement, and what the students really enjoy and learned from. Because of this information I have been able to provide feedback to the HOL company and help them fine-tune their protocols. I will also be able to adjust labs in the future so that they are more meaningful to the students.
- Freeing up a lab class at least once a week has positively impacted the departments need to accommodate the growing number of lab sections each semester.

F) Did you create a class?

I created a BIO 123 on-line course using at home hands-on labs. The labs for this online class were carefully selected in order to mirror the traditionally taught course which would serve as our control. This class ran Fall 2010 and is currently running Fall 2011.

G and H) Has your project impacts students and faculty?

- During the Fall 2010, 16 students were part of the on-line pilot study and 30 students engaged in the traditionally taught lab.
- This Fall 2011, 18 students partook in the on-line lab section and 25 in the traditionally taught lab.
- I teach the lecture section of the course (so that all students have the same lecture experience, thus removing lecture from the equation). I teach the on-line lab and one faculty member teaching the traditionally taught lab under my supervision. In order to maintain consistence between the lab experiments, I carefully select the labs, write the syllabus, and work with the lab instructor.

I) Unintended outcomes?

- Thus far, the outcomes are similar to what was expected. I was, however, surprised to see how many students were in favor of the online lab---- and not only because of convenience, but because it gave them a more meaningful lab experience that was one-on-one in nature as opposed to working in small groups with several group members not participating or not participating fully.

J) Conference Presentations

- In May 2011 I presented a project outline, the original goals, information on the hands-on labs system, and preliminary student feedback to date at The Faculty Institute, Pace University.
- In October 2011 I presented "Hands-on Labs (HOL): Using Technology and Web-Based Resources to Transform a Traditional Lab-Based Biology Course into a Distance Learning (DL) Hybrid Course" at The National Association of Biology Teachers Professional Development Conference.

K) Do your outcomes reflect the change or benefit you were hoping to receive?

- Yes. Overall I think it will be shown that students can have a pedagogically sound, inquiry-based and academically aligned hands on laboratory experience outside of the lab classroom.

L) How has your project furthered the Thinkfinity Cornerstone you selected?

- Cornerstone III is the initiative for innovative teaching, technology and research that focuses on interdisciplinary programs and informatics. This project supports a growing demand for technology, web-based resources, and web-based coursework. This grant has helped the Department of Biology and Health Sciences develop a distance learning course that integrated a hands-on lab experience. Data will (hopefully) show that students can learn, retain, and apply

concepts when an active participant in their learning as a result of the on-line lab experience.

M) Future plans for sustaining the program or project?

- I am currently in talks with the Dean's office to offer all BIO 123 courses in an on-line format. Beginning first with all labs, our goal is to completely transition this hybrid course into a full distance learning course.