

Department of Biology

Departmental Assessment Executive Summary for Academic Year 2006-2007

Our focus this past academic year was to implement changes in the classroom as a result of two standardized assessment tools that were distributed to the college as a whole and as a result “close the loop” in terms of student learning and its assessment.

CCSSE Survey

The first tool used was the CCSSE Survey that was issued to students in Spring of 2006. We focused on three main concerns that were indicated in the results of the CCSSE Survey.

1) The survey indicated that students had little opportunity to work with classmates outside of class time to prepare assignments and to make a class presentation.

The department proposed that students in Biology 121 would be asked to present scientific topics as a group. It was hoped that this activity would foster working with classmates outside of class and give students an opportunity to make oral presentations.

Measurements for this outcome included the creation of a rubric to better measure standards of this activity. In the participating sections of Biology 121, data indicates that a majority of students were successful in presenting a scientific topic as a group. Data further indicates, that because of the newly created rubric, student grades were superior to the grades of students from the previous semester who were graded without such rubric.

In Fall of 2007, the department will issue an end of the semester survey given to both classes who did and did not participate in group presentations to determine if any significant differences exist in their learning experience.

2) The CCSSE Survey indicated that students did not have an opportunity to contribute to the welfare of their community.

The department proposed that students in Biology 119 would be asked to participate in either an in-class or out-of-class experience that would give them an opportunity to contribute to the welfare of their community. It was hoped that students will not only be given the opportunity to participate in the community, but also become inspired and willing to maintain their contributions in the future. Biology 119 was selected because this course contains a field component that covers both service learning (contributions to society and the environment) and outdoor and off-campus lab work. The service learning components consisted of restoration ecology fieldwork throughout various locations in the Cook County Forest Preserve District. Following the fieldwork, students were asked to reflect on their experiences in writing.

Measurements for this outcome included pre & post surveys to determine student’s willingness/desire to contribute to their community and value in doing so. Data indicates significant changes from pre and post survey results. For example, pre survey indicates that 63% of students polled have volunteered/contributed to their community, while post survey indicates that 77% have volunteered/contributed. Further, a larger percentage increase (56% to 72%) was shown when students were asked if they had volunteered/contributed to helping the natural environment. There was a 17% increase in the population that indicated thoughts about volunteering/contributing to the environment, with 90% of students polled agreeing. Lastly, through the duration of the semester, there was an increase from 19% to 45% of students who indicated that presently they do contribute/volunteer their time to help the environment.

The department also proposed the establishment of a 60m x 60m prairie plot on an empty lot behind the college. The restoration of a natural prairie is underway with various field labs being conducted by the Biology 119 sections. The focus of the prairie is to engage students in active learning through teamwork, using scientific techniques for data collection, scientific report writing and service learning. It is hoped that students will connect the relationships between ecology, environmental issues and use this gained knowledge to contribute to environmental community activities. Currently, Biology 119 sections have been actively involved in cleaning the site and spreading seeds.

This past academic year, included the development of Biology 299, a course that would allow students participating in the prairie project to earn transferable college credit. Two students were involved in the project. They conducted soil nutrient analysis and will continue to monitor changes in soil composition as the native wildflowers grow on the site. Students are currently being recruited for the summer semester.

As the prairie becomes established, several field activities will be conducted. Evaluation of the project will be accomplished by a series of reflection activities.

3) The CCSSE Survey indicated that students did not have the opportunity to communicate with an instructor using email.

The department proposed requiring students to communicate with their instructor via email several times over the course of the semester. Biology courses 114 and 115 were chosen because of the high representation of non-science majors. Blackboard accounts were established for all students enrolled in these courses. Students were asked to email their instructor within the first two weeks of the semester. The content of the email included personal information and a brief introduction of the student. Data indicates that 100% of students completed this assignment successfully. During the semester, students were asked to find a recent article on a scientific discovery or related topic presented in class and via email share and summarize their findings with the instructor and class. Data indicates that a majority of students were successful in completing this assignment.

The department, in an effort to encourage online communication and at the same time increase the number of courses offered, proposed the development and scheduling of two hybrid courses. A typical week in a hybrid course consisted of once-a-week campus meeting in which discussion and lab activities were conducted and a once-a-week internet based assignment. A section of both Biology 114 and 115 were offered.

In an attempt to determine the effectiveness of the hybrid courses, measurements included the comparison of these courses to the traditional twice-a-week campus meetings. Three parameters were evaluated, 1) student retention in these courses, 2) distribution of letter grades and specifically number of successful completers, and 3) performance on the departmental final exam. Due to the timing of the submission of this report, only one parameter can be fully measured; student retention. When comparing the withdrawal rate of the traditional classes to the hybrid, data indicates that student retention is equal, with an average of six students per section withdrawing. In terms of grade distribution, midterm grades also indicate no significant differences between the two types of courses.

The department plans to offer the same two sections of hybrid classes in Fall 2007. At this time, final grade distribution and performance on the final exam will be evaluated from Spring 2007.

CAAP Exam

The second assessment tool used was the CAAP Exam. Based on the results of this exam, there was a need to address the abilities of our science students to make generalizations. Students were having difficulties extending given information to a broader or different context, generating models that are consistent with given information, and developing new procedures to gain additional information.

The department proposed that students in Biology 122 be given pre and post test modules that emphasize generalization skills. Scores from the beginning of the semester would be compared to those at the end, to indicate if there was any evidence of students having increased their ability to go beyond given information to predict outcomes based on the information. Throughout the semester, the instructor would encourage the use of generalizations during the discussion of scientific topics and during test taking. Nearly 100% of exam questions would be critically thinking based, requiring students to do a significant amount of writing.

Data indicates that there was no improvement between pre and post test modules and that less than a majority of students were successful in either of the modules. Any improvements noted were by students who were already successful in their responses on the pre test module. Further, responses on the SEIQs that were issued to students near the end of the Fall 2006 semester indicate one third of the class exhibits a great dislike for the testing format and prefer traditional test formats like multiple choice selections. More disturbing, based on responses on SEIQs, approximately 14% of students were unable to see the connection between class material taught and the application of this material. Because the ability to critically think in the sciences is so crucial to effective student learning, the department will begin to discuss new ways to attempt to encourage critical thinking in the classroom.

Other Assessment Projects

In addition to the projects that were developed directly from the standardized assessment tools, the department is involved in several ongoing projects geared to enhance and measure student learning.

PRS Technology In the Classroom

In Fall of 2006, the department proposed the implementation of PRS Technology in the classroom. Based on national data, when used wisely by an instructor during the course of classroom instruction, PRS technology makes it possible for each student to become more actively engaged in the learning process. Students and instructors receive immediate feedback that indicates how well students comprehend a particular course concept. This technology allows instructors to move beyond the limitations of the traditional lecture method and implement new interactive teaching strategies that facilitate and encourage otherwise passive students to become actively involved with the course materials.

In October, the department hosted a workshop that featured presenters who have successfully used PRS systems in their own science classes to engage students in becoming more active learners in the classroom. These presenters demonstrated a variety of effective strategies for using the technology in a science course. The workshop was also designed to help instructors understand the technical aspects of PRS use so that technical failures and glitches are minimized when classroom implementation occurs. The workshop was open to all full and part time science instructors at Wright College.

Currently, PRS technology has been implemented by three full-time faculty in a variety of ways. Data collected represents the use in the Biology 233 sections, where use of the technology has been extensive.

Use of the PRS technology was assessed in three ways. 1) Did use promote an increase in student comprehension of biology course concepts and topics? 2) Did use promote an increase in student success/credit ratios (SCRs)? 3) Did use promote an increase in student retention rates?

Based on an in-class survey, data indicates that 91% of students agree that the technology increased student comprehension of biology course concepts and topics. 85% of students agreed that the immediate feedback they received helped them learn. Comparison of exam scores between Fall 2006 (no use of technology) and Spring 2007 (use of technology) support the findings of the survey by indicating a slight increase in student scores. Data also indicates that 94% of students felt that this technology kept them more attentive in class as compared to traditional classrooms.

Due to the timing of the submission of this report, SCRs cannot be assessed until final grades are complete. However, a comparison of SCRs for two sections of microbiology in Fall 2006 and in Spring 2007 will be done.

In regards to retention rates, data currently suggests no significant difference between Fall 2006 and Spring 2007. However, 97% of students agreed that they enjoyed using this technology in the classroom. Continued use of PRS technology will continue in several courses. Its effectiveness will continue to be assessed over the next academic year.

Use of Portfolios

The use of portfolios in sections of anatomy and physiology classes has continued through this academic year. Portfolios are meant to simulate the student's ability to prepare, organize, and complete a patient's medical chart. Students were assessed on these features throughout the semester as the portfolios were compiled. Data indicates that for both Fall 2006 and Spring 2007, a majority of students earned 75% or more of possible points and were successful in the creation of their portfolios. Instructors are currently discussing options to enhance this process for Fall 2007.

Redesigned Laboratory Manual

Biology 121 is a laboratory course that is recommended for those students contemplating a career in the sciences. One of the student learning outcomes of the course is to develop an appreciation of the application of science in everyday life; to effectively perform laboratory experiments; and to conduct quantitative and qualitative analysis. The need for a redesigned lab manual was a project concept that had been discussed by the department over the past couple of years. It was understood by the department that the revised manual would be of substantial aid to our full time faculty and adjuncts in assisting our students expand on their scientific and investigative skills. In addition, the redesigned laboratory manual is anticipated to better prepare our students for effective scientific inquiry.

The revised manual is meant to provide clearly structured directions; incorporate laboratory exercises that generate consistent results; demonstrate practices for technology application; challenge students' interests; complement the lecture sessions by assisting in the understanding of intricate concepts; promote constructive group discussions; and achieve the course learning objectives. The newly designed manual is anticipated to enhance student retention through interactive exercises that incorporate the Personal Response System (PRS)-clicker model. The proposed PRS technology should effectively engage our students in the classroom by means of predicting demonstration results in addition to conducting real-time demonstrations.

A student satisfaction survey was conducted as an indirect assessment of the effectiveness of the presently employed laboratory manual. The survey was administered to four randomly selected Biology 121 sections with a total cohort size of 105 students. The analysis was carried out with SPSS.

Data indicates that 72.4% of the surveyed students expressed their satisfaction with the quality of the currently employed lab manual, yet 73.3% conveyed a need for making improvements. It was interesting to find that 82% of the students considered the manual provided clearly structured directions with 60% agreeing to the consistency of the experimental results/outcomes, conversely, the comment section of the survey on aspects of improving the manual evidently emphasized the need for more detailed and clear instructions that provided consistent results. Other feedback comments highlighted the need for creative labs that challenge their interests.

The question regarding demonstrated practices of technology application had the lowest approval rating (53% agreed versus 47% disagreed). This finding further supports the proposal of incorporating the PRS technology and possibly incorporating internet based lab activities.

Fall 2007 will include actively employing the redesigned manual into selected section(s) of the Biology 121 course, the review and editing of the redesigned laboratory activities, the conduction of a Post-Student Satisfaction Survey to assess the effectiveness of the redesigned Biology 121 laboratory manual on improving student satisfaction and learning and the analysis of the data.