**BIO 121 – Spring 2011 – SLOAT Final Report – Jill Stein**

***Introduction***

The purpose of this assessment is to document the progress of a cohort of students taking BIO 121 during the Spring 2011 semester, and to compare the results of this assessment with a similar one done in Fall 2010. (For general information regarding the importance and role of BIO 121 as a required or elective course, please refer to the BIO 121 – Fall 2010 – SLOAT Final Report, which can be found on the ECC SLO Assessment website, http://sloat.mathography.org.)

Currently, the only pre-requisites for BIO 121 are completion of all remedial courses, if necessary, or demonstration of college-level readiness in Mathematics and English. There is no college science pre-requisite. New for the Spring semester, the students received a pre-test on the first day of class to assess their reading comprehension and math skills. Further, a basic text in Anatomy and Physiology, one simpler than the required text, was recommended as part of the class syllabus. The students were given the same exams as those in the Fall semester, the percent of students showing proficiency for each measurable course performance objective (MPO) was established, and the results compared with those from the Fall semester.

***Methodology***

**Pre-test:** The pre-test was administered only on the first day of class. Since late registration continues through the first week of classes, some students were able to register for the class after the pre-test had been given. The test consisted of nine questions, four math and five reading comprehension.  
**Math Pre-test:** Questions from a prior MTH 092 midterm exam were used. The questions were provided by Prof. Shoreh Andresky of the Math Department.  
**Reading Pre-test:** Questions from a prior RDG 096 final exam were used. The questions were provided by Prof. Carol Kushner of the English Department.

**Unit Exams:** Forty-seven students, comprising two sections, were part of the initial cohort. This number was based on the official class lists after the “no shows” were removed. In addition, one student withdrew after the second week and did not take any exams. Eight exams were given in class at varying intervals throughout the semester starting with the third week of class. Each exam contained a variety of short answer questions which were blueprinted to specific MPOs. Assessment methods used were direct, summative, quantitative, and objective. Multiple questions were used to assess each MPO. Each question was scored for the number of students selecting the correct answer. This number was converted to a percentage of the total number of students taking the exam. Multiple percentages for each MPO were then averaged to determine the overall student success for each MPO.

***Results***

Thirty-seven students took the pre-test on the first day of class. At the end of the semester, the results from the pre-test were compared with the students’ final grades to see if any correlation could be made between the pre-test score and the final course grade.

**Table 1: Overall Score on Pre-test Compared to Final Grade in Course**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** |
| **A** | 3 |  | 2 |  | 1 |  |  |  |  |
| **B+** |  |  | 1 | 1 |  |  |  |  |  |
| **B** |  | 2 | 3 | 4 | 2 |  | 1 |  |  |
| **C+** |  |  |  |  |  |  |  |  |  |
| **C** |  |  |  |  | 1 |  | 1 |  |  |
| **D** |  |  |  | 2 | 1 |  |  |  |  |
| **F** |  |  |  |  | 1 |  | 2 |  |  |
| **W** |  |  | 3 |  | 2 | 1 | 2 | 1 |  |

The sample size is small, but the results seem to show that a score of 6 or higher would indicate likely success in the course. A score of 5 is borderline, and a score of less than 4 would indicate a greater potential for an unsuccessful outcome.

A clearer picture emerges when the results are separated into the reading and math components.

**Table 2: Reading Score on Pre-test Compared to Final Grade in Course**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **5** | **4** | **3** | **2** | **1** | **0** |
| **A** | 6 |  |  |  |  |  |
| **B+** |  | 1 | 1 |  |  |  |
| **B** |  | 5 | 6 |  | 1 |  |
| **C+** |  |  |  |  |  |  |
| **C** |  |  | 2 |  |  |  |
| **D** |  |  | 2 | 1 |  |  |
| **F** |  |  | 1 | 1 | 1 |  |
| **W** |  | 4 | 1 | 3 | 1 |  |

**Table 3: Math Score on Pre-test Compared to Final Grade in Course**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **5** | **4** | **3** | **2** | **1** | **0** |
| **A** |  | 3 |  | 2 |  | 1 |
| **B+** |  |  | 2 |  |  |  |
| **B** |  | 4 | 3 | 5 |  |  |
| **C+** |  |  |  |  |  |  |
| **C** |  |  |  | 1 |  | 1 |
| **D** |  | 1 | 1 | 1 |  |  |
| **F** |  |  |  | 2 |  |  |
| **W** |  | 1 | 2 | 2 | 4 | 1 |

These results show that good reading comprehension scores are indicative of potential success, while poor reading comprehension skills generally point to unsuccessful outcomes. No such broad generalizations can be made about the math scores. Five students who scored a two on the math pre-test received As and Bs, as did 5 students who scored a four on the test. One student scored a zero on the math pre-test and still completed the course with an A.

The attrition for this cohort was also determined. As shown in Figure 1 below, the number of students taking the exams declined over the course of the semester, from 47 to 29. However, in comparison with the Fall 2010 semester, there was a marked improvement in retention, from 44% (Fall 2010, series 2) to 62% (Spring 2011, series 1).

**Figure 1: Number of Students in the Cohort  
Who Took Each BIO 121 Exam**

The steep decline in the number of students remaining after Exam 4 can be attributed to the fact that midterm warnings were received at that time.

Student success for each MPO is shown in Table 4 below. The first number is from the Fall 2010 semester, while the second number is from the Spring 2011 semester.

**Table 4: Student Success for Each MPO on Exams 1 - 8**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **MPO** | **Exam 1** | **Exam 2** | **Exam 3** | **Exam 4** | **Exam 5** | **Exam 6** | **Exam 7** | **Exam 8** |
| **1.1** | 68.7/79.6 |  |  |  |  |  |  |  |
| **1.2** | 61.2/66.0 |  |  |  |  |  |  |  |
| **1.3** |  | 56.7/64.6 |  |  |  |  |  |  |
| **1.4** |  | 49.4/64.1 |  |  |  |  |  |  |
| **1.5** |  | 55.9/58.7 |  |  |  |  |  |  |
| **1.6** |  |  | 62.3/74.4 |  |  |  |  |  |
| **2.1** |  |  | 62.7/66.8 |  |  |  |  |  |
| **2.2** |  |  |  | 73.1/76.5 | 57.5/62.6 |  |  |  |
| **2.3** |  |  |  |  |  | 65.6/67.1 |  |  |
| **2.4** |  |  |  |  |  |  | 70.1/72.4 | 69.2/69.5 |
| **3.1** | 56.4/75.2 |  |  |  |  |  |  |  |
| **3.2** |  |  | 70.8/80.9 |  |  |  |  |  |
| **3.3** |  |  |  | 68.2/71.9 | 72.2/76.6 |  |  |  |
| **3.4** |  |  |  |  |  | 69.9/68.2 |  |  |
| **3.5** |  |  |  |  |  |  | 61.3/71.0 | 72.5/76.6 |

Increases in student success are noted for all MPOs, with the exception of 3.4, with a decline of 2.4%. Most changes were modest, but significant increases were noted for MPOs 3.1 (33.3%), 1.4 (29.8%), 1.6 (19.4%), and 3.2 (14.3%).

Students were asked to complete brief surveys after Exams 1 and 2. Forty-six students completed the survey after Exam 1 (see BIO 121 – Appendix A for full results). Once again, students cited test anxiety, insufficient biology background and overcommitted schedules as barriers to success. However, more students indicated that they felt fully prepared (48%) this semester, as opposed to only 32% in the Fall. This confidence was well placed, as noted by the increases in student success for the MPOs assessed in Exam 1.

Forty-three students completed the survey after Exam 2 (see BIO 121 – Appendix B for full results). Although success rates improved for all MPOs assessed with this exam, percentages are still relatively low due to the nature of the material (cell biology and biochemistry), and most overall scores declined from the first exam. Many students indicated that they felt overwhelmed by the amount of material and didn’t know which topics should be given more weight than others. Additional issues, such as sickness and family emergencies, continued to play important roles.

***Discussion***

As noted in BIO 121 – Fall 2010 – SLOAT Final Report, the content for BIO 121 is both quantitatively and qualitatively difficult to master, and critical thinking and analysis are required to answer some of the questions. Anecdotally and demonstrably, many students are unaccustomed to this type of course, are insufficiently prepared, and lacking in the appropriate study skills. Students have informally told me that they really needed to “wake up” earlier than they did in order to receive the grade that they wanted. Therefore, I felt it was imperative to convey this challenge to the students from the minute that they entered the classroom.

The purpose of the pre-test was really two-fold. One was to obtain some idea of the true skill sets that my students had, regardless of which courses they had taken, and then to see if their performance on this test could be related in any way to the final outcomes. Although the sample size was small, reading comprehension scores seemed to give a good indication of potential success or failure (see Table 2). Further assessment may support or negate this statement. Although math scores did not correlate with success or failure, this does not mean to say that the requirement for completion of remedial math should be removed. Critical thinking skills learned in math class are very important to overall success. The second purpose, implied and not overt, was to let the students know, by giving a pre-test the very first day, that this course was going to require hard work, and that they had better get started immediately. In addition, mindful of their incomplete science backgrounds, a basic text was listed in the class syllabus as an optional purchase. This fact was reiterated multiple times over the course of the semester, with student recommendations for specific purchases mentioned during class.

As can be seen from Figure 1 and Table 4, outcomes improved from the Fall 2010 to Spring 2011 semesters. At this time, it would be foolish to attribute these differences in outcomes merely to these two small changes. Although it is typical to find older students in BIO 121 (coming back to school for a career change to the health sciences), this semester seemed to have an overabundance of this type of student (specific numbers not determined). These students are normally highly motivated and very receptive to suggestions on ways to improve performance. However, this does seem to be a good start, and these changes should be continued.

In addition, BIO 100, the preparatory course, continues to be a very useful and highly undervalued tool for acclimating our students to the rigors of BIO 121. Further, the large block of information covered on Exam 2 will be scrutinized for appropriate focus and importance.

**Appendix A – Student Survey Administered After Exam 1 in BIO 121**

**N = 39**  **Fall 2010** SCORE EARNED ON EXAM #1 \_\_\_\_\_\_\_\_

**PLEASE ANSWER THE FOLLOWING QUESTIONS HONESTLY:**

1. How prepared were you for this exam based on the work you’ve done so far? (Circle one.)

FULLY PREPARED **12** SOMEWHAT PREPARED **23**

NOT AT ALL PREPARED **3**

1. Do you have a copy of the required textbook (or a similar book by a different author)?

YES **35** NO **4**

1. Do you have a copy of the lab manual?

YES **33** NO **6**

1. How much homework have you done so far this term? (Circle one.)

ALL **20** MOST (>50%) **14** SOME (<50%) **3** NONE **2**

1. How did you find the level of the exam? (Circle one.)

TOO HARD **5** REASONABLE **32** TOO EASY **1**

1. Did you feel rushed to complete the exam? (Circle one.)

YES **1** NO **37**

1. If you didn’t do as well as you’d hoped, why not? (Circle all that apply.)

TEST ANXIETY **13** INSUFFICIENT BIOLOGY BACKGROUND **7**

DIDN’T STUDY ENOUGH – LAZY **1**

DIDN’T STUDY ENOUGH – OVERCOMMITTED SCHEDULE **16**

OTHER: **see written report**

**ADDITIONAL HELPFUL COMMENTS CAN BE WRITTEN ON THE BACK OF THIS SHEET.**

**Appendix A – Student Survey Administered After Exam 1 in BIO 121**

**N = 46**  **Spring 2011** SCORE EARNED ON EXAM #1 \_\_\_\_\_\_\_\_

**PLEASE ANSWER THE FOLLOWING QUESTIONS HONESTLY:**

1. How prepared were you for this exam based on the work you’ve done so far? (Circle one.)

FULLY PREPARED **22** SOMEWHAT PREPARED **22**

NOT AT ALL PREPARED **2**

1. Do you have a copy of the required textbook (or a similar book by a different author)?

YES **42** NO **4**

1. Do you have a copy of the lab manual?

YES **43** NO **3**

1. How much homework have you done so far this term? (Circle one.)

ALL **32** MOST (>50%) **7** SOME (<50%) **6** NONE **1**

1. How did you find the level of the exam? (Circle one.)

TOO HARD **2** REASONABLE **41** TOO EASY **3**

1. Did you feel rushed to complete the exam? (Circle one.)

YES **2** NO **44**

1. If you didn’t do as well as you’d hoped, why not? (Circle all that apply.)

TEST ANXIETY **12** INSUFFICIENT BIOLOGY BACKGROUND **10**

DIDN’T STUDY ENOUGH – LAZY **1**

DIDN’T STUDY ENOUGH – OVERCOMMITTED SCHEDULE **10**

OTHER: **see written report**

**ADDITIONAL HELPFUL COMMENTS CAN BE WRITTEN ON THE BACK OF THIS SHEET.**

**Appendix B – Student Survey Administered After Exam 2 in BIO 121**

**N = 31** **Fall 2010** SCORE EARNED ON EXAM #2 \_\_\_\_\_\_\_\_\_\_\_\_\_

**PLEASE ANSWER THE FOLLOWING QUESTIONS HONESTLY**:

1. How did you do on this exam compared to Exam #1?

Better **2** About the same **7** Worse **22**

2. If you did **better** on this exam, why was this so? (Circle all that are applicable. Leave it

blank if necessary.)

Studied more Have the book now Completed more homework

Wasn’t as nervous – kind of knew what to expect **2** Didn’t miss as many classes

Other: \_\_\_\_\_\_\_\_\_

3. If you did **worse** on this exam, why was this so? (Circle all that are applicable. Leave it

blank if necessary.)

Test anxiety **7** Bad Biology background **7** Missed too many classes

Didn’t study enough – Lazy Didn’t study enough – Overcommitted schedule **10**

Didn’t do enough homework **1** Other: **see written report**

4. How did you find the level of the exam? (Circle one.)

Too hard **9** Reasonable **20** Too Easy **0**

5. Did you feel rushed to complete the exam? (Circle one.)

Yes **3** No **27**

**Appendix B – Student Survey Administered After Exam 2 in BIO 121**

**N = 43** **Spring 2011** SCORE EARNED ON EXAM #2 \_\_\_\_\_\_\_\_\_\_\_\_\_

**PLEASE ANSWER THE FOLLOWING QUESTIONS HONESTLY**:

1. How did you do on this exam compared to Exam #1?

Better **1** About the same **9** Worse **33**

2. If you did **better** on this exam, why was this so? (Circle all that are applicable. Leave it

blank if necessary.)

Studied more **3** Have the book now **1** Completed more homework

Wasn’t as nervous – kind of knew what to expect **1** Didn’t miss as many classes

Other: \_\_\_\_\_\_\_\_\_

3. If you did **worse** on this exam, why was this so? (Circle all that are applicable. Leave it

blank if necessary.)

Test anxiety **8** Bad Biology background **4** Missed too many classes **10**

Didn’t study enough – Lazy **3** Didn’t study enough – Overcommitted schedule **10**

Didn’t do enough homework **2** Other: **see written report**

4. How did you find the level of the exam? (Circle one.)

Too hard **12** Reasonable **30** Too Easy **0**

5. Did you feel rushed to complete the exam? (Circle one.)

Yes **0** No **42**