**Ad Hoc Assessment Team Report**

**for the Liberal Education Program Outcome #5**

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The Liberal Education Program (LEP) Outcome #5 states that upon completion of the LEP, students will be able to **understand both physical and social aspects of the world and their place in it**. This includes the following:

1. **Demonstrate knowledge of concepts, methods, and theories designed to enhance understanding of the natural world and human society**
2. **Demonstrate the ability to access, comprehend, compare, and evaluate contemporary scientific and social literature**
3. **Demonstrate an awareness of multiple worldviews, and how each is shaped by the interaction of physical and social factors**
4. **Critically consider the ethical and physical ramifications of scientific decisions on society and the environment**

**Identification of courses that support SLO #5**

For many of the SMSU LEP student learning outcomes it is very easy to see the overlap with courses in the Minnesota Transfer Curriculum (MnTc)--communication skills, critical thinking, and diversity. However, this is not true for LEP outcome #5. On the surface, LEP courses that fall within MnTc Goal 3 (natural sciences) and MnTc Goal 10 (people and the environment) appear to be appropriate courses that would introduce the goals and learning outcomes of SLO#5. However, there may be courses within other MnTc goal areas which would support SLO#5 as well. Additionally, there may be upper level courses that are not part of the MnTc that support and/or reinforce SLO#5.

In an attempt to get faculty input in identifying courses that best support the SMSU student learning outcomes, surveys were sent out so faculty could self-identify which learning outcomes could be assessed in their courses. We realize that self-identification isn’t the best way to determine if a course supports a particular student learning outcome so it was very important that faculty indicated a certain SLO matches their course only if it could be assessed in their course, not merely mentioned. Additionally, the surveys asked faculty to rate where they were with assessment of that outcome. Surveys were sent out electronically and paper forms were distributed during faculty workshop days.

**Courses identified by AHA team and/or self-identified by faculty as of April 2014**

**LEP Courses MnTc Goal area**

Biol 100: Biology in the Modern World 3

Biol 200: Introduction to Cellular Biology 3

Biol 201: Introduction to Biodiversity and Evolution 3 and 10

Chem 110: Our Chemical World 3 and 10

Chem 121: Basic Chemistry 3

Chem 231: General Chemistry 3

Culg 200: Culinary Essentials I

Culg 210: Culinary Essentials I

Eng 107: Introduction to creative writing 6

Eng 360: Scientific and Technical writing upper level writing

Envs 100: Earth Science 3 and 10

Envs 101: Physical Geology 3

Envs 115, Redwood River Monitoring

Envs 180: Introduction to Enviromental science 3 and 10

Envs 302: Geomorphology

Envs 311, Environmental Geology

Envs 400, Senior Capstone

Envs 390, Research Methods in Environmental Science

Envs 401, Wetland Ecology

Envs 406, Limnology and Lab

Geog 101: Introduction to Geography 10

Hist 310: Environmental History 10

Hosp 100: Introduction to Hospitality Management

Hosp 320: Hospitality Law

Hosp 460: Hospitality Operations and Policy

Humt 201: Origins of Western Civilization 6

Humt 203: Modern Western Civilization 6

Juad 144: Introduction to Justice and Society 9

Lit170: Literature: People and Environment 10

Lit 262: Short Story 6

Mktg 301: Principles of Marketing

Mktg 441: Market Research

Mktg 461: Entreprenuership

Mktg 381: Advertising Management

Mktg 431, Sales Management

Mktg 491, Strategic Marketing Policy

Music 101: Survey of World Music 6 and 8

Phil 103: Ethics 9

Phil107: Environmental Ethics 9 and 10

Phil 201: Aesthetics

Phys 121: Introduction to Astronomy 3

Pol 120: American National Government 9

Psyc 335: Abnormal Psychology

Spch230: Interpersonal and Cross Cultural Communication 7

Soc 101: Introduction to Sociology 5

Soc 211: Marriage and Family 7

Thtr 100: Introduction to Theater 6

**Identification of assessment tools**

Instead of trying to create a “one-size-fits all” assessment tool and forcing faculty to take time to implement that tool, we focused our efforts on assessments that were already occurring within the classroom. This would eliminate the faculty “buy in” needed in developing a new instrument and would increase the likelihood of obtaining data. Many faculty met during assessment day in March 2012 to recommend assessment tools that may be useful for each student learning outcome. Additionally, the faculty teaching courses identified as supporting student learning outcome #5 were asked how they measure student learning in those courses. The table below summarizes the results of those events.

**LEP Outcome #5: Understand both physical and social aspects of the world and their place in it.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Outcomes** | **Activities** | **assessment** | **Who** |
| 1. Demonstrate knowledge of concepts, methods, and theories designed to enhance understanding of the natural world and human society | Pre/post test  Objective exams and homework  Concept item analysis  Publisher designed learning outcomes summary from online assignments  Student generated questions | Percentage of class meeting set threshold  Concept analysis of exams/quizzes | Faculty teaching class will collect data from whole class or subset of class—most likely as part of program assessment. Will pass along data to LEC |
| 1. Demonstrate the ability to access, comprehend, compare, and evaluate contemporary scientific and social literature | assignments such as:  Annotated bibliography  Evaluation of current events articles  Papers  Select exam questions—open ended questions | Use of rubric to identify competency level  Percentage of class meeting threshold level | Faculty teaching class will collect data from whole class or subset of class—most likely as part of program assessment. Will pass along data to LEC |
| 1. Demonstrate an awareness of multiple worldviews, and how each is shaped by the interaction of physical and social factors 2. Critically consider the ethical and physical ramifications of scientific decisions on society and the environment | assignments such as:  Group presentation of current topic  Group response to issues  Case studies related to discipline  Papers | Use of rubric to identify competency level  Percentage of class meeting threshold level | Faculty teaching class will collect data from whole class or subset of class—most likely as part of program assessment. Will pass along data to LEC |

**Assessment**

According to our surveys and discussions with faculty members, most faculty are at the beginning stages of assessment; reworking their assessment tools and gathering data. This closely matches the trends of the University as a whole as it has taken many years to get faculty/staff on board with the assessment process. However, there are some faculty/programs that have initial assessment data and are beginning to analyze it, and there are some faculty/programs with substantial assessment data along with reflections on how that data is shaping their courses and programs. Our assessment team chose to highlight a few examples of assessment occurring for LEP outcome #5 as a way for other faculty members to see how they could do (or may already do) assessment for their own courses so that they may provide us with data in the future. The following courses were chosen because 1) they are high-enrollment classes; 2) they come from different MnTc goal areas; 3) they represent different stages of assessment.

**The following information is given for each class**

**Basic information**

Course name

Primary area within MnTC/LEP

Student impact (Enrollment/year)

Course goals and outcomes and their alignment with LEP student learning outcome #5

**Assessments**

Description of at least one assessment tool used in the course

Description of how the assessment tool is scored

Description of how the tool shows student learning

Description of how assessment results have modified course content/delivery (if available)

**Example #1: Biol100: Biology in the Modern World**

Biol100 and lab is a non-majors course that currently satisfies MnTc goal 3. This course has the highest enrollment of any course at SMSU enrolling over 400 students each year with two sections of 100 students during the Fall semester; two sections of 100 students during the Spring semester; and a section of 35 students during the summer. Therefore, the majority of students will take this course during their educational experience at SMSU! Various members of the biology program take turns teaching the course every semester. However, Dr. Pamela Sanders has taught the course every semester and so provides a great example of the changes that occur due to assessment. Most of the following information is provided by her.

The goals/student learning outcomes for Biol100 can be summarized into three main areas: 1) improving biological literacy by developing an understanding of diverse biological topics; 2) understanding and applying the scientific method 3) developing an understanding and appreciation of current biological issues and their relevance to society and the environment. These closely match the overall goals and student learning outcomes developed by the biology program (see biology web page) and several of the sub-outcomes listed for SLO#5.

The following assessment tools used in Bio100 are described below:

* + Pre/post test
  + Assignments (CARDs assessment; Mastering Biology concept analysis; current events articles)
  + Concept analysis of exams

**Pre- and post-tests:**

Pre- and post-tests are a simple way to demonstrate an understanding of the basic content knowledge of the course (sub-outcome 1).Data from Dr. Sanders class is shown below. Based on this information, it appears that students are able to demonstrate knowledge of concepts, methods and theories of the natural world. It should be noted that in 2013, the biology program created a new pre/post-test that will be across all sections BIOL 100 including college now.

**Pre- and Post-test data from 20-question quiz – BIOL 100 lecture** (example included). Mean score (%), number of students who scored over 70% with denominator of number who took the quiz (N), and number of questions that more than 70% of students got correct

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **F08** | | **S09** | | **F09** | | **F10** | |
|  | **Pre-test** | **Post-test** | **Pre-test** | **Post-test** | **Pre-test** | **Post-test** | **Pre-test** | **Post-test** |
| **Mean score** | **58%** | **78%** | **59%** | **78%** | **53%** | **79%** | **59%** | **78%** |
| **Number students scoring >70%**  **over N** | 17/70 | 40/53 | 20/74 | 30/47 | 21/108 | 64/82 | 25/80 | 40/50 |
| **Number questions > 70% got correct** | 6/20 | 14/20 | 7/20 | 16/20 | 4/20 | 16/20 | 5/20 | 15/20 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **F10** | | **F11** | | **S13** | | |
|  | **Pre-test** | **Post-test** | **Pre-test** | **Post-test** | | **Pre-test** | **Post-test** |
| **Mean score** | **59%** | **78%** | **58%** | **78%** | | **61%** | **79%** |
| **Number students scoring >70%**  **over N** | 25/80 | 40/50 | 17/70 | 40/53 | | 29/89 | 61/74 |
| **Number questions > 70% got correct** | 5/20 | 15/20 | 6/20 | 14/20 | | 5/20 | 16/20 |

**Assignments:**

The instructors of Biol100 have tried a variety of different assignments to help students learn the basic content knowledge and evaluate scientific literature. In 2006, the biologists created numerous “low-stakes” quizzes on D2L. Students could take repeated attempts at the quizzes with the hopes that they would learn from their mistakes as they went along. Unfortunately, students put little effort into quizzes and merely clicked answers until they got them all correct without noting which answers were correct or why they were correct. The following describes Dr. Sanders modifications to the assignment area of the course.

In 2012, traditional assignments were replaced with CARDs open-ended in-class assessments (Schinskee 2011).Key aspects of the CARDS assessments are that they are only 1 or 2 questions answered on a note card after brief paired-discussion, a simplified grading system and the option to resubmit unlimited times until the concept is learned. The resubmission option meant many students actually talked to the instructor about the topics/questions and worked hard to put their thoughts into words correctly. They hardly ever asked about the same questions once they were on D2L. Resubmission also gave valuable data about how many students cared enough to keep trying and how many cared enough to submit one after an absence. Data from CARDS assessment is shown below. While scores continued to improve after resubmission, we are unsure what to make of the fact that many students can get an excellent score on a CARD, yet answer a similar question wrong on a multiple-choice exam.

**Summary of CARDS assessment data from Fall 2011 and the question topics.** For students in class on the day of the CARD, possible grades are Excellent, Partly Complete, or Off-Track (10, 6, 3 points, respectively). If these students resubmit their answers, they can improve to Partly Complete or Excellent. Absent students initially earn 0 points, but can resubmit for 7, 5, or 2 point versions of the same labels.

**CARDS ASSESSMENT F11 completed Dec 2011**

% of absent who resubmitted is affected by those who later withdrew = 10 students total by end

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **#1** | | **#2** | | **#3** | | **#4** | |
|  | **INITIAL** | **END** | **INITIAL** | **END** | **INITIAL** | **END** | **INITIAL** | **END** |
| **EXCELLENT** | 34 | 61 | 61 | 83 | 53 | 67 | 9 | 33 |
| **ABSENT E** |  | 4 |  | 6 |  | 12 |  | 3 |
| **PARTLY COMPLETE** | 53 | 27 | 13 | 5 | 28 | 18 | 60 | 45 |
| **ABSENT PC** |  | 4 |  | 1 |  | 5 |  | 10 |
| **OFF-TRACK** | 15 | 7 | 30 | 10 | 7 | 3 | 19 | 9 |
| **ABSENT OT** |  | 1 |  | 2 |  | 1 |  | 1 |
| **ABS – NOT DONE** | 17 | 5 | 16 | 2 | 31 | 3 | 31 | 8 |
| **COUNT** | 119 | 109 | 120 | 109 | 119 | 109 | 119 | 109 |
| **% abs RESUBMITTED** |  | 47% |  | 56% |  | 58% |  | 45% |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **#5** | | **#6** | | **#7** | | **#8** | |
|  | **INITIAL** | **END** | **INITIAL** | **END** | **INITIAL** | **END** | **INITIAL** | **END** |
| **EXCELLENT** | 24 | 50 | 64 | 79 | 23 | 45 | 26 | 45 |
| **ABSENT E** |  | 2 |  | 8 |  | 26 |  | 8 |
| **PARTLY COMPLETE** | 32 | 26 | 8 | 4 | 17 | 10 | 32 | 24 |
| **ABSENT PC** |  | 1 |  | 0 |  | 5 |  | 5 |
| **OFF-TRACK** | 37 | 15 | 20 | 9 | 19 | 5 | 20 | 10 |
| **ABSENT OT** |  | 4 |  | 2 |  | 0 |  | 4 |
| **ABS – NOT DONE** | 26 | 11 | 27 | 7 | 50 | 18 | 31 | 13 |
| **COUNT** | 109 | 109 | 109 | 109 | 109 | 109 | 109 | 109 |
| **% RESUBMITTED** |  | 27% |  | 37% |  | 62% |  | 55% |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **#9** | | **#10** | |
|  | **INITIAL** | **END** | **INITIAL** | **END** |
| **EXCELLENT** | 12 | 28 | 30 | 38 |
| **ABSENT E** |  | 2 |  | 3 |
| **PARTLY COMPLETE** | 40 | 32 | 18 | 18 |
| **ABSENT PC** |  | 6 |  | 7 |
| **OFF-TRACK** | 15 | 7 | 23 | 16 |
| **ABSENT OT** |  | 13 |  | 6 |
| **ABS – NOT DONE** | 42 | 21 | 38 | 21 |
| **COUNT** | 109 | 109 | 109 | 109 |
| **% RESUBMITTED** |  | 50% |  | 42% |

**Simplified summary of the CARDS data from Fall 2011** - % of students who initially earned a grade of Excellent and those who did by the end of the term by resubmitting answers, including those who had been absent.

|  |  |  |
| --- | --- | --- |
| **Question #** | **Initial % Excellent** | **Final % Excellent** |
| 1 | 29 | 60 |
| 2 | 51 | 82 |
| 3 | 45 | 72 |
| 4 | 8 | 33 |
| 5 | 22 | 48 |
| 6 | 59 | 80 |
| 7 | 21 | 65 |
| 8 | 24 | 49 |
| 9 | 11 | 28 |
| 10 | 28 | 38 |

In 2010, Dr. Sanders began using the Mastering Biology online homework system supplied by the publisher. This is similar to our intention with the low-stakes quizzes on D2L, but goes way beyond what we could do on D2L by providing video tutorials, hints with questions, animations, automatic feedback on answers, ability to return to a question several times with grading that rewards using hints and penalizes guessing. Below is a list of Mastering biology concepts including the number of questions related to that concept and the average class score. The concepts have been placed into two categories: those for basic content knowledge which matches SLO#5 sub-outcome #1; and global concepts which match SLO#5 sub-outcomes 2 and 4

**Mastering Biology Concepts and average score by the class.**

|  |  |  |
| --- | --- | --- |
| **Basic Knowledge concepts** (sub-outcome #1) | **# of questions** | **Average Score** |
| Describe Darwin’s theory of evolution, the evidence for evolution, and how populations may evolve through natural selection | 43 | 85.5% |
| Describe the roles of cellular reproduction in living cells, including the processes and outcomes of mitosis and meiosis | 68 | 87.5 |
| Use examples to explain how abiotic factors affect the distribution of species and determine the locations and characteristics of Earth’s biomass | 16 | 88.5 |
| Describe the molecular basis of life in terms of the four major classes of biomolecules | 32 | 86.3 |
| Describe the major structures of angiosperms and relate them to plant growth and life cycle | 9 | 88 |
| Describe the evolution and characteristics of plants and fungi | 13 | 88.2 |
| Explain the definition of biology, including the sub-definitions of life, science, and evolution | 26 | 83.4 |
| Describe life’s underlying chemical composition | 22 | 85.8 |
| Describe properties common to all living animals, including structural hierarchy, exchange with the external environment, and homeostasis | 13 | 82.5 |
| Catalog and contrast the structures that comprise prokaryotic, animal, and plant cells | 33 | 87.8 |
| Describe the cellular bases of energy conversion, enzymatic promotion of chemical reactions, and transport across selectively permeable membranes | 40 | 84.7 |
| Outline the process of photosynthesis with particular emphasis on the inputs and outputs of each stage | 29 | 88.2 |
| Explain how genotype controls phenotype in simple Mendalian inheritance patterns and some common variations | 47 | 84.2 |
| Describe how the structure of DNA relates to its functions of self-replication and the flow of genetic information through the cell | 45 | 84.4 |
| List the various means by which cells can control the flow of genetic information from gene to protein | 31 | 82.9 |
| Explain the processes of speciation and macroevolution, and the significance of phylogeny in studying these topics | 20 | 80 |
|  |  |  |
| **Global concepts: (**sub-outcomes 2 and 4) |  |  |
| Demonstrate the ability to make connections between concepts across biology | 23 | 76.2 |
| Read and interpret graphs and data | 27 | 84.1 |
| Communicate effectively in writing | 4 | 74.9 |
| Demonstrate the ability to think critically and employ critical thinking skills | 85 | 84.8 |
| Demonstrate an understanding of the impact of science on society | 48 | 83.4 |
| Describe the techniques and societal implications of gene cloning, DNA profiling, genomics, and human gene therapy | 29 | 85.1 |

In addition to learning the key concepts of biology, this course should help students develop an understanding and appreciation of current biological issues and their relevance to society and the environment. This reflects many of the sub-outcomes of SLO#5, in particular the ability to comprehend and evaluate scientific literature, and critically consider the ramifications of scientific decisions on society and the environment. We can see above that some of the mastering biology questions approach this goal, however, most of the biol100 instructors have approached this through current events assignments or journals. Currently Dr. Sanders and Dr. Greenfield do similar current events assignments called Biology Matters. Students read an article about a current biology topic in a science journal that would be more appropriate to a non-science major such as *Science News* or *Scientific American*. Then the students answer questions posted on D2L.Some questions are to be sure they actually read the article, others focus on experimental design and interpretation issues (sub-outcome 2), and others ask what they think should be done based on the evidence given (sub-outcome 4). Below is a list of articles used in the different sections

***Fishing may exert evolutionary pressure on largemouth bass* by Susan Milius in *Science News*, Jan. 12, 2013, Vol. 183, No. 1, p. 16. This article provides a great example of the importance of natural selection.**

***The Color of Controversy* by Laura Beil in *Science News*, Aug. 27, 2011, Vol. 180, No. 5, pp. 22-25. The first article is about the difficulties in determining whether food dyes increase hyperactivity in kids.**

***The Lowdown on Ginko biloba*  by Gold, Cahill, and Wenk in Scientific American, April 2003, 87-91. This article is great for discussions on proper scientific method and experimental design.**

***Rebuilding the food pyramid* by Willet and Stampfer in Scientific American, January 2002. This article helps relate topics of biological molecules to our daily life and emphasizes evaluation of data.**

***Methane and Plants* by Kepler and Rockman in Scientific American, February 2007. This article shows that plants produce greenhouse gases as well, but emphasizes the importance of evaluating evidence when looking for causes of global warming.**

***Cancer Clues from pet dogs*  by Waters and Wildasin in Scientific American, December 2006. This article helps with discussions on the use of animal models and occasional problems of animal models.**

***Whose Blood is it?*  By Kline in Scientific American 2001. This article helps contribute to ethical discussions of stem cells including whether this technology would be available to everyone or just the wealthy.**

***The Mammals that Conquered the Seas* by Kate Wong in Scientific American 2002. This article helps reiterate many concepts discussed in the evolution section and gets students to interpret/evaluate fossil evidence and construct phylogenetic trees to discover evolution of whales from terrestrial mammals.**

***Founder Mutations* by Dennis Drayna in Scientific American 2005. This article examines genetic mutations that enable scientists to trace the migration and development of human populations. This article helps link genetics and evolution concepts to medical concepts of using ethnicity to estimate risk of disease or determine best treatments.**

***Are Viruses Alive?*  By Villarreal in Scientific American 2004. This article gets students to question the properties that define life and then determine whether viruses should be considered living organisms.**

Both Dr. Sanders and Dr. Greenfield report that for those students completing the assignment earn over 72% of the points. We are unsure as to why nearly 20% of the class do not complete the assignment but can speculate they fail to realize the amount of time required to adequately read and understand the article. Dr. Greenfield has noted that students generally do better on the basic questions (showing that students read the article) than questions that require evaluation of data or ask students to use reasoning to answer more debatable questions or consider what should be done next. Generally upper level students do better than first and second year students on these types of assignment, which should be expected if they are gaining experience in thinking skills as they progress through the LEP.

**Exams**

Exams are still one of the most common forms of assessment in all sections of Biol100 and mainly focuses on assessing concepts, methods, and theories (sub-outcome #1). Exam scores are typically lower than we would like, with a mean range of 65-70% regardless of section or instructor (data from Dr. Sanders section is shown below).

**Mean scores (%) on each exam in the course in sequence**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course** | **F 2007** | **S 2008** | **F 2008** | **S 2009** | **F 2009** | **S 2010** | **F 2010** | **F 2011** | **S 2012** | | **F 2012** | **S 2013** |
| **BIOL 100**  **Final** | **67 70**  **62 68**  **74** | **64 72**  **68 70**  **71** | **65 70**  **62 65**  **70** | **70 72**  **69 74**  **74** | **68 68**  **63 69**  **73** | **Not**  **taught** | **65 68**  **67 67**  **69** | **67 67**  **64 65**  **67** | **Not**  **taught** | | **Not**  **taught** | **71 68**  **68 69**  **69** |
| **Means are calculated without the zeroes**  **of students who did not take the exams.** | | | | | | | | | | **2013 zeroes were included in means** | | |

All biol100 instructors are looking at exams to identify where students are doing well and where they are struggling. We run analysis on all exams to determine which questions/concepts are missed most frequently so we can place greater emphasis on those areas. It is interesting to note that even questions from homework or CARDs assignments which students have seen and discussed before still show up as most frequently missed questions on exams. We are unsure what to make of this, however, Dr. Greenfield has noted a correlation between most frequently missed questions and the day which the material was covered. The material for a frequently missed question is often presented on a Friday or a day with low attendance (which is usually a Friday). Unfortunately, we often spend too much time on where students go wrong and not enough examining where students do well. Dr. Sanders has been completing a concept analysis of comprehensive final exams for the past few years to determine how well students are doing with learning and retaining the basic concepts throughout a semester of biol100. Her data is shown below.

**Number of questions that more than 70% of students answered correctly per learning outcome category/total number of questions in category (Sanders)**

|  |  |  |
| --- | --- | --- |
| Learning Outcome | # Q. correct by  >70% students | Total number questions |
| Cell function, structure | 11 | 23 |
| Evolution | 4 | 6 |
| Genetics/Molecular Genetics | 13 | 20 |
| Scientific Inquiry | 1 | 1 |
| Total | 29 | 50 |

For comparison, Dr. Greenfield ran a similar analysis on his past semester final exam (shown below) and can see very similar trends. In both cases, the class tends to do well on questions related to scientific process and questions related to genetics. One could speculate that students may come into the class with greater knowledge of these areas already, and when we examinng the scientific process questions on the pre-test, this certainly is true. However, the genetics questions are among the lowest scores on the pre-test indicating that students are making exceptional gains in this area. Even though the class does not do as well with the evolution questions, we are quite pleased how well they do given the number of misconceptions students have coming into the class when examining the pre-test. It is perplexing as to why students continue to do so poorly on basic cell structure and function questions; a concept that is common in K-12.

|  |  |  |
| --- | --- | --- |
| Learning Outcome | # Q. correct by  >70% students | Total number questions |
| Cell function, structure | 2 | 9 |
| Evolution | 4 | 7 |
| Genetics/Molecular Genetics | 7 | 10 |
| Scientific Inquiry | 4 | 5 |
| Cellular reproduction | 1 | 3 |

**Example #2: ENVS180: Introduction to Environmental Science**

ENVS180 is an introductory course for majors but primarily serves as a non-majors course fulfilling MnTc goals 3 (natural sciences) and 10 (people and the environment). ENVS180 enrolls approximately 80 students each semester and because it double counts for two goal areas, is considered a high demand course. Therefore, similar to Biol100 mentioned above, a majority of students will take this course while at SMSU. ENVS180 is taught by the same instructor, Dr. Emily Deaver, every semester which makes it easier to track changes that have been made over the past several years.

The student learning outcomes listed below for ENVS180 match very well with LEP student learning outcome #5.

1. demonstrate a knowledge and understanding of the current major environmental issues and regulations;

2. be able to critically evaluate environmental issues by examining multiple points of view and then rationally developing his/her own defensible opinion;

3. be able to make connections between concepts covered in class and current events;

4. effectively communicate an awareness of resource consumption and the importance of sustainability.

The following assessment tools are used in ENVS180 some of which are described in more detail below.

* + Pre-post assessment quiz
  + Annotated Bibliography assignment
  + Group annotated bibliography assignment
  + GMO paper
  + Group sustainability presentation

**Pre-Post quiz**:

The pre-post quiz is a 20 question multiple choice quiz posted on D2L. Students take the pre-quiz during the first week of class, and they take the post-quiz between the last day of class and the last day of final exams. Class average scores are shown below for pre-post quizzes given from Spring 2005 to Fall 2013. Summary data on the quizzes including average score, range, % failing the quiz, and number of students taking the quiz are shown in the table.

The Post Test Average Score is similar to the Final Course Grade average in ENVS 180 which is typically 77-80%. Based on these measures, it appears that students are able to demonstrate knowledge of concepts, methods and theories designed to enhance understanding of the natural world and human society.

Individual questions are also monitored to identify common wrong answers and misconceptions. They are also compared with similar questions on cumulative final exams to determine which topic areas students are showing improvement and which topic areas they are still struggling. These assessment data indicate that in most topic areas there was considerable improvement in the number of correct responses especially on the topics of natural selection, photosynthesis, bio- magnification, main world food crops, the role of environmental estrogens and the role of the U.S. Forest Service. Other topic areas such as the causes of extinction and the greenhouse effect showed less improvement with many students still confused. Overall this type of assessment tool seems to be valuable in determining knowledge gains in specific content areas and where to try different teaching strategies in the future. Based on this information some changes were made to how some of the content areas were taught: more time was spent in class covering the greenhouse effect, global climate change and extinction, and new short video clips were incorporated into the course.

**Annotated Bibliography assignments**

An assessment tool used to evaluate **sub-outcome 2**: **“Demonstrate the ability to access, comprehend, compare and evaluate contemporary scientific and social literature**” is an Annotated Bibliography Assignment. Students must find, read, summarize and correctly cite 10 scientific peer-reviewed journal articles on a topic of their own choice that relates to the ENVS 180 class. Students must 1)find articles that are appropriate for their topic; 2) find articles that are from peer-reviewed sources; 3) find articles that are current; and 4) adequately summarize the information in the article. A second Annotated Bibliography assignment is given at the end of the semester related to a specific topic on Sustainable Development. In addition to the requirements of the first assignment, students must evaluate the quality of sources from various websites. There is an improvement of scores overall when comparing the initial Annotated Bibliography Assignment compared to the final one. Increase in average score ranged from 0.54% to 12.4%.

Table 2. Information on grades on an Annotated Bibliography Assignment given during the first 2 weeks of the semester in (ENVS 180) Intro to Environmental Science

Annotated Bibliography Assignment

(due the 4th week of the semester)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Year*** | ***Average Grade*** | ***% of Students with this Grade*** | | | | | ***# students in Class*** |
| ***A*** | ***B*** | ***C*** | ***D*** | ***F*** |
| Fall 2010 | 79.31 | 57.83 | 13.23 | 8.43 | 8.43 | 12.44 | 83 |
| Spring 2011 | 74.04 | 51.04 | 7.29 | 12.50 | 10.42 | 18.75 | 96 |
| Fall 2011 | 80.39 | 61.25 | 15 | 7.50 | 2.50 | 13.75 | 80 |
| Spring 2012 | 76.52 | 52.38 | 17.86 | 8.33 | 3.57 | 17.86 | 84 |
| Fall 2012 | 82.97 | 58.11 | 16.21 | 18.92 | 0 | 6.76 | 74 |
| Spring 2013 | 78.78 | 42.50 | 32.5 | 7.5 | 2.5 | 15 | 80 |
| Fall 2013 | 81.49 | 58.29 | 15.07 | 12.03 | 2.73 | 11.0 | 73 |

Table 3. Information on grades on a Sustainability Annotated Bibliography Assignment given during the last 4 weeks of the semester in (ENVS 180) Intro to Environmental Science

Sustainability Project Annotated Bibliography

(due the last week of class)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Year*** | ***Average Grade*** | ***% of Students with this Grade*** | | | | | ***# students in Class*** |
| A | B | C | D | F |
| Fall 2010 | 82.00 | 49.38 | 14.82 | 27.16 | 2.47 | 6.17 | 81 |
| Spring 2011 | 86.68 | 56.25 | 29.17 | 12.50 | 1.04 | 1.04 | 96 |
| Fall 2011 | 80.93 | 36.25 | 35 | 17.5 | 5 | 6.25 | 80 |
| Spring 2012 | 78.33 | 29.77 | 28.57 | 26.19 | 8.33 | 7.14 | 84 |
| Fall 2012 | 89.17 | 70.27 | 21.62 | 6.76 | 0 | 1.35 | 74 |
| Spring 2013 | 85.42 | 50 | 37.5 | 3.75 | 5.00 | 3.75 | 80 |
| Fall 2013 | 89.29 | 65.73 | 17.80 | 11.0 | 1.36 | 4.11 | 73 |

**Soc101: Introduction to Sociology**

Soc101 is an introductory course for the sociology and social work programs, but also serves in the MnTc under the social sciences goal (Goal 5). Soc101 enroll approximately 160 students per year (two sections of 40 each semester) and therefore represents another example of a course taken by many of the SMSU students . The Goals of the course align with Goal #1 and Student learning outcome #1.2 from the Social Science program as well as LEP SLO#5 sub-outcome #1.

**Goal 1: Knowledge base of sociology**: Demonstrate an understanding of the discipline of sociology, major concepts, and sociology’s role in contributing to our understanding of social reality.

**Student Learning Outcome 1.2:** Apply principles, concepts, and the sociological imagination to at least one area of social reality.

One example how student learning is assessed in Soc101 is a video clip assignment. For this assignment, the students partnered with another student in class. The student teams were instructed to find a video clip (less than five minutes in length) that illustrated a sociological concept and write an analysis that connected the concept to examples in the video. The students were provided with a list of 42 possible concepts and several sample questions to aid them in connecting the concept to the action in the video. One class period was used to begin the assignment and provide assistance from the professor. The students met in the library computer lab on this day. The assignment was due the last week of class.

**Assessment Strategy:** Because the grading rubric for classroom purposes included criteria such as grammar and editing, a summary of the video clip, and source citation, a new rubric was constructed to assess the responses of the student teams. The answers were scored as exemplary, satisfactory, or needing improvement. Exemplary answers demonstrated accurate understanding of the concept and provided sufficient, detailed examples. Answers which demonstrated some understanding of the concept were scored as satisfactory. Answers were scored as needing improvement if limited understanding was demonstrated (See Table 1: Scoring Rubric). Though the directions instructed the students to provide analysis of one concept, some assignments included the use of two or more concepts. Each concept was assessed separately, totaling 40 answers. In one instance, an assignment included an analysis of four terms, two of which were not on the concept list. These terms were used incorrectly and excluded from the results.

**Table 1: Scoring Rubric for Written Assignment**

|  |  |  |
| --- | --- | --- |
| **Exemplary** | **Satisfactory** | **Needs Improvement** |
| **Demonstrates accurate understanding of concept; sufficient, detailed examples** | **Demonstrates some understanding of concept; some examples provided** | **Limited or no understanding of concept; lacks depth and detail** |

**Results:** Of the 40 illustrations of concepts, five (12.5%) were exemplary answers, 20 (50%) answers were satisfactory, and 15 (37.5%) answers needed improvement. Twenty-one different concepts were illustrated in the answers. A further breakdown of concepts by topics indicate that six concepts illustrated the topic of socialization and social structure; seven concepts illustrated deviance; five concepts illustrated race/ethnicity; and three concepts were from other topic areas. The results are detailed in Table 2.

The results indicate that the students illustrated concepts of race/ethnicity most frequently (42.5%), followed by socialization and social structure (27.5%), deviance (22.5%), and other topics (7.5%) (See Table 3). According to the course schedule, the topic of race and ethnicity was discussed toward the end of the semester, while socialization, social structure, and deviance were discussed in the earlier half of the semester. This may provide some explanation. Another consideration is that students may have a sense that they better understand the terms dealing with discrimination, prejudice, and stereotypes since these terms are heard more commonly in the news and daily life.

**Table 2:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | **Answers (N=40)** | | | | |
| **Concept chosen** | | **Exemplary**  **(N=5, 12.5%)** | | **Satisfactory**  **(N=20, 50.0%)** | | **Needs Improvement**  **(N=15, 37.5%)** |
| ***Topic area: Socialization or Social Structure*** | | | | | | |
| Gender roles | | 1 | | 3 | | 2 | |
| Impression management | | 0 | | 1 | | 0 | |
| Master status | | 1 | | 0 | | 0 | |
| In-group/out-group | | 0 | | 0 | | 1 | |
| Cliques | | 0 | | 0 | | 1 | |
| McDonaldization | | 0 | | 0 | | 1 |
| ***Topic area: Deviance*** | | | | | | |
| Deviance | | 0 | | 1 | | 0 |
| Obedience | | 0 | | 1 | | 1 |
| Labeling | | 0 | | 1 | | 0 |
| Differential association | | 0 | | 1 | | 0 |
| Conformity | | 1 | | 1 | | 0 |
| Stigma | | 1 | | 0 | | 0 |
| Social control | | 0 | | 0 | | 1 |
| ***Topic area: Race/Ethnicity*** | | | | | | |
| Discrimination | | 0 | | 3 | | 3 |
| Prejudice | | 0 | | 1 | | 3 |
| Stereotypes | | 0 | | 5 | | 0 |
| White privilege | | 0 | | 0 | | 1 |
| Assimilation | | 0 | | 1 | | 0 |
| ***Topic area: Other*** | | | | | | |
| Sick role | | 1 | | 0 | | 0 |
| Sexism | | 0 | | 1 | | 0 |
| Ageism | | 0 | | 0 | | 1 |

If both exemplary and satisfactory answers are considered as demonstrating adequate understanding, the students were the most successful in illustrating concepts of deviance (77.8%), followed by other topics (66.6%), race/ethnicity (58.9%), and socialization/social structure (54.6%). Overall, students provided exemplary or satisfactory application of the concepts in 62.5% of the answers.

**Table 3: Comparison of Topic Areas and Scores**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Topic Areas** | | | |
| **Scores** | **Answers**  **N=40** | **Socialization/**  **Social Structure**  **N=11, 27.5%** | **Deviance**  **N=9, 22.5%** | **Race/Ethnicity**  **N=17, 42.5%** | **Other**  **N=3, 7.5%** |
| **Exemplary** | 5  (12.5%) | 2 (18.2%) | 2 (22.2%) | 0 (--%) | 1 (33.3%) |
| **Satisfactory** | 20 (50.0%) | 4 (36.4%) | 5 (55.6%) | 10 (58.9%) | 1 (33.3%) |
| **Needs Improvement** | 15 (37.5%) | 5 (45.5%) | 2 (22.2%) | 7 (41.2%) | 1 (33.3%) |

**Limitations and possible revisions under consideration:** There are several limitations that must be addressed before fully implanting the assessments used in this course. They include the following:

* Ideally, the written assignments would be assessed by all program faculty. Because of the demands of teaching loads and other responsibilities to the university, a discussion on how to best complete this needs to take place.
* The 5-year assessment plan for Goal 1 included the use of essay questions to assess student learning outcomes. The use of this written assignment was substituted to provide a starting point for discussion and revision.
* This written assignment was completed with a partner, raising the concern of free riders. On the other hand, students may produce better work because of collaboration. The students were also free to select a concept from a provided list. Some may have chosen a concept that was easier to understand and illustrate. Even though the assessment is based on the team’s ability to demonstrate understanding of the concept, a better look at the difficulty level of the concepts is needed.

**Conclusion:** The outcome data suggests that by the end of the semester, students were able to demonstrate satisfactory or exemplary application of the sociological concepts to social reality in 62.5% of their written answers. This will serve as a benchmark for assessment in SOCI 101. Program faculty will meet during the spring semester to make necessary changes to both the assessment strategy and tools used to assess student learning goals in this course.

**Geog101: Introduction to Geography**

Geog101 serves mainly in the LEP for MnTc goal 10, people and the environment but is also a requirement for certain Education majors. Geog101 serves approximately 160 students each year (two sections of 40 each semester) and so provides another example of a course impacting a larger number of students. The course outcomes are listed below. These outcomes match those of the program; those required of the Board of Teaching; and those listed for LEP SLO#5.

**At the end of this course, students will understand the following:**

1) the relative location, direction, size, and shape of locales, regions, and the world,

2) how to create, interpret, use, and synthesize information from various representations of the earth,

3) appropriate resources, data sources, and geographic tools to generate and manipulate charts, graphs, and maps and to interpret information from resources including atlases, databases, and grid systems,

4) how to determine distance, scale, area, density, and distinguish spatial distribution patterns,

5) the relationships among various regional and global patterns of geographic phenomena,

6) how physical earth system changes explain geographic phenomena,

7) physical and cultural patterns and their interaction,

8) how people create places that reflect culture, human needs, government policy, and current values and ideals as they design and build specialized buildings, neighborhoods, shopping centers, urban centers, industrial parks, and the like,

9) how historical events have been influenced by, and have influenced, physical and human geographic factors in local, regional, national, and global settings,

10) how language, art, music, belief systems, and other cultural elements can facilitate global understanding or cause misunderstanding,

11) conditions and motivations that contribute to conflict, cooperation, and interdependence among groups, societies, and nations,

12) causes, consequences, and possible solutions to persistent, contemporary, and emerging global issues.

**Class activities**:

Below are three examples of class activities that are used in Geog101 to assess student learning as it relates to LEP SLO#5. These activities are assessed using a simplified Rubric: “√”= Responses submitted reflect effort and originality and are relevant to the course. “—“ = Responses submitted reflect little or effort or originality. When the “—/0“ equals responses submitted reflect no effort; do not conform to the assignment requirements and have no relevance to the course.

**Satellite images**: Students must evaluated three satellite images and determine what concepts are occurring in the images. Responses must include mention of various ecological concepts and human impacts discussed in class and the text.

**Identifying concepts in article X**: Students must read an instructor selected article and then describe as many cultural, economic, and environmental issues and concepts that appear in the article. Students should consider what issues show up in the magazine’s framing? What issues can be read into the story? Find likely cases of culture, biodiversity, ecology, biomagnifications, or other relevant class topics in action.

**Governing board for MPCA**: Students work as a three person panel for the state pollution control agency and must issue a ruling on an instructor supplied topic and provide support for the ruling. Students must consider economic benefits (cheaper gas and higher employment); and issues of fossil fuels in a discussion of “Would you approve of the air-quality changes and Trade an improvement in local (smog) and trans-local impacts (acid rain) for a larger global problem (an enhanced greenhouse effect)” or “Trade certain pollutant-caused ailments (elevated ozone levels are responsible for ailments from asthma to emphysema to lung cancer) for larger unknowns (climate change and rising sea-levels)?”

The results shown below indicate that the majority of student responses are adequate.

Activity and Semester “√” “—“ “—/0“ or 0

|  |  |  |  |
| --- | --- | --- | --- |
| Activity One | 73 | 3 | 6 |
| Activity Two | 45 | 22 | 9 |
| Activity Three | 65 | 31 | 13 |

**Pre/Post tests:**

For the purposes of even more active and utilizable assessment, the program is currently working toward the development and implementation of a pretest and post-test for Introduction to Geography. Once the tests are implemented, the results will be tabulated, maintained, and used for revision.The pre-test/post-test would be a multiple-choice and it would test student’s ability to apply concepts and demonstrate their learning across all of the course’s outcomes. Furthermore, the pool of questions would come from a standard set used at other higher education institutions and created by reputable publishers and instructors. Students’ performances on the pre-test and post-test would enable reviewers to assess progress over the course of the semester. The instrument as envisioned would become part of a feedback loop. The results would facilitate determinations of strengths and weaknesses of course learning. Scores would enable instructors to identify areas and learners needing improvement Based on the findings, adjustments would come, and the cycle and the process and cycle would start again each semester. This evaluate-adjust approach would continue through the years.

**Eng360: Scientific and Technical writing**

Eng360 is an upper level course that is not part of the MnTc. However, it serves within the LEP as an upper level core-skills course for several majors on campus. We chose to include this course in our report because it provides a nice contrast to the introductory level courses, and showcases how students can apply their understanding of the natural world with their communication skills that we expect them to learn in their LEP courses. So while assessment in the other classes show student learning over a semester, performance in this class will indicate the retention and application of those concepts.

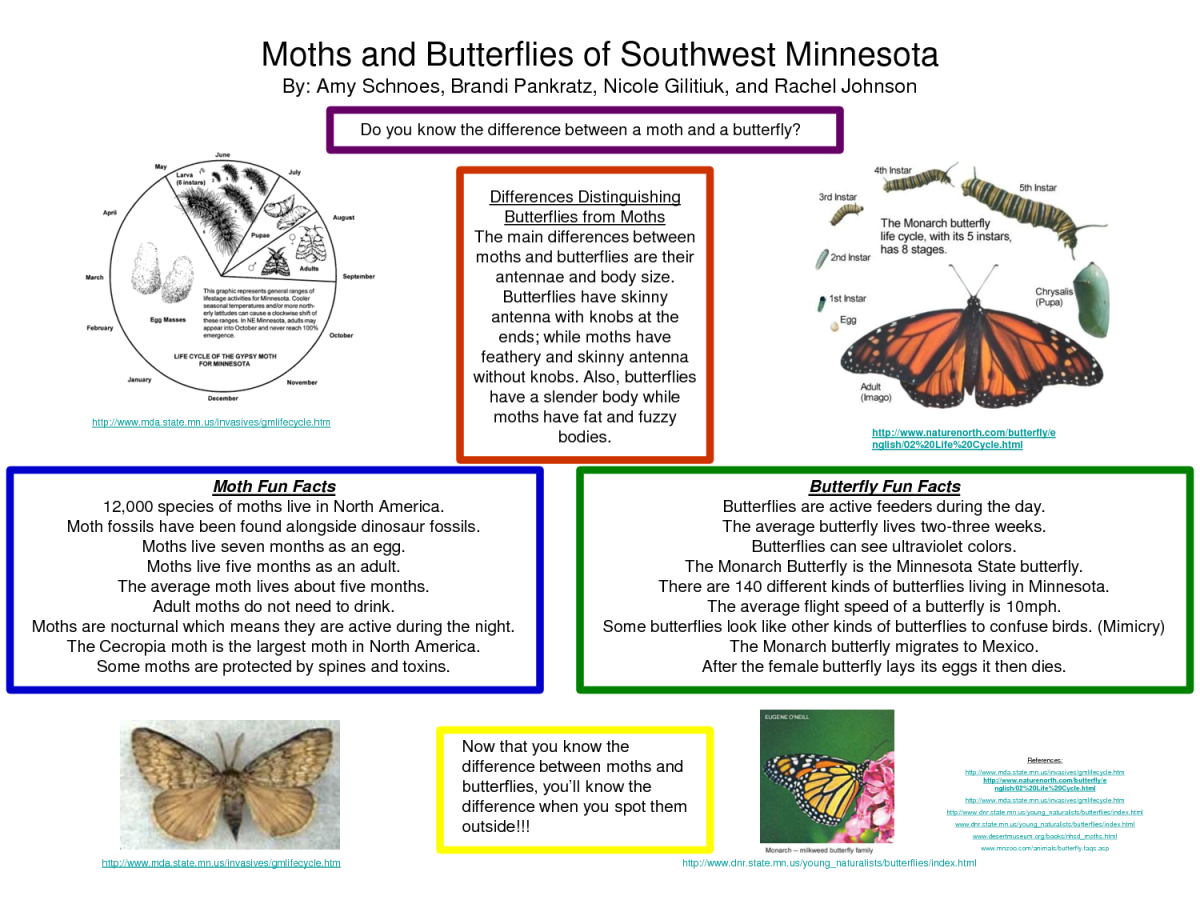
While the primary objective of the course is “to prepare you to write in a variety of technical and professional settings where clear, concise, accurate, logical, and ethical communication is required”, several assignments within the course reflect the sub-outcomes of LEP SLO#5. Students are required to organize and present information in a ways that allow people to take action, and therefore must consider the audience’s needs rather than their own needs or subject matter.

**Analytical report assignment:**

Students must write a recommendation report about “how to make some aspect of our campus community healthier” or “how to make some aspect of our campus community more sustainable”. In order to do this, students must first be able to find, understand, and evaluate literature on these subjects which directly corresponds to sub-outcome #2 of LEP SLO#5. In the report, students must clearly identify the problem and provide examples. They must outline a plan of action and provide justification for this recommendation. In order to do this well, students must be aware of multiple points of view on the subject as well as carefully considering the potential ramifications of their plan which directly reflects sub-outcomes 3 and 4 of LEP SLO#5. Two examples of reports, “sustainable lighting at SMSU” and “Wind power sustainability report” are included (where?) as examples of student work.

**Multimedia report assignment**:

Eng360 includes another assignment that showcases an understanding of physical and social aspects of the world and their place in it. This project was published in the [Journal of Effective Teaching, Vol 8. No.2, 2008, 40-49](http://uncw.edu/cte/et/articles/Vol8_2/Henning.pdf). For this assignment, students create educational displays and exhibits for the natural history museum on campus. The purpose of these exhibits is to promote scientific literacy, primarily in children that come through the museum in hopes of stimulating the curiosity of young people about human culture and the natural world around them. In order to create these displays, students must first have a basic understanding of the concepts they are presenting. They are required to research and evaluate literature on the topic. And most importantly, they have to determine how to appropriately present the topic in a way that stimulates young minds (target audience is 4th grade). Once again, this directly addresses the sub-outcomes for LEP SLO#5. Student created displays have included: butterflies vs moths; Minnesota wetlands, Minnesota prairies, fish of Minnesota, and prairie plant directories. The prairie plants directory has now been incorporated into the SMSU wildlife area website and can be seen at <http://www.smsu.edu/campuslife/attractions/wildlife/plantsdir.html> . Another example which is currently on display in the museum is shown below.



**Conclusions and Future Directions:**

This report highlights just a few of the courses and some of the ways faculty at SMSU are assessing student learning for LEP student learning outcome #5. We will continue to identify those courses in the MnTc as well as other courses within majors that support SLO#5. We hope that the examples provided here will help other faculty develop and share the assessments used in their courses so that we can showcase more examples of assessment in future reports. As part of department annual reports, faculty/programs are asked to include assessment activities. We suggest that faculty consider how their courses support the LEP as well as their own programs as they are completing this area of the annual report. This will make it easier for future assessment teams to summarize assessment for each student learning outcome. Additionally, future assessment teams should not only showcase assessment from other areas, but show how some of the beginning assessment data here has been used to make changes.