Student Learning Outcomes Report

Academic Year: 2012-2013
Department/Program: Department of Geography
Degree Program: B.A./B.S. and Minor in Geography
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Summary of the 2012-2013 Annual Progress Report on Assessment of Student Learning

The Geography Department’s four student learning outcomes were assessed in the 2012-13 academic year using direct and indirect measures. Approximately 76% of the students assessed in GEOG 221 and 495 were able to use maps to solve geographic problems. Interpretation of geographic patterns was assessed in GEOG 302. Of the students enrolled in GEOG 302, 77% were able to correctly interpret and account for geographic patterns displayed on thematic maps in the class final exam. The assessment of student understanding of physical and human processes was done in GEOG 221. Approximately 56% of the students correctly answered final exam questions dealing with physical processes and the impact of humans on those processes. The ability to address geographic problems using geographic techniques was assessed in GEOG 508. On lecture and laboratory exams, 80% of the students were able use geographic techniques to analyze, solve, and present spatial problems in geography. Our indirect measures of student learning (senior exit interviews) revealed that students value the 24-hour access to the geospatial teaching lab, the diversity of classes offered in the department, the weekly department newsletter, and interaction with the department's graduate students.

Link to the department web site where degree program student learning outcomes (SLOs), alignment matrix, and 2012-2013 APR summary are posted.

http://www.k-state.edu/geography/

I. Student Learning Outcomes

The Department of Geography identified four Student Learning Outcomes (SLOs) in its Assessment of Student Learning Plan submitted on 29 January 2004. Geography majors are assessed for SLOs 1-4 and Geography minors are assessed for SLOs 1-3. Geography students will:

1) be able to interpret maps and use them to solve geographic problems;
2) be able to comprehend and associate geographic patterns at various spatial scales;
3) understand the processes and patterns of the physical world and how human actions impact and interact with natural systems;
4) be able to address, solve, and communicate spatial problems using geographic techniques, including geographic information systems (GIS).

In the 2012-13 academic year, the department assessed for the ninth year the first three outcomes (map interpretation, geographic patterns, and physical/human processes) using direct and indirect methods; the fourth outcome (geographic techniques) was assessed in the 2012-13 academic year for the seventh time.

II. Assessment Strategies

Direct Measures

Map interpretation and physical/human processes were measured using exam questions and lab exercises in GEOG 221 during the 2012-13 academic year. In the 2012-13 academic year, 359 students were enrolled in GEOG 221. Students in GEOG 221 completed fourteen lab exercises as part of the course and took a final lab exam administered in the last week of classes during the spring and fall semesters. In the lecture, a final course exam was administered during the final exam period.

Knowledge of geographic patterns was assessed in GEOG 302 during Fall 2012 and Spring 2013 semesters. For these combined periods, a total of 56 students were enrolled. Assessment was done through the use of lecture and laboratory-based practical exams, laboratory exercises, and a capstone map design project. Six of the eleven lab exercises assigned to students, and a practical exam completed during each semester, focused on the design and production of thematic maps. The practical exams and the capstone project specifically challenged students to reach beyond the normal requirements of the laboratory exercise and produce publication-quality maps using data and geographic areas with which they were unfamiliar. The written midterm and final exams tested student familiarity with concepts ranging from the impact of data classification and transformation on map pattern generation to outlining the map design and data processing steps necessary to produce a thematic map that communicates relevant geographic patterns to a specified audience.

Student ability to interpret maps and use them to solve geographic problems was also assessed in GEOG 495. A total of 35 senior geography majors completed the class in Fall 2012 (the class is taught only in the fall semester).

The ability to address, solve, and communicate spatial patterns using geographic techniques, including geographic information systems (GIS), was assessed in GEOG 508. Students were evaluated through class and laboratory exams, laboratory exercises, and class projects. Thirty-nine students took the class in Fall 2012 and 54 students completed
the class in Spring 2013.

**Indirect Measures**

As an indirect measure of the four student learning outcomes, senior geography majors were interviewed by a small group of geography faculty members during the last week of each semester (the interviews do not include geography minors). All graduating seniors were encouraged to attend the exit interview, and additional interview times were made available for those students who were unable to attend the main session. In December 2012, three graduating seniors (out of six graduating) attended the 45 minute exit interview with two faculty members; in May 2013, seven graduating seniors (out of twenty-six graduating) were interviewed by three faculty members in a session of 90 minutes. Students were asked to comment on positive and negative aspects of the department, and encouraged to suggest ways in which the undergraduate major could be improved. Interviews took place in the Geography Department seminar room.

**III. What was Learned from the Assessment Results**

**Direct Measures (Map Interpretation)**

The department continued to assess map interpretation in GEOG 221 with exam questions that asked students to use geographic grid systems (e.g., latitude and longitude) and interpret maps and map symbols. Students were also required to use and interpret a variety of topographic maps in the lab component of the course. Map reading skills acquired in the lab and during lecture were evaluated in the lab and course final exams.

We have specific results on the direct assessment of map interpretation from two sections of GEOG 221 taught in Fall 2012 and Spring 2013. A final exam question asked students to interpret the U.S. Public Land Survey by locating plots of land based on the land survey description. Of the students in the two classes, 76% answered the question correctly. In Fall 2010 and Spring 2011, 84% of the students answered this question correctly; we do not have data on this question for AY 2011-2012.

In Spring 2013, we also assessed student ability to comprehend and associate geographic patterns at various scales through a series of final exam questions in the lecture portion of GEOG 221. On the exam, which was given to 192 students, a series of questions required students to explain atmospheric and climatic differences on global and continental scales. The questions were designed to test the ability of students to interpret spatial data shown on a map and then account for the patterns they saw. For the questions dealing with atmospheric circulation on global and continental scales, 76% of students provided the correct answer; on similar questions from an hourly exam in Spring 2011, 81% of the students provided the correct answer; we do not have data on this question for AY 2011-2012. On questions covering climatic differences at global and continental
scales, 65% of students listed the correct answer; on similar questions from an hourly exam in AY 2011-2012, 81% of students supplied the right answer.

GEOG 495 was completed by 35 students in Fall 2012. The combined average score for a map development and interpretation video that students composed was 96% (91% in Fall 2011), indicating a superior ability among senior geography majors to interpret maps, communicate with maps, and use maps to solve geographic problems.

Direct Measures (Geographic Patterns)

For the 2012-13 academic year, 56 students in GEOG 302 were assessed on their ability to generate map products that illustrated geographic patterns. Students completed a series of ten laboratory exercises during the semester, with six of those exercises dealing with concepts and/or techniques that directly address the student learning outcome for geographic patterns. Class averages for individual lab exercises ranged from 75% to 96% in Fall 2012 and from 73% to 96% in Spring 2013. This compares to average scores of 58% to 90% in AY 2011-2012. The combined average score for the two practical laboratory exams was 88% (Fall 2012) and 89% (Spring 2013). In AY 2011-2012, the average was 76%.

Additional assessment of student learning outcomes in GEOG 302 was performed by reviewing the results from class written mid-term and final examination. All questions posed to students dealt directly or indirectly with the ability to generate and/or correctly interpret geographic patterns. The class average for the mid-term exam was 84% in Fall 2012 and 81% in Spring 2013; we do not have data for the mid-term exam in AY 2011-2012. For the final exam during Fall 2012 and Spring 2013 semesters, the class averages were 76% and 78%, respectively; we do not have data for the mid-term exam during AY 2011-2012.

In GEOG 302, a final assessment of knowledge of geographic patterns was performed by having students complete a capstone map design project. The project challenged students to create a mini-atlas of multiple publication-quality thematic maps about a topic using data chosen by the students. In addition, it required students to consider the various ways their maps described demographic and economic composition of a geographic area. Students constructed maps using similar templates and stylistic elements, and then combined them to form the final mini-atlas. Additional objectives of this capstone project were to (1) teach students how to plan a successful mapping project from start to finish and (2) to extend their design skills beyond the basic requirements practiced during the conduct of the assigned laboratory exercises (which focused on the mechanics of thematic map design). The average score for the capstone project was 76% (Fall 2012) and 79% (Spring 2013); in AY 2011-2012, the average score for the capstone project was 85%.
**Direct Measures (Physical/Human Processes)**

The department continued to assess the ability of students to understand the processes and patterns of the physical world and the impact of humans on those processes in GEOG 221. Students were asked in the final course exam for GEOG 221 to interpret the relationship between flood recurrence interval and discharge. Of 359 students in Fall 2012 and Spring 2013, 56% answered the question correctly; this compares to 65% who answered the question correctly in Fall 2010 and Spring 2011. We do not have data for this information for AY 2011-2012. In another example, students were asked to describe and account for groundwater quantity and quality issues in Kansas, issues directly related to human activities. Of the students in the class during the Fall 2012 and Spring 2013, 52% answered the question correctly. In AY 2011-2012, 80% of the students supplied the correct answer.

In GEOG 221 during Spring 2013, students were asked a series of questions on the final lecture exam that tested their understanding of physical processes and patterns and the human impact on them. For the series of questions, an average of 72% supplied the correct answer; on similar questions from an hourly exam in AY 2011-2012, an average of 80% of the students provided the right answer.

**Direct Measures (Geographic Techniques)**

Students were assessed on their ability to address, solve, and communicate spatial problems using geographic techniques through class and laboratory exams, laboratory exercises, and class projects in GEOG 508. Thirty-nine students took the class in Fall 2012 and 54 completed it in Spring 2013.

In Fall 2012, the average for lab exercises was 84%; an average for lab exercises was not calculated for AY 2011-2012, but lab exercise scores during the period ranged from 8% to 100%. The presentation of final projects in the class assessed the ability of students to develop a GIS research proposal, conduct a GIS analysis, and present findings orally in front of the class. The mean final project score in Fall 2012 was 87%.

Student learning outcomes in GEOG 508 were also assessed in Fall 2012 by two course exams and two practical lab exams. The lecture exams evaluated student familiarity with geographic information science concepts, methods, and general procedures. The laboratory exams required students to demonstrate their familiarity with and ability to use geospatial techniques to solve spatial problems. In Fall 2012, the class mean on the two course exams was 82%, the same as it was in Fall 2011.

In Spring 2013, students were evaluated on this learning outcome using 12 laboratory exercises, two laboratory exams, two hourly lecture exams, and a comprehensive final
exam. In addition, the students were evaluated in seven take-home real world exercises. In Spring 2013, the average grades in the laboratory component and the take-home exercises were 88%; grades on this component ranged from 8% to 100% in AY 2011-2012. The class mean on the two hourly lecture exams was 78% (82% in Spring 2012), and on the final exam the class mean was 68% (no final exam score available for Spring 2012). As a final evaluation of student ability to conduct geographic analysis using GIS technologies, students developed, carried out, and presented a comprehensive final class project. The mean grade on the project for the class was 68%; in Spring 2012, the mean grade on the project was 88%. GIS is a “hands-on” component of geographic research and teaching, so it is not surprising that student performance was, overall, stronger in the lab component of the class than in the lecture component.

As indicated by data from the lecture and laboratory components of both sections of GEOG 508, a clear majority of students in the class were adept by the conclusion of the class at using GIS techniques to address, analyze and solve geographic spatial problems and communicate findings in a professional manner.

*Indirect Measures (All Departmental Student Learning Outcomes)*

Senior exit interviews conducted in December 2012 and May 2013 provided an indirect assessment of how well the department is doing in educating its undergraduate majors, and suggested improvements that could be made to the department and the geography curriculum. The interviews were informal, the questions open-ended. Given the number of graduates that we have in a typical year (25-30), the geography faculty members have conducted exit interviews in person rather than via an electronic survey. In the interviews, which we have been conducting since the mid-1990s, graduating seniors have consistently complimented the department, noting that the atmosphere in the department is conducive to interaction with the faculty. Students consistently commented that the geography faculty office doors are open and faculty are available to meet with students. Students noted that the quality of undergraduate advising is high and helped students pick classes that allowed them to graduate in a timely manner. Students appreciate the breadth and variety of classes in the department and the academic options such as the Geographic Information Science (GIS) Undergraduate Certificate. Specific items noted by students in the 2012-13 interviews included the 24-hour access to the department's cartography/GIS teaching lab, the diversity of classes offered in the department, the usefulness of the weekly newsletter *The Seaton Globe* in making the geographic community aware of student accomplishments, and the opportunity to interact with the department's M.A. and Ph.D. students.

**IV. Faculty Review of the Assessment Results**

Faculty members of the Geography Department were provided with a copy of the assessment report. The report was then reviewed by members of the Geography
Department faculty. Members of the faculty approved the department’s Undergraduate Student Learning Outcomes Assessment Report for academic year 2012-13 on 24 October 2013.

V. **Actions and Revisions Implemented**

The assessment results demonstrate that the Geography Department is providing numerous opportunities in GEOG 221, 302, 495, and 508 for students to be exposed to and ultimately master the department’s four student learning outcomes. Both direct and indirect assessment measures indicate that the department is succeeding in teaching students to interpret and use maps, comprehend geographic patterns at various scales, and solve geographic problems using cutting-edge GIS and spatial analysis techniques. Based on results from GEOG 221, students in 2012-13 were not as adept in understanding processes in the physical world and the human impact on them as they were in mastering the other department SLOs. Student performance on GEOG 221 final exam questions was worse in 2012-2013 than it had been in 2011-2012. Variation from year-to-year likely occurs because of differences in students enrolled in the class and because of the approaches taken by various doctoral students and faculty who teach the course.

VI. **Effects on Student Learning and Future Plans**

The results of the assessment using both direct and indirect measures demonstrate that geography majors and minors are successfully meeting the four student learning outcomes put forth by the faculty members of the Geography Department. Department faculty members will continue to monitor the assessment results for the student learning outcomes using the methods described earlier in this report. The department will continue to assess the student learning outcomes each year.