

Texas State University

Outcomes Report

General Information

Academic Year:	2011-2012
College:	Liberal Arts
Department:	Geography
Program:	Water Studies
Program Code:	3.02
Outcome Type:	Student Learning
Degree:	Undergraduate
Contact Name:	Dr. Richard Earl
Status:	Data Entry Closed

Mission Statement

The Water Studies program provides students with a focused study of the physical, chemical, social, political, and economic factors of water resources from the geographic perspective in preparation for employment in both the public and private sectors. As water resources become ever more critical to the nation - and in particular Texas - this program addresses the increasing need for professionals in this crucial field. In addition to general and specialized lecture-format courses, the program offers a variety of project-based lab and field-trip experiences, career development through advising, job-shadowing and internships as well as team-building and leadership opportunities available by joining one or more geography department student organizations. The Water Studies program also prepares students for graduate studies. Finally, the Water Studies program provides students with the foundation for a liberal education, preparing graduates to think independently, to choose freely and to base personal and professional decisions on a broad understanding of the Earth's physical and cultural landscapes in order to live full, rewarding lives.

Evidence of Improvement

Assessment results of this year's geographic information systems (GIS) knowledge questions for Outcome 4 - Method 1 show a 15% increase in the number of students meeting or exceeding expectations compared to AY 2010 – 2011.

Assessment results of this year's water studies embedded knowledge questions for Outcome 5 – Method 1 show a 7.7% increase in the number of students exceeding expectations compared to AY 2010 – 2011.

Action Plan

For Outcome 3 – Method 1, instructor will use AY 2011 – 2012 results as new baseline data and add embedded questions to evaluate student knowledge of inferential statistics.

For Outcome 4 – Method 2, instructor will revise grading rubrics for final project so that students can be better differentiated based on the quality of their work and so that outstanding students can be challenged to more fully develop their potential.

For Outcome 5 – Method 2, instructor and lab TA will use returned assignments with corrections as a learning tool to emphasize the importance of following prescribed bibliographic format for reference citations.

Outcome 1

Students will demonstrate knowledge of the major physical features of the Earth and the ability to locate examples of Earth's major physical features on a map.

Outcome 1 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major physical features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 1 - Result

During the fall 2011 semester, 355 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major physical features of the Earth. The course instructor found that 90.3% of the undergraduate students met (31.8%) or exceeded (58.5%) expectations by demonstrating their knowledge of the major physical features of the Earth. The most frequently missed knowledge questions – related to the physical features of Africa - still had at least 85% of the students getting them correct. Given these findings, students should continue to improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 1 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major physical features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test

questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 2 - Result

During the fall 2011 semester, 355 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major physical features of the Earth on a map. The course instructor found that 82.2% of the undergraduate students met (46.5%) or exceeded (35.7%) expectations by demonstrating their ability to locate examples of major physical features of the Earth on a map. Students failed to meet the 70% target on two map locations: both in Africa (62.7% and 61.4%). Given these findings, students should continue to improve their ability to locate examples of major physical features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions compared to knowledge questions may be the result of the complex nature of the map location questions, which require students to examine information about a location and select the correct answer based on that information, as well as know that location on a map.

Outcome 2

Students will demonstrate knowledge of the major cultural features of the Earth and the ability to locate examples of Earth's major cultural features on a map.

Outcome 2 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major cultural features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 1 - Result

During the fall 2011 semester, 355 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major cultural features of the Earth. The course instructor found that 89.0% of the undergraduate students met (45.5%) or exceeded (43.5%) expectations by demonstrating their knowledge of the major cultural features of the Earth. No questions for this outcome and method had less than an 80% correct response rate. Given these findings, students should improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 2 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major cultural features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 2 - Result

During the fall 2011 semester, 355 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major cultural features of the Earth on a map. The course instructor found that 79.8% of the undergraduate students met (47%) or exceeded (32.8%) expectations by demonstrating their ability to locate examples of major cultural features of the Earth on a map. No questions for this outcome and method had less than an 80% correct response rate. Given these findings, students should continue to improve their ability to locate examples of major cultural features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions may be the result of the complex nature of the map location questions which require students to examine information about a location and select the correct answer based on that information, as well as knowing that location on a map.

Outcome 3

Students will demonstrate knowledge of quantitative methods used by geographers and their ability to use statistical software to solve geographic problems.

Outcome 3 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of quantitative methods using 10 embedded test questions from the course: Quantitative Methods for Geography (GEO 3301). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 1 - Result

During the spring 2010 semester, 69 undergraduate students were assessed during the semester by instructor on their knowledge of quantitative

methods using embedded test questions from the course: Quantitative Methods for Geography (GEO 3301). 73% of the students met (52%) or exceeded (21%) expectations on embedded knowledge questions related to measurement and descriptive statistics. 81% of the students met (64%) or exceeded (17%) expectations on embedded knowledge questions related to bivariate relationships and spatial statistics.

Outcome 3 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use statistical software to solve geographic problems using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Quantitative Methods for Geography (GEO 3301). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 2 - Result

During the spring 2012 semester, 69 undergraduate students were assessed on their ability to use statistical software to solve geographic problems using a final project graded with rubric from the course: Quantitative Methods for Geography (GEO 3301). 79% of the students met (29%) or exceeded (50%) expectations on their ability to use statistical software to solve geographic problems. Students lost most points by failing to follow assignment instructions.

Outcome 4

Students will demonstrate knowledge of the foundations and theories of geographic information systems (GIS) and use the tools and methods of GIS.

Outcome 4 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of geographic information systems using 10 embedded test questions from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 1 - Result

During the fall 2011 semester, 54 undergraduate students were assessed during and at the end of the semester by instructors on their knowledge of geographic information systems using knowledge questions embedded in the midterm and final exams for Fundamentals of Geographic Information Systems (GEO 2426). Overall, 90.8% of the students met or exceeded expectations - an improvement of more than 15% compared to AY 2010 – 2011.

Outcome 4 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use the tools and methods of GIS using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 2 - Result

During the fall 2011 semester, 54 undergraduate students were assessed at the end of the semester by instructors on their ability to use the tools and methods of GIS with a final project using a grading matrix in the lab section of Fundamentals of Geographic Information Systems (GEO 2426). 96.3 % of the students met or exceeded expectations - an improvement of 4.5% compared to AY 2010 – 2011.

Outcome 5

Students will demonstrate their knowledge of the formation, use, conservation and management of water resources including legal, economic, political and societal factors and the evaluation of attempts to manage water resources. Students will also be able to demonstrate a working knowledge of hydrology, water availability and quality, hazards, use, demand and allocation; they will demonstrate this knowledge through embedded test items and a project.

Outcome 5 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources using approximately 10 embedded test questions from the course: Water Resources (GEO 3434). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 1 - Result

During the Spring 2012 semester, 54 undergraduate students were assessed using 10 embedded test questions on the final exam in order to measure their understanding of major concepts in water resources. The course instructor found that 76% of all the students met (56%) or exceeded (20%) expectations. Students who failed to meet expectations had the most difficulty with knowing specific state laws controlling water use in Texas, sources of nitrogen water pollution and water volume calculations based on stream flow.

Outcome 5 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources as an embedded class project for the course: Water Resources (GEO 3434). Instructors will use a grading rubric (scored from 0 – 10) to assess student ability on the basis of “failure to meet,” “meeting,” or “exceeding expectations,” (Score 10 = exceeded expectations, score 7 – 9 = met expectations, score 6 or less = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 2 - Result

During spring 2012, 54 undergraduate students were assessed using a class project in order to measure their knowledge of water resources. The course instructor found that 81.5% of the undergraduate students met (61.1%) or exceeded (20.4 %) expectations by demonstrating their knowledge of water resources. Students who failed to meet expectations did not follow the prescribed bibliographic format for reference citations in the text and in the “references” section in the end. Some students could not come up with methods to solve specific water quality and quantity problems. Also, some students failed to correct calculation errors made in previous submitted projects and that instructor corrected on those returned assignments.

Approval History

Approval History Event

Outcomes Approved Level 1
Outcomes Approved Level 2
Outcomes Audit Report Submitted
Results Approved Level 1
Results Approved Level 2
Results Audit Report Submitted

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Mission Statement

The Water Studies program provides students with a focused study of the physical, chemical, social, political, and economic factors of water resources from the geographic perspective in preparation for employment in both the public and private sectors. As water resources become ever more critical to the nation - and in particular Texas - this program addresses the increasing need for professionals in this crucial field. In addition to general and specialized lecture-format courses, the program offers a variety of project-based lab and field-trip experiences, career development through advising, job-shadowing and internships as well as team-building and leadership opportunities available by joining one or more geography department student organizations. The Water Studies program also prepares students for graduate studies. Finally, the Water Studies program provides students with the foundation for a liberal education, preparing graduates to think independently, to choose freely and to base personal and professional decisions on a broad understanding of the Earth's physical and cultural landscapes in order to live full, rewarding lives.

Evidence of Improvement

Assessment results of this year's embedded knowledge questions for Outcome 1, Method 1 show that 89.1% of the students met or exceeded expectations compared to 86.6% of students meeting or exceeding expectations during the 2009-2010 academic year - a 2.5% improvement.

Assessment results of this year's embedded questions for Outcome 3, Method 2 show that 97% of the students met or exceeded expectations compared to 90% of students meeting or exceeding expectations during the 2009-2010 academic year – a 7% improvement.

Assessment results of this year's embedded questions for Outcome 4, Method 2 show that 91.8% of the students met or exceeded expectations compared to 79% of students meeting or exceeding expectations during the 2009-2010 academic year – a 12.8% improvement.

Assessment results of this year's embedded questions for Outcome 5, Method 1 show that 88.7% of the students met or exceeded expectations compared to 71% of students meeting or exceeding expectations during the 2009-2010 academic year – a 17.7% improvement.

Assessment results of this year's embedded questions for Outcome 5, Method 2 show that 46.4% of the students exceeded expectations compared to 38% of students exceeding expectations during the 2009-2010 academic year – an 8.4% improvement.

Action Plan

Based on the results of this large sample (n=450), the course instructor will focus extra emphasis on frequently missed knowledge questions and spend additional time on the Asia and Africa regions during the next academic year (2010 – 2011). For the 2009-2010 academic year, it was speculated that the weaker performance on Asia was related to that particular section of the course having substantially more information that students need to study in preparation for the exam. Asia was split up, with Southeast Asia's material joining the Africa material at the end of the course. However, this may have resulted in the difficulty being spread out, as the Asia questions improved, but the Africa questions saw decline from the previous year. Also, there may be a regression to the mean that may result from the sample from the fall 2010 semester being double the size of the previous year's sample. The course instructor will continue to emphasize the complex nature of the map questions, which go beyond merely knowing and remembering but also understanding and applying knowledge, to help students better prepare for their examinations. This will involve students doing additional map exercises to become more familiar with using maps as geographic tools.

Based on the results of this large sample (n=450), the course instructor will focus extra emphasis on frequently missed knowledge questions including spending additional time on the cultural features of Africa during the next academic year. The weaker performance on Africa may also be related to that particular section of the course having substantially more information with the inclusion of Southeast Asia, a change that was considered in last year's report. That additional information of a relatively unfamiliar region to a unit covering an extremely unfamiliar region may have resulted in time constraints and possible information overload. Also, the slight degree of the decline may also be a result of a sample size that was double the size of the previous year's sample size, indicating a possible regression to the mean. The course instructor will also emphasize the complex nature of the map questions, which go beyond merely knowing and remembering but also understanding and applying knowledge, to help students better prepare for their examinations. This will involve students doing additional map exercises to become more familiar with using maps as geographic tools.

Although Math 1315 College Algebra is a prerequisite for our quantitative methods course many students continue to have difficulty with basic arithmetic and algebra. As in the past, course instructor had to spend significant time reviewing basic mathematical operations and techniques. Course instructor will continue to review basis math as required.

During this assessment period course instructor introduced a field sampling problem that required statistical analysis using either Excel™ or SPSS™. Moreover, the instructions were general in nature, not a “cookbook recipe.” Initially, this frustrated the students, but they quickly learned to build the equations and formulas in the software packages. The sampling exercise required both collection of primary data and spatial analysis of these data. Course instructor expanded this exercise and incorporated a day in the field to collect data. Students analyzed these data and wrote a research report based on their sample and the analysis. Course instructor also spent more time on graphing and charting techniques and theory. Course instructor will continue to expand the above and will also spend more time using SPSS.

Based on the results of this analysis (n=49), the course instructor will review other methods of teaching about 1) scales of measurement, 2) spatial data abstraction theory, and 3) data classification methods.

After reviewing the learning outcome measurement method for the GEO2426 lecture section (Method 1) it was found that the current test questions might not capture some essential spatial learning outcomes. Thus, in the 2011/2012 academic year the instructor will review and redesign (if necessary) the 10 embedded test questions. Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions (10 questions correct = exceeded expectations, 7 - 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations).

Instructor and lab TA will emphasize the importance of following prescribed bibliographic format for reference citations and using returned assignments with corrections as a learning tool.

Outcome 1

Students will demonstrate knowledge of the major physical features of the Earth and the ability to locate examples of Earth's major physical features on a map.

Outcome 1 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major physical features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 1 - Result

During the fall 2010 semester, 450 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major physical features of the Earth. The course instructor found that 89.1% of the undergraduate students met (33.8%) or exceeded (55.3%) expectations by demonstrating their knowledge of the major physical features of the Earth. The most frequently missed knowledge questions – related to the physical features of Africa - still had at least 80% of the students getting them correct. Given these findings, students should continue to improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 1 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major physical features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 2 - Result

During the fall 2010 semester, 450 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major physical features of the Earth on a map. The course instructor found that 79.7% of the undergraduate students met (49.5%) or exceeded (30.2%) expectations by demonstrating their ability to locate examples of major physical features of the Earth on a map. Students failed to meet the 70% target on three map locations: one in Asia (65.3%) and two in Africa (68.6% and 60%). Given these findings, students should continue to improve their ability to locate examples of major physical features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions compared to knowledge questions may be the result of the complex nature of the map location questions, which require students to examine information about a location and select the correct answer based on that information, as well as know that location on a map.

Outcome 2

Students will demonstrate knowledge of the major cultural features of the Earth and the ability to locate examples of Earth's major cultural features on a map.

Outcome 2 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major cultural features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 1 - Result

During the fall 2010 semester, 450 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major cultural features of the Earth. The course instructor found that 87.1% of the undergraduate students met (46.3%) or exceeded (40.8%) expectations by demonstrating their knowledge of the major cultural features of the Earth. The most frequently missed knowledge questions – a cultural question from Latin America – missed the 70% target just slightly (68.9%). This may be due to the relative lack of time given to the material to which this question pertained. In fact, no other question for this outcome and method had less than an 80% correct response rate. Given these findings, students should improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 2 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major cultural features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 2 - Result

During the fall 2010 semester, 450 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major cultural features of the Earth on a map. The course instructor found that 79.7% of the undergraduate students met (49.2%) or exceeded (30.5%) expectations by demonstrating their ability to locate examples of major cultural features of the Earth on a map. Students failed to meet the 70% target on one question related to the cultural features of Africa (64.3%). Given these findings, students should continue to improve their ability to locate examples of major cultural features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions may be the result of the complex nature of the map location questions which require students to examine information about a location and select the correct answer based on that information, as well as knowing that location on a map.

Outcome 3

Students will demonstrate knowledge of quantitative methods used by geographers and their ability to use statistical software to solve geographic problems.

Outcome 3 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of quantitative methods using 10 embedded test questions from the course: Quantitative Methods for Geography (GEO 3301). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 1 - Result

During fall 2010, 20 undergraduate students were assessed using embedded test questions in order to measure their basic knowledge of quantitative methods for geography. The course instructor found that 97% of the undergraduate students met (50%) or exceeded (47%) expectations by demonstrating their knowledge of quantitative methods for geography. The 3% of the students who failed to meet expectations had the most difficulty with basic arithmetic and algebra skills. Given these findings, students could improve their knowledge of basic arithmetic and algebra skills as prompted by the instructor. Also, this particular student had significant attendance problems.

Outcome 3 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use statistical software to solve geographic problems using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Quantitative Methods for Geography (GEO 3301). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 2 - Result

During fall 2010, 39 undergraduate students were assessed using embedded test questions in order to measure their ability to use statistical software to solve geographic problems. The course instructor found that 59.0% of the undergraduate students met expectations, and 38.0%

exceeded expectations, by demonstrating their ability to use statistical software to solve geographic problems. The 3.0% of the students who failed to meet expectations had the most difficulty drawing conclusions from their data. Furthermore, the students who failed to meet expectations regarding software analysis had significant attendance problems.

Outcome 4

Students will demonstrate knowledge of the foundations and theories of geographic information systems (GIS) and use the tools and methods of GIS.

Outcome 4 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of geographic information systems using 10 embedded test questions from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 1 - Result

During AY 2010-2011, 49 undergraduate students were assessed using 10 embedded test questions in the midterm and final exam in order to measure their understanding of the general concepts of geographic information systems (GIS). The course instructor found that 75.48% of all undergraduate students met expectations. Three embedded questions failed to meet the 70% threshold. These questions were related to 1) the scales of measurement, 2) spatial data abstraction theory, and 3) data classification methods. Given these findings, additional class exercises will be developed to address these theoretical concepts. In addition, students will be asked to keep up with weekly readings and assignments.

Outcome 4 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use the tools and methods of GIS using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 2 - Result

During AY 2010-2011 the lab learning outcomes of 49 undergraduate students were assessed using a final project grading matrix. The course instructor found that 91.8% of the undergraduate students met expectations by demonstrating their ability to utilize a GIS to work on a project and answer geographic questions.

Outcome 5

Students will demonstrate their knowledge of the formation, use, conservation and management of water resources including legal, economic, political and societal factors and the evaluation of attempts to manage water resources. Students will also be able to demonstrate a working knowledge of hydrology, water availability and quality, hazards, use, demand and allocation; they will demonstrate this knowledge through embedded test items and a project.

Outcome 5 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources using approximately 10 embedded test questions from the course: Water Resources (GEO 3434). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 1 - Result

During the spring 2011 semester 53 undergraduate students were assessed using 10 embedded test questions on the final exam in order to measure their understanding of major concepts in water resources. The course instructor found that 88.7% of all the students met (77.4%) or exceeded (11.3%) expectations. Students who failed to meet expectations had the most difficulty with flood climatology; sources of nitrogen water pollution; water volume calculations based on stream flow; and climate moisture regimes for San Marcos, Texas. Given these findings, students could improve their knowledge by focusing more study on these problem areas as prompted by the instructor.

Outcome 5 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources as an embedded class project for the course: Water Resources (GEO 3434). Instructors will use a grading rubric (scored from 0 – 10) to assess student ability on the basis of "failure to meet," "meeting," or "exceeding expectations," (Score 10 = exceeded expectations, score 7 – 9 = met expectations, score 6 or less = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 2 - Result

During spring 2011, 53 undergraduate students were assessed using a class project in order to measure their knowledge of water resources. The course instructor found that 82.1% of the undergraduate students met (35.7%) or exceeded (46.4%) expectations by demonstrating their knowledge of water resources. Students who failed to meet expectations did not follow the prescribed bibliographic format for reference citations in the text and in the "references" section in the end. Also, some students failed to correct calculation errors made in previous submitted projects and that instructor corrected on those returned assignments.

Approval History

Approval History Event

Outcomes Approved Level 1

Outcomes Approved Level 2

Outcomes Audit Report Submitted

Results Approved Level 1

Results Approved Level 2

Results Audit Report Submitted

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Status:	Data Entry Closed

Mission Statement

The Water Studies program provides students with a focused study of the physical, chemical, social, political, and economic factors of water resources from the geographic perspective in preparation for employment in both the public and private sectors. As water resources become ever more critical to the nation - and in particular Texas - this program addresses the increasing need for professionals in this crucial field. In addition to general and specialized lecture-format courses, the program offers a variety of project-based lab and field-trip experiences, career development through advising, job-shadowing and internships as well as team-building and leadership opportunities available by joining one or more geography department student organizations. The Water Studies program also prepares students for graduate studies. Finally, the Water Studies program provides students with the foundation for a liberal education, preparing graduates to think independently, to choose freely and to base personal and professional decisions on a broad understanding of the Earth's physical and cultural landscapes in order to live full, rewarding lives.

Evidence of Improvement

Assessment results of this year's embedded knowledge questions for Outcome 1, Method 1 show that 86.6% of the students met or exceeded expectations compared to 82.8% of students meeting or exceeding expectations during the 2008-2009 academic year - a 3.8% improvement. Assessment results of this year's embedded map questions for Outcome 1, Method 2 show that 79.8% of the students met or exceeded expectations compared to 79.5% of students meeting or exceeding expectations during the 2008-2009 academic year - a very slight .3% improvement. Assessment results of this year's embedded knowledge questions for Outcome 2, Method 1 show that 90.7% of the students met or exceeded expectations compared to 87.5% of students meeting or exceeding expectations during the 2008-2009 academic year - a 3.2% improvement. Assessment results of this year's embedded map questions for Outcome 2, Method 2 show that 81.9% of the students met or exceeded expectations compared to 80.2% of students meeting or exceeding expectations during the 2008-2009 academic year - a 1.7% improvement. Assessment results of this year's embedded questions for Outcome 3, Method 1 show that 99% of the students met or exceeded expectations compared to 70.4% of students meeting or exceeding expectations during the 2008-2009 academic year - a 28.6% improvement, due at least in part, to a review-session activity created by the instructor. Assessment results of this year's embedded questions for Outcome 3, Method 2 show that 90% of the students met or exceeded expectations compared to 70.8% of students meeting or exceeding expectations during the 2008-2009 academic year - a 19.2% improvement, due at least in part, to additional exercises prepared by the instructor. Outcome #5 Note - Last year, the instructor had noted a distinct weakness in students' familiarity with the applications of GIS and remote sensing. This year, this was no longer an area of distinct weakness.

Action Plan

Based on the results of this large sample (n=225), the course instructor will focus extra emphasis on frequently missed knowledge questions and spend additional time on the Asian region during the next academic year (2009 - 2010). The weaker performance on Asia may also be related to that particular section of the course having substantially more information that students need to study in preparation for the exam. It may be prudent to examine the possibility of breaking up Asia, spreading sub-regions into different sections of the course. The course instructor will also emphasize the complex nature of the map questions, which go beyond merely knowing and remembering but also understanding and applying knowledge, to help students better prepare for their examinations. This will involve students doing additional map exercises to become more familiar with using maps as geographic tools.

Based on the results of this large sample (n=225), the course instructor will focus extra emphasis on frequently missed knowledge questions including spending additional time on the cultural features of Asia during the next academic year. The weaker performance on Asia may also be related to that particular section of the course having substantially more information that students need to study in preparation for the exam. It may be prudent to examine the possibility of breaking up Asia, spreading sub-regions into different sections of the course. The course instructor will also emphasize the complex nature of the map questions, which go beyond merely knowing and remembering but also understanding and applying knowledge, to help students better prepare for their examinations. This will involve students doing additional map exercises to become more familiar with using maps as geographic tools.

Despite the fact that Math 1315 College Algebra is a prerequisite for our quantitative methods course, many students continue to have difficulty with basic arithmetic and algebra. As in the past, instructor had to spend significant time reviewing basic mathematical operations and techniques and plans to continue to do so in the future as required. Instructor also plans to elaborate on a field sampling problem collecting primary spatial data that requires statistical analysis using either Excel or SPSS.

Based on the results of this analysis (n=102), course instructors will meet and discuss better methods of teaching about 1) the history of Geographic Information Systems; 2) projections and coordinate systems, and 3) spatial analysis methods. After reviewing the learning outcome

measurement method for the GEO2426 lab (Method 2), the instructors decided that the current format might not capture some essential spatial learning outcomes. In the 2010/2011 academic year the instructors will measure the lab learning outcomes with a final project grading matrix. The matrix will review 7 skill categories (Asking Geographic Questions, Researching Background Information, Collecting and Editing Geographic Data, Analyzing Geographic Data, Map Design, Answering Geographic Questions, Poster Design and Presentation). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the final project grading matrix: 19-21 points = exceeded expectations, 14-18 points = met expectations, 13 or fewer points = failed to meet expectations.

Students will be helped with water law by the professor's providing more detailed and organized information on major laws affecting water resources. The professor will attend the lab sessions more regularly to make the students aware that the professor notes their attendance in the lab session and can provide assistance to students in applying information on basic hydrology to solving water resources problems.

Outcome 1

Students will demonstrate knowledge of the major physical features of the Earth and the ability to locate examples of Earth's major physical features on a map.

Outcome 1 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major physical features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 1 - Result

During the fall 2009 semester, 225 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major physical features of the Earth. The course instructor found that 86.6% of the undergraduate students met (33.5%) or exceeded (53.1%) expectations by demonstrating their knowledge of the major physical features of the Earth, which exceeded our target. The most frequently missed knowledge questions – related to the physical features of Asia - still met the 70% target. Given these findings, students should continue to improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 1 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major physical features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 2 - Result

During the fall 2009 semester, 225 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major physical features of the Earth on a map. The course instructor found that 79.8% of the undergraduate students met (48.8%) or exceeded (31%) expectations by demonstrating their ability to locate examples of major physical features of the Earth on a map, which exceeded our target. Students failed to meet the 70% target on one map location: Africa (68.7%). Given these findings, students should continue to improve their ability to locate examples of major physical features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions compared to knowledge questions may be the result of the complex nature of the map location questions, which require students to examine information about a location and select the correct answer based on that information, as well as know that location on a map.

Outcome 2

Students will demonstrate knowledge of the major cultural features of the Earth and the ability to locate examples of Earth's major cultural features on a map.

Outcome 2 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major cultural features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 1 - Result

During the fall 2009 semester, 225 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major cultural features of the Earth. The course instructor found that 90.7% of the undergraduate students met (44.2%) or exceeded (46.5%)

expectations by demonstrating their knowledge of the major cultural features of the Earth, which exceeded our target. The most frequently missed knowledge questions – cultural and political features in Asia such as defining a ‘forward capital’ and Asian languages – still met the 70% target. In fact, no question for this outcome and method had less than a 76% correct response rate. Given these findings, students should improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 2 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major cultural features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students’ ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students’ total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 2 - Result

During the fall 2009 semester, 225 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major cultural features of the Earth on a map. The course instructor found that 81.9% of the undergraduate students met (58.7%) or exceeded (23.2%) expectations by demonstrating their ability to locate examples of major cultural features of the Earth on a map, which exceeded our target. Students failed to meet the 70% target on one question related to the cultural features of Asia (64.8%). Given these findings, students should continue to improve their ability to locate examples of major cultural features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions may be the result of the complex nature of the map location questions which require students to examine information about a location and select the correct answer based on that information, as well as knowing that location on a map.

Outcome 3

Students will demonstrate knowledge of quantitative methods used by geographers and their ability to use statistical software to solve geographic problems.

Outcome 3 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of quantitative methods using 10 embedded test questions from the course: Quantitative Methods for Geography (GEO 3301). Students’ ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students’ total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 1 - Result

During spring 2010, 20 undergraduate students were assessed using embedded test questions in order to measure their knowledge of quantitative methods for geography. The course instructor found that 99% of the undergraduate students met (50%) or exceeded (49%) expectations by demonstrating their knowledge of quantitative methods for geography, which exceeded our target. The 1% of the students who failed to meet expectations had the most difficulty with basic arithmetic and algebra skills. Given these findings, students should continue to improve their knowledge of basic arithmetic and algebra skills as prompted by the instructor. Also, students who failed to meet expectations had significant attendance problems.

Outcome 3 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use statistical software to solve geographic problems using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Quantitative Methods for Geography (GEO 3301). Students’ ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students’ total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 2 - Result

During spring 2010, 20 undergraduate students were assessed using embedded test questions in order to measure their ability to use statistical software to solve geographic problems. The course instructor found that 90% of the undergraduate students met (45%) or exceeded (45%) expectations, by demonstrating their ability to use statistical software to solve geographic problems, which exceeded our target. The 10% of the students who failed to meet expectations had the most difficulty with the process of drawing conclusions from their data. Furthermore, the students who failed to meet expectations with statistical software analysis had significant attendance problems. Given these findings, students should continue to improve their skill at drawing conclusions from data analyzed using statistical software to solve geographic problems as prompted by instructor.

Outcome 4

Students will demonstrate knowledge of the foundations and theories of geographic information systems (GIS) and use the tools and methods of GIS.

Outcome 4 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of geographic information systems using 10 embedded test questions from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 1 - Result

During the 2009-2010 academic year 102 undergraduate students were assessed using 10 embedded test questions in the course final exam in order to measure their understanding of the general concepts of geographic information systems (GIS). The course instructor found that 77% of undergraduate students met expectations with no students exceeding expectations, which met our target. During this assessment period, students had difficulty with the following concepts: 1) understanding the difference between a map and a Geographic Information System; 2) distinguishing between projections and coordinate systems; 3) data classification methods. The concept of 'errors in geographic data sets' that was previously identified (AY 2008-2009) as a problem area has been corrected. The concept and methods of data classification continue to be problematic. Given these findings, students should continue to improve their knowledge of and understanding of data classification with a review of basic quantitative methods for geographers during the first weeks of class each semester as led by instructor. In addition, instructor should emphasize the link between the theoretical knowledge learned in class and lab exercises designed to reinforce that knowledge that will help clarify the other problem areas identified above.

Outcome 4 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use the tools and methods of GIS using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 2 - Result

During the 2009-2010 academic year 102 undergraduate students were assessed using 10 embedded test questions in order to measure their ability to utilize a GIS to answer geographic questions. The course instructor found that 79% of the undergraduate students met expectations by demonstrating their ability to utilize a GIS to answer geographic questions with no students exceeding expectations, which met our target. Although meeting the 70% target, students showed weaknesses in two areas: 1) spatial joins and 2) map overlay. Problems with 1) results analysis and 2) presentation format that were previously identified (AY 2008-2009) have been corrected. Given these findings, students should improve their lab-based skills and ability to utilize a GIS to answer geographic questions by considering each lab exercise in a coordinated sequence and reviewing the previous lab prior to attempting the next as well as a review of basic math skills for geographers as prompted by instructor.

Outcome 5

Students will demonstrate their knowledge of the formation, use, conservation and management of water resources including legal, economic, political and societal factors and the evaluation of attempts to manage water resources. Students will also be able to demonstrate a working knowledge of hydrology, water availability and quality, hazards, use, demand and allocation; they will demonstrate this knowledge through embedded test items and a project.

Outcome 5 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources using approximately 10 embedded test questions from the course: Water Resources (GEO 3434). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 1 - Result

During spring 2010, 42 undergraduate students were assessed using embedded test questions on the final exam in order to measure their knowledge of the formation, use, conservation and management of water resources. The course instructor found that 71% of the undergraduate students met expectations by demonstrating their knowledge of water resource management, which met our target. The 29% of the students who failed to meet expectations had the most difficulty with understanding water law and basic hydrology. Given these findings, students could improve their knowledge by focusing more study on basic hydrology and water law as prompted by the instructor.

Outcome 5 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources as an embedded class project for the course: Water Resources (GEO 3434). Instructors will use a grading rubric (scored from 0 – 10) to assess student ability on the basis of "failure to meet," "meeting," or "exceeding expectations," (Score 10 = exceeded expectations, score 7 – 9 = met expectations, score 6 or less =

failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 2 - Result

During spring 2010, 42 undergraduate students were assessed using a class project in order to measure their knowledge of water resources. The course instructor found that 83% of the undergraduate students met (45%) or exceeded (38%) expectations by demonstrating their knowledge of water resources, which exceeded our target. The 17% of the students who failed to meet expectations includes three students who did not turn in the assignment, but the four who did had the most difficulty in identifying and understanding the data in such a way as to identify problems and coming up with realistic solutions to those problems. The greatest problem for these underachieving students was their poor attendance record for the lab session of this course. Last year, the instructor had noted a distinct weakness in students' familiarity with the applications of GIS and remote sensing. This year, this was no longer an area of distinct weakness.

Approval History

Approval History Event

Outcomes Approved Level 1

Outcomes Approved Level 2

Outcomes Audit Report Submitted

Results Approved Level 1

Results Approved Level 2

Results Audit Report Submitted

General Information

Academic Year:	2008-2009
College:	Liberal Arts
Department:	Geography
Program:	Water Studies
Program Code:	3.02
Outcome Type:	Student Learning
Degree:	Undergraduate
Contact Name:	Dr. Richard Earl
Status:	Data Entry Closed

Mission Statement

The Water Studies program provides students with a focused study of the physical, chemical, social, political, and economic factors of water resources from the geographic perspective in preparation for employment in both the public and private sectors. As water resources become ever more critical to the nation - and in particular Texas - this program addresses the increasing need for professionals in this crucial field. In addition to general and specialized lecture-format courses, the program offers a variety of project-based lab and field-trip experiences, career development through advising, job-shadowing and internships as well as team-building and leadership opportunities available by joining one or more geography department student organizations. The Water Studies program also prepares students for graduate studies. Finally, the Water Studies program provides students with the foundation for a liberal education, preparing graduates to think independently, to choose freely and to base personal and professional decisions on a broad understanding of the Earth's physical and cultural landscapes in order to live full, rewarding lives.

Evidence of Improvement

During this academic year, we have refined our data collection process and our action plans. The previous syllabi review process is now complete. Course topic checklists keep multiple sections consistent, and emphasis in teaching mapping skills and cultural geography concepts and theories continues as part of our instruction to graduate teaching assistants in GEO 5150/5250 and 7150/7250 (Teaching Geography). We have revised embedded questions to focus on both knowledge and map questions, and now have good baseline data. Assessment results of this year's embedded knowledge questions show that more than 82% of the undergraduate students met or exceeded expectations for Outcome 1 compared to 70% of students meeting or exceeding expectation during the 2007-2008 academic year.

For Outcome 4, which deals with students' knowledge of geographic information systems (GIS), weaknesses were found in five subject areas in the 2007-2008 assessment. For 2008-2009, only two of these areas were identified as still weak, although a new third area emerged as a weak subject area. Overall, the number of weak subject areas within GIS dropped from five to three.

Each year, the instructor for the capstone course experience in the Water Studies major notes areas of distinct weakness based on the students' class projects. Last year, the instructor noted a distinct weakness in students' ability to cite references properly. This year, this was no longer an area of distinct weakness.

Action Plan

Based on the results of this large sample (n=647), the course instructor will focus extra emphasis on frequently missed knowledge questions and spend additional time on the Asian region during the next academic year (2009 – 2010). The course instructor will also emphasize the complex nature of the map questions, which go beyond merely knowing and remembering but also understanding and applying knowledge, to help students better prepare for their examinations. This will involve students doing additional map exercises to become more familiar with using maps as geographic tools.

Based on the results of this large sample (n=647), the course instructor will focus extra emphasis on frequently missed knowledge questions including spending additional time on the cultural features of Asia, South American and Africa during the next academic year. The course instructor will also emphasize the complex nature of the map questions, which go beyond merely knowing and remembering but also understanding and applying knowledge, to help students better prepare for their examinations. This will involve students doing additional map exercises to become more familiar with using maps as geographic tools.

Despite the fact that Math 1315 College Algebra is a prerequisite for our quantitative methods course, it will be necessary for students to focus extra study on basic arithmetic and algebra skills by participating in a review-session activity created by the instructor. Students will also receive additional practice drawing conclusions from data analyzed using statistical software to solve geographic problems, through additional exercises prepared by the instructor.

Based on the results of this sample (n=61), course lecture instructors will meet and discuss methods to teach: 1) the geometry of spatial joins; 2) errors in geographic data sets; 3) data classification methods. Since all of these items relate to quantitative methods in geography, lecture instructors will provide a brief summary of quantitative methods during the first week of class. Students will do two new lab exercises that will 1) help students analyze the results of their GIS more rigorously and 2) learn how to use the 'map layout' function of the GIS software to present GIS maps within a MS PowerPoint presentation, rather than using simple screen-shots.

Students will focus extra study on water law by completing a specific assignment, created by the course instructor, to reinforce their understanding of laws and legal decisions that impact water resource management. Students will also work to improve their geographic-technique skills by

completing an extended revised lab exercise.

Deleted.

Outcome 1

Students will demonstrate knowledge of the major physical features of the Earth and the ability to locate examples of Earth's major physical features on a map. We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 1 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major physical features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 1 - Method 1 - Result

During the 2008-2009 academic year, 647 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major physical features of the Earth. The course instructor found that 82.8% of the undergraduate students met (32.8%) or exceeded (50%) expectations by demonstrating their knowledge of the major physical features of the Earth. The most frequently missed knowledge questions - related to climate, tectonic activity and the physical features of the Asian sub-continent - still met the 70% target. Given these findings, students could improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 1 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major physical features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 1 - Method 2 - Result

During the 2008-2009 academic year, 647 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major physical features of the Earth on a map. The course instructor found that 79.5% of the undergraduate students met (50%) or exceeded (29.5%) expectations by demonstrating their ability to locate examples of major physical features of the Earth on a map. Students failed to meet the 70% target on two map locations: Middle America (69.6%) and Asia (57%). Given these findings, students could improve their ability to locate examples of major physical features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions may be the result of the complex nature of the map location questions, which require students to examine information about a location and select the correct answer based on that information, as well as know that location on a map.

Outcome 2

Students will demonstrate knowledge of the major cultural features of the Earth and the ability to locate examples of Earth's major cultural features on a map. We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 2 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of the major cultural features of the Earth using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 2 - Method 1 - Result

During the 2008-2009 academic year, 647 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the major cultural features of the Earth. The course instructor found that 87.5% of the undergraduate students met (57.5%) or exceeded (30%) expectations by demonstrating their knowledge of the major cultural features of the Earth. The most frequently missed knowledge questions – cultural and political features in Asia such as defining a 'forward capital' and Asian languages – still met the 70% target. Given these findings, students could improve their knowledge by focusing more study on these weaker areas as prompted by the instructor.

Outcome 2 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to locate examples of major cultural features of the Earth on a map using 10 embedded test questions from the course: World Regional Geography (GEO 1310). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test

questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 2 - Method 2 - Result

During the 2008-2009 academic year, 647 undergraduate students were assessed using embedded test questions in order to measure their ability to locate examples of major cultural features of the Earth on a map. The course instructor found that 80.2% of the undergraduate students met (70.2%) or exceeded (10%) expectations by demonstrating their ability to locate examples of major cultural features of the Earth on a map. Students failed to meet the 70% target on two questions related to the cultural features of South America (69.4%) and Africa (69.2%). Given these findings, students could improve their ability to locate examples of major cultural features of the Earth on a map by focusing more study on these weaker areas as prompted by the instructor. Slightly lower scores on map questions may be the result of the complex nature of the map location questions which require students to examine information about a location and select the correct answer based on that information, as well as knowing that location on a map.

Outcome 3

Students will demonstrate knowledge of quantitative methods used by geographers and their ability to use statistical software to solve geographic problems. We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 3 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of quantitative methods using 10 embedded test questions from the course: Quantitative Methods for Geography (GEO 3301). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 3 - Method 1 - Result

During spring 2008, 39 undergraduate students were assessed using embedded test questions in order to measure their knowledge of quantitative methods for geography. The course instructor found that 70.4% of the undergraduate students met (50.4%) or exceeded (20%) expectations by demonstrating their knowledge of quantitative methods for geography. The 29.6% of the students who failed to meet expectations had the most difficulty with basic arithmetic and algebra skills. Given these findings, students could improve their knowledge of basic arithmetic and algebra skills as prompted by the instructor.

Outcome 3 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use statistical software to solve geographic problems using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Quantitative Methods for Geography (GEO 3301). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 3 - Method 2 - Result

During spring 2008, 39 undergraduate students were assessed using embedded test questions in order to measure their ability to use statistical software to solve geographic problems. The course instructor found that 70.8% of the undergraduate students met expectations, and none exceeded expectations, by demonstrating their ability to use statistical software to solve geographic problems. The 29.2% of the students who failed to meet expectations had the most difficulty with the process of drawing conclusions from their data. Given these findings, students could improve their skill at drawing conclusions from data analyzed using statistical software to solve geographic problems as prompted by instructor.

Outcome 4

Students will demonstrate knowledge of the foundations and theories of geographic information systems (GIS) and use the tools and methods of GIS. We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 4 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of geographic information systems using 10 embedded test questions from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 4 - Method 1 - Result

During the 2008-2009 academic year, 118 undergraduate students were assessed using 10 embedded test questions in the course final exam in order to measure their understanding of the general concepts of geographic information systems (GIS). The course instructor found that all undergraduate students met expectations. Three embedded questions related to spatial analysis failed to reach the 70% target: 1) the geometry of spatial joins; 2) errors in geographic data sets; 3) data classification methods. Given these findings, students could improve their knowledge of GIS

spatial analysis with a review of basic quantitative methods for geographers during the first weeks of class each semester.

Outcome 4 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their ability to use the tools and methods of GIS using 10 test questions embedded in lab assignments and/or lab quizzes from the course: Fundamentals of Geographic Information Systems (GEO 2426). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 4 - Method 2 - Result

During the 2008-2009 academic year, 61 undergraduate students were assessed using 10 embedded test questions in order to measure their ability to utilize a GIS to answer geographic questions. The course instructor found that 92% of the undergraduate students met expectations by demonstrating their ability to utilize a GIS to answer geographic questions. Although meeting the 70% target, students showed weaknesses in two areas: 1) results analysis and 2) presentation format. Given these findings, students could improve their ability to utilize a GIS to answer geographic questions by 1) learning to summarize the steps in the process in order to better explain the results, and 2) by practicing the skill of presenting GIS maps within a MS PowerPoint presentation.

Outcome 5

Students will demonstrate their knowledge of the formation, use, conservation and management of water resources including legal, economic, political and societal factors and the evaluation of attempts to manage water resources. Students will also be able to demonstrate a working knowledge of hydrology, water availability and quality, hazards, use, demand and allocation; they will demonstrate this knowledge through embedded test items and a project. We expect at least 70% of the students will meet or exceed expectations for this outcome.

Outcome 5 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources using approximately 10 embedded test questions from the course: Water Resources (GEO 4313). Students' ability will be assessed on the basis of failure to meet, meeting, or exceeding expectations, which will be determined by the students' total score on the embedded test questions. (10 questions correct = exceeded expectations, 7 – 9 questions correct = met expectations, 6 or fewer questions correct = failed to meet expectations.)

Outcome 5 - Method 1 - Result

During spring 2009, 34 undergraduate students were assessed using embedded test questions in order to measure their knowledge of the formation, use, conservation and management of water resources. The course instructor found that 77% of the undergraduate students met expectations by demonstrating their knowledge of water resource management. The 23% of the students who failed to meet expectations had the most difficulty with understanding water law. Given these findings, students could improve their knowledge by focusing more study on water law as prompted by the instructor.

Outcome 5 - Method 2

Students will be evaluated during and/or at the end of the semester by instructors on their knowledge of water resources as an embedded class project for the course: Water Resources (GEO 4313). Instructors will use a grading rubric (scored from 0 – 10) to assess student ability on the basis of "failure to meet," "meeting," or "exceeding expectations," (Score 10 = exceeded expectations, score 7 – 9 = met expectations, score 6 or less = failed to meet expectations.) We expect at least 70% of the students will meet or exceed expectations.

Outcome 5 - Method 2 - Result

During spring 2009, 34 undergraduate students were assessed using a class project in order to measure their knowledge of water resources. The course instructor found that 85% of the undergraduate students met (37%) or exceeded (48%) expectations by demonstrating their knowledge of water resources. The 15% of the students who failed to meet expectations had the most difficulty in understanding the application of remote-sensing and geographic information systems to explain and seek solutions to water-related problems. Given these findings, students could improve their geographic-technique skills by spending more time on lab exercises that apply remote-sensing and geographic information systems techniques to water-related problems as prompted by the instructor. Last year, the instructor had noted a distinct weakness in students' ability to cite references properly. This year, this was no longer an area of distinct weakness.

Outcome 6

Deleted.

Outcome 6 - Method 1

Deleted.

Outcome 6 - Method 1 - Result

Deleted.

Outcome 6 - Method 2

Deleted.

Outcome 6 - Method 2 - Result

Deleted.

Approval History

Approval History Event

- Outcomes Approved Level 1
- Outcomes Approved Level 2
- Outcomes Audit Report Submitted
- Results Approved Level 1
- Results Approved Level 2
- Results Audit Report Submitted

General Information

Academic Year:	2007-2008
College:	Liberal Arts
Department:	Geography
Program:	Water Studies
Program Code:	3.02
Outcome Type:	Student Learning
Degree:	Undergraduate
Contact Name:	Dr. Richard Earl
Status:	Data Entry Closed

Mission Statement

The Water Studies program provides students with a focused study of the physical, chemical, social, political, and economic factors of water resources from the geographic perspective in preparation for employment in both the public and private sectors. As water resources become ever more critical to the nation - and in particular Texas - this program addresses the increasing need for professionals in this crucial field. In addition to general and specialized lecture-format courses, the program offers a variety of project-based lab and field-trip experiences, career development through advising, job-shadowing and internships as well as team-building and leadership opportunities available by joining one or more geography department student organizations. The Water Studies program also prepares students for graduate studies. Finally, the Water Studies program provides students with the foundation for a liberal education, preparing graduates to think independently, to choose freely and to base personal and professional decisions on a broad understanding of the Earth's physical and cultural landscapes in order to live full, rewarding lives.

Evidence of Improvement

We have collected data for AY 2006 / 2007 & AY 2007 / 2008, so can only make preliminary conclusions as a result. We have been working to refine our data collection processes and our action plans. Assessment results of our syllabi review indicate that most (approximately 80%) of the syllabi show evidence of including the required topics. Details provided in Action Plan section for each outcome. Assessment results of embedded questions show that approximately 70% of students answered these embedded questions correctly. Advanced students completed project-based assignments successfully. Details of missed questions provided in Action Plan section for each outcome. Instructor feedback has helped drive the following enhancements that apply to all of our undergraduate programs this AY 2007 / 2008: 1) Improvement of undergraduate student learning through refinement of Teaching Geography courses for graduate instructors of record and lab assistants who teach undergraduate sections, (2) Creation of new lower-level meteorology course to increase physical geography learning opportunities, (3) New computer lab for quantitative methods courses to allow for additional demonstration / use of statistical software, (4) New prerequisite of MATH 1315 (College Algebra) for GEO 3301 Quantitative Methods course.

Action Plan

We will no longer use syllabi review in the future, since that is an indirect method; however, instructors will complete their own topics checklists beginning fall 2008. Examining the topics checklist will help remind instructors to specify these important introductory geography topics. We will turn our attention to direct methods using embedded test questions to measure success of outcomes. In addition in the fall, we will reinforce the need to focus on problem areas (mapping skills and cultural geography concepts and theories) as part of our instruction to graduate teaching assistants in GEO 5150 / 5250 and 7150 / 7250 (Teaching Geography). Students will be given specific out of class mapping activities to reinforce these skills.

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We will no longer use syllabi review in the future, since that is an indirect method; however, instructors will complete their own topics checklists beginning fall 2008. Examining the topics checklist will help remind instructors to specify these important introductory geography topics. We will turn our attention to direct methods using embedded test questions to measure success of outcomes. In addition in the fall, we will reinforce the need to focus on problem areas (Hypothesis testing, shape of distributions and use of statistical software) as part of our instruction to graduate teaching assistants in GEO 5150 / 5250 and 7150 / 7250 (Teaching Geography). Students will be given specific out of class and lab quantitative methods activities, to reinforce these learning outcomes.

We will no longer use syllabi review in the future, since that is an indirect method; however, instructors will complete their own topics checklists beginning fall 2008. Examining the topics checklist will help remind instructors to specify these important introductory geography topics. We will turn our attention to direct methods using embedded test questions to measure success of outcomes. In addition in the fall, we will reinforce the need to focus on problem areas (Coordinate systems; 2) topological vs non-topological; 3) data classification strategies; 4) spatial joins and thematic layer; 5) Intersect command) as part of our instruction to graduate teaching assistants in GEO 5150 / 5250 and 7150 / 7250 (Teaching Geography). Students will be given specific out of class and lab GIS activities to reinforce these learning outcomes.

Upon reflection, we plan to combine Outcomes 5 & 6 Fall 2008.

We will combine Outcomes 5 & 6 for 2008 - 2008 - eliminating the syllabi review. Encourage instructors to create handouts or presentations to help students with problem areas according to instructor comments.

Outcome 1

Outcome 1 – All Geography Majors: “The Geographic Perspective.” Students will learn to analyze the physical and cultural realms of our world by comparing and contrasting similarities and differences of the major world regions with an emphasis on remarkable physical features and cultural specialties as well as human impacts on the natural environment including the ethical need for environmental stewardship in order to synthesize a value-based interpretation of the world from a geographic perspective and to become positive contributors to the diverse community to which we all belong.

Outcome 1 - Method 1

Assessment Method #1 - Syllabus Review

Syllabus Review. (A) Review GEO 1309: Cultural Geography syllabi using Syllabus Content Checklist. This is a required course (and/or 1310: World Regional) for all Geography Majors. There are multiple sections and instructors of this course. (B) Review GEO 1310: World Regional Geography syllabi using Syllabus Content Checklist. This is a required course (and/or 1309: Cultural) for all Geography Majors. There are multiple sections and instructors of this course, which necessitated that we review the syllabi of all instructors to ensure that the outcomes are part of the curriculum. That said, indirect methods are not preferable and will be changed next year; however it is certainly an important first step in assessment.

GEO 1309 Topics List: Cultural Geography Syllabi by comparing to syllabi topic checklist: 1) Cultural Geography Overview; 2) Cultures and Regions; 3) Population; 4) Language; 5) Religion; 6) Migration; 7) Agriculture; 8) Urbanization and Development; 9) Economic Geography; 10) Ethnic Geography; 11) Political Geography; 12) Globalization.

GEO 1310 Topics List: World Regional Geography syllabi by comparing to syllabi content checklist: 1) Introduction to Physical and Cultural GEO; 2) Map and Globe Skills; 3) Earth Generalizations; 4) Population; 5) World Regions; 6) Europe; 7) Asia; 8) Latin America; 9) Africa; 10) Oceania; 11 - 20) Other Regional Breakdowns depending on instructor.

Outcome 1 - Method 1 - Result

Overall, three course syllabi (GEO 1310) met expectations (that is, 80% of the course topics were listed on the syllabi); one course (GEO 1309) did not meet expectations. Although minimum standards were met in three course syllabi, only one course syllabus (GEO 1310) included Map and Globe skills, and only one syllabus (GEO 1310) included Population as a topic.

Outcome 1 - Method 2

Assessment Method #2: Course-Embedded Assessment

Assessment derives from locally developed examinations for GEO 1309 and/or GEO 1310, which are courses required for all Geography Majors. There are multiple sections and instructors of these courses.

Outcome 1 - Method 2 - Result

In GEO 1309, 70% of students answered 18 of the 19 embedded questions correctly. In GEO 1310, with a sample of 321 to 338 students (3 large sections fall 2007 & spring 2008), students responded to 20 embedded questions. 70% of students answered 15 of the 20 questions correctly. An analysis of missed questions revealed some deficiency in students' learning in the area of cultural geography.

Outcome 2

Outcome 2 – All Geography Majors: “The Natural-Physical Environment.” Students will learn to analyze how the Earth works as an energy/matter system with an emphasis on the inputs of solar and internal Earth energy in order to synthesize an understanding of the Earth's atmosphere, hydrosphere, biosphere, cryosphere, and lithosphere and explain the spatial distributions of the Earth's environments and physical features from a geographic perspective. Students will learn to measure and analyze the Earth's physical processes and patterns on the landscape by developing skills such as map reading, scientific methodology, data collection / evaluation and geographic fieldwork. Lab projects provide students an opportunity to practice working in small groups and to learn to speak intelligently about the physical aspects of our world using the lexicon of physical geography. Lab reports provide students an opportunity to practice concise, coherent writing.

Outcome 2 - Method 1

Assessment Method #1: Syllabus Review

Syllabus Review. Review GEO 2410 syllabi for the lecture and lab sections. There are multiple sections and instructors of this course, which necessitated that we review the syllabi of all instructors to ensure that the outcomes are part of the curriculum. That said, indirect methods are not preferable and will be changed next year; however it is certainly an important first step in assessment.

GEO 2410 Topics List: 1) Earth Systems; 2) Earth Measurement / Earth-Sun Relationships; 3) Atmosphere / Temperature, Energy Budget; 4) Pressure / Winds / Global Circ / Moisture; 5) Climate Controls / Climate Classification; 6) World Climates / Biomes; 7) Plate Tectonics / Volcanoes / Earthquakes; 8) Weathering / Mass Wasting; 9) Rivers / Fluvial Landforms; 10) Arid / Eolian Landforms; 11) Glaciers / Glacial Landforms; 12) Biogeography; 13) Coastal Landforms; 14) Groundwater; 15) Karst Topography; 16) Soils.

Outcome 2 - Method 1 - Result

All(100%) of the syllabi evidenced inclusion of these topics.

Outcome 2 - Method 2

AssessmentMethod #2: Course-Embedded Assessment

Locally developed examinations for GEO 2410: Physical Geography. Required course for all Geography Majors. Multiple sections and instructors of this course. Required course for all Geography Majors. Multiple sections and instructors of this course.

Outcome 2 - Method 2 - Result

In GEO 2410, 70% of students answered the embedded questions correctly. Although minimum standards were met, some students had difficulty with basic Earth/Sun relationships and factors determining climatic zonation.

Outcome 3

Outcome 3 – All Geography Majors: “Quantitative Methods for Geography.” Students will learn to use descriptive and inferential statistical techniques to collect, classify, analyze and display data about variables distributed across the world's physical and cultural landscapes in order to make comparisons, examine relationships and look for spatial patterns and historical trends to answer questions, solve problems and make confident, ethical decisions by providing scientific evidence supporting a particular point-of-view. Students will learn to combine the use of words, numbers and images to effectively communicate their message.

Outcome 3 - Method 1

AssessmentMethod #1: Syllabus Review

Syllabus Review. Review GEO 3301. Quantitative Methods. syllabi using Syllabus Content Checklist. This is a required course for all Geography Majors. There are multiple sections and instructors of this course, which necessitated that we review the syllabi of all instructors to ensure that the outcomes are part of the curriculum. That said, indirect methods are not preferable and will be changed next year; however it is certainly an important first step in assessment.

GEO3301 Topics List: 1) The Nature of Inquiry; 2) Data Collection Methods; 3) Data Measurement; 4) Data Organization and Classification; 5) Measures of Central Tendency; 6) Measures of Dispersion; 7) Data Visualization; 8) Correlation; 9) Linear Regression; 10) Spatial Statistics; 11) Probability and Probability Distributions; 12) Sampling a Population; 13) Z and t Scores; 14) Point and Interval Estimation (Conf Intervals); 15) Difference of Means Test; 16) Hypothesis Testing; 17) Difference of Means Test; 18) ANOVA; 19) Chi-square; 19) Use of statistical Software (Excel / SPSS).

Outcome 3 - Method 1 - Result

All course syllabi reference at least 80% of the course topics list. Although minimum standards were met, 3301 syllabi reviewed did not include spatial statistics.

Outcome 3 - Method 2

AssessmentMethod #2: Course-Embedded Assessment

Assessment derives from locally developed examinations for GEO 3301, which is a required course for all Geography Majors. There are multiple sections and instructors of this course.

Outcome 3 - Method 2 - Result

70% of students responded correctly to embedded questions. The most frequently missed questions include, hypothesis testing and shape of distributions. 70% of students met lab assignment criteria using statistical software.

Outcome 4

Outcome 4 – All Geography Majors: “Geo-Spatial Technologies and Mapping.” Students will acquire a working knowledge of at least one Geographic Information Science technique: Geographic Information Systems (GIS), Remote Sensing or Cartography. Successful completion of project-based assignment(s) becomes part of students' professional portfolio.

Outcome 4 - Method 1

AssessmentMethod #1: Syllabus Review

Syllabus Review. Review GEO 2426: Introduction to GIS syllabi using Syllabus Content Checklist. This is one of three options for required techniques course for all Geography Majors. There are multiple sections and instructors of this course, which necessitated that we review the syllabi of all instructors to ensure that the outcomes are part of the curriculum. That said, indirect methods are not preferable and will be changed next year; however it is certainly an important first step in assessment.

GEO2426 Topics List: 1) What is a GIS?; 2) Understanding Spatial Data; 3) Projections and Coordinate Systems; 4) Databases; 5) Map Design; 6) Vector Data Structures; 7) Topology; 8) Raster Data Structures; 9) Geo-coding; 10) Spatial Analysis and Modeling; 11) Visualization of geo-

information; 12) GIS Applications; 13) New GIS Developments and Research.

Outcome 4 - Method 1 - Result

All course syllabi reference at least 80% of the course topics list. We have instituted a common consistent course syllabus for all three lecture sections.

Outcome 4 - Method 2

Assessment Method #2: Course-Embedded Assessment

Assessment derives from locally developed examinations for GEO 2426. This is a required course for all Geography Majors. There are multiple sections and instructors of this course.

Outcome 4 - Method 2 - Result

70% of students answered 15 of the 20 embedded questions correctly. Most frequently missed questions include, 1) Coordinate systems; 2) topological vs non-topological; 3) data classification strategies; 4) spatial joins and thematic layer; 5) Intersect command.

Outcome 5

Outcome 5 – Program Specific: “Water Studies – Theory and Analysis.” Students will learn to analyze the major physical processes determining the production and availability of surface and ground-water resources as well as the major controls of water quality and the means to assess and improve water quality using physical and mathematical models and other quantitative methods in order to synthesize possible solutions to managing the legal, economic and social factors that affect the availability and quality of surface and ground-water resources from a geographic perspective.

Outcome 5 - Method 1

Assessment Method #1. Syllabus Review. GEO 3434: Water Resources, GEO 4314: River Basin Management, GEO: 4334 Groundwater Resources, GEO: 4325 Fluvial, GEO: 4335 Water Policy. Multiple sections of these courses are offered by a variety of instructors. Indirect methods are not preferable and will be changed next year.

Outcome 5 - Method 1 - Result

No data collected.

Outcome 5 - Method 2

Assessment Method #2 (Direct). Course-Embedded Assessment. Locally developed examinations for GEO 3434: Water Resources, GEO 4314: River Basin Management, GEO 4334 Groundwater Resources, GEO 4325 Fluvial, GEO 4335 Water Policy.

Outcome 5 - Method 2 - Result

No data collected.

Outcome 6

Outcome 5 – Program Specific: “Water Studies – Application.” Students will learn to design and implement a field research project using maps and scientific methodology to acquire, analyze, and interpret data that measure changes and interactions of the atmosphere, hydrosphere, biosphere, and lithosphere in order to create a logical framework to identify patterns to answer questions and solve problems related to the Earth’s physical realm.

Outcome 6 - Method 1

Assessment Method #1. Syllabus Review. GEO 3434: Water Resources. Multiple sections of these courses are offered by a variety of instructors. Indirect methods are not preferable and will be changed next year.

Outcome 6 - Method 1 - Result

Course syllabi reference at least 80% of the course topics list.

Outcome 6 - Method 2

Assessment Method #2. Course-Embedded Assessment. Locally developed project-based lab assignment(s) for GEO 3434. Successful completion of project-based assignment(s) become part of students' professional portfolio.

Outcome 6 - Method 2 - Result

Water Resources students complete a lab-based water planning exercise which includes the following: 1) Watershed basin basics; 2) Watershed

resources planning; 3) Management strategy; and 4) Surveillance and monitoring strategy.

80 percent of students successfully completed the 100% of the assignment objectives according to a grading rubric.

Instructor Comments: 1) Students need practice inserting and formatting images into reports and 2) Students need practice properly citing references.

Approval History

Approval History Event

Outcomes Approved Level 1

Outcomes Approved Level 2

Results Approved Level 1

Results Approved Level 2