Texas State University
Outcomes Report

General Information

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<tr>
<th>Academic Year:</th>
<th>2011-2012</th>
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<tbody>
<tr>
<td>College:</td>
<td>Liberal Arts</td>
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<tr>
<td>Department:</td>
<td>Geography</td>
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<td>Program:</td>
<td>Geographic Information Science</td>
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<td>Program Code:</td>
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<td>Outcome Type:</td>
<td>Student Learning</td>
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<tr>
<td>Degree:</td>
<td>Undergraduate</td>
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<tr>
<td>Contact Name:</td>
<td>Dr. Alberto Giordano</td>
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Mission Statement

The Geographic Information Science program prepares students for employment in local, state, and federal agencies, commercial companies, planning departments, engineering firms, utility companies, and many others. The program stresses the importance of a content-rich background in geography along with principles and techniques of Geographic Information Science: GIS; remote sensing; visualization; cartography; spatial modeling; and quantitative methods. 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 Geographic Information Science program also prepares students for graduate studies. Finally, the Geographic Information Science 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 GEO 4427 GIS capstone course (Outcome 5 – Method 1) show a 4% increase in the number of students exceeding expectations.

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 will continue to seek out willing clients and identify appropriate project topics. Course instructor and lab assistant will focus additional attention to three aspects of the teaching-learning process: the selection of client and project, student group dynamics and composition of the student groups.

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 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 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 5**

Students will demonstrate their competence to work individually and as a team to develop and present a client-driven GIS solution; they will demonstrate this competence by delivering and presenting a GIS project.

**Outcome 5 - Method 1**

Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to develop a client-driven GIS solution as an embedded class project for the course: Advanced GIS II (GEO 4427). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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**

Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to develop a client-driven GIS solution as an embedded class project for the course: Advanced GIS II (GEO 4427). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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.
In the fall 2011 semester, fifteen undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and all behaved professionally with the clients and each other. The reduced class size of this semester’s GEO 4427 created problems for one group, which was reduced to two elements from four at the beginning of the course. This group was able to complete the work required, although not to a level that was entirely satisfactory to the client and instructor. 60% of the students in the class met expectations and 26% exceeded expectations. Following the action plan proposed in fall 2010, to be continued and refined in future years, in fall 2011 instructor spent a much longer amount of time in the lab helping the students and assisting the TA. This worked well to facilitate the work of the students and contributed to the establishment of a good learning atmosphere of this year’s 4427. Contrary to previous years, in the fall 2011 instructor had no major problems in any of the groups.

In the fall 2011 semester, fifteen undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and all behaved professionally with the clients and each other. All students met the expectations for making in-class presentations to the client and creating a website – thus meeting the 70% target. None of the students exceeded expectations. One major challenge during the semester was for the students to handle the dynamics on the client’s side – ‘point of contact’ has changed for one of the projects and the students needed special help to keep up with this dynamic and make the project move on smoothly as planned. The instructor and the lab assistant stepped in in a timely manner to help with the transition, and the project was wrapped up as expected. Overall, the projects were all completed to the client’s satisfaction.

### Approval History

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General Information

Academic Year: 2010-2011
College: Liberal Arts
Department: Geography
Program: Geographic Information Science
Program Code: 314.00
Outcome Type: Student Learning
Degree: Undergraduate
Contact Name: Dr. Alberto Giordano
Status: Data Entry Closed

Mission Statement

The Geographic Information Science program prepares students for employment in local, state, and federal agencies, commercial companies, planning departments, engineering firms, utility companies, and many others. The program stresses the importance of a content-rich background in geography along with principles and techniques of Geographic Information Science: GIS; remote sensing; visualization; cartography; spatial modeling; and quantitative methods. 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 Geographic Information Science program also prepares students for graduate studies. Finally, the Geographic Information Science 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 class project for Outcome 5, Method 2 demonstrates 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.

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 focus extra emphasis on frequently missed knowledge questions and spend additional time on the Asia and Africa regions 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 that students need to study in preparation for the exam. Africa was split up, with Southeast Asia’s material joining the Africa material at the end of the course.

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 Africa and Asia regions 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. 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 focus extra emphasis on frequently missed knowledge questions and spend additional time on the Africa and Asia regions 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 that students need to study in preparation for the exam. Africa was split up, with Southeast Asia’s material joining the Africa material at the end of the course.

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 basic 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
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).

Based on the results discussed above, course instructors will continue to seek out willing clients and identify appropriate project topics. Course instructor and lab assistant will need to pay more attention to three aspects of the teaching-learning process. The first one is the selection of client and project. The instructor needs to ensure that a client understands that the students will deliver the projects as part of their learning process and that the students are not full-time employees or professional contractors who can afford devoting extra time to address a client’s constantly updating request / expectation. This can be achieved by maintaining a regularly scheduled brief to the clients by the instructor and lab assistant (in addition to the routine project progress report by all groups). The second aspect is for the instructor and lab assistant to follow up with group dynamics more closely by having more individual meetings with students who are facing challenges working in a group environment. This will give the student who needs special guidance more time and support to catch up and work properly on a team. Finally, increased attention has to be paid by the instructor to the group composition stage. In the fall 2010 semester, the instructor has tried to balance groups not only on the basis of interests and background, but also in terms of students’ GPA. This strategy proved effective and will be refined in future classes, trying to minimize possible conflicts. One way of doing this that might be tested is to allow students to suggest group composition.

Overall, the students in this class gained experience working on real-world GIS projects, and it is to the students’ advantage to learn the importance of working as a team for a client during their undergraduate careers.

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.

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 to 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.

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.

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 competence to work individually and as a team to develop and present a client-driven GIS solution; they will demonstrate this competence by delivering and presenting a GIS project.

Outcome 5 - Method 1

Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to develop a client-driven GIS solution as an embedded class project for the course: Advanced GIS II (GEO 4427). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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 1 - Result

In the Fall 2011 semester, twenty undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and almost all
behaved professionally with the clients and each other. However, one of the five groups had some difficult internal dynamics. Seventeen of the twenty in the class met (twelve, or 70%) or exceeded (five, or 25%) expectations meeting the 70% target.

**Outcome 5 - Method 2**

Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to deliver a class-embedded verbal and visual presentation of their client-driven GIS solution for the course: Advanced GIS II (GEO 4427). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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**

In the Fall 2011 semester, twenty undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and almost all behaved professionally with the clients and each other. However, one of the five groups had some difficult internal dynamics. Nevertheless, all students met the expectations for making in-class presentations to the client and creating a website – thus meeting the 70% target. None of the students exceeded expectations. One major challenge during the semester was for the students to handle the dynamics on the client’s side – “point of contact” has changed for one of the projects and the students needed special help to keep up with this dynamic and make the project move on smoothly as planned. The instructor and the lab assistant stepped in in a timely manner to help with the transition, and the project was wrapped up as expected. Overall, the projects were all completed to the client’s satisfaction.

**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
The Geographic Information Science program prepares students for employment in local, state, and federal agencies, commercial companies, planning departments, engineering firms, utility companies, and many others. The program stresses the importance of a content-rich background in geography along with principles and techniques of Geographic Information Science: GIS; remote sensing; visualization; cartography; spatial modeling; and quantitative methods. 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 Geographic Information Science program also prepares students for graduate studies. Finally, the Geographic Information Science 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 knowledge 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 map questions for Outcome 1, 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 map 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 map questions for Outcome 3, Method 1 show that 90% 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 30% improvement, due at least in part, to additional exercises prepared by the instructor. Assessment results of this year’s embedded class project for Outcome 3, Method 1 show that 25% of the students exceeded expectations compared to 23% of students exceeding expectations during the 2008-2009 academic year – a 2% improvement. Group dynamics also improved this year with only 1 group in 10 having difficulty compared to 2 groups in 10 during the 2008-2009 academic year. Assessment results of this year’s embedded verbal and visual class presentation for Outcome 5, Method 2 show that 100% of the students met or exceeded expectations compared to 94% of students meeting or exceeding expectations during the 2008-2009 academic year – a 6% improvement.

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.

Based on the results discussed above, course instructors will continue to seek out willing clients and identify appropriate project topics. Course instructor and lab assistant will need to pay more attention to two aspects of the teaching-learning process. The first one is the selection of client and project. The instructor needs to ensure that a client understands that the students will deliver the projects as part of their learning process and that the students are not full-time employees or professional contractors who can afford devoting extra time to address a client’s constantly updating request / expectation. This can be achieved by maintaining a regularly scheduled brief to the clients by the instructor and lab assistant (in addition to the routine project progress report by all groups). The second aspect is for the instructor and lab assistant to follow up with group dynamics more closely by having more individual meetings with students who are facing challenges working in a group environment. This will give the student who needs special guidance more time and support to catch up and work properly on a team. Overall, the students in this class gained experience working on real-world GIS projects, and it is to the students’ advantage to learn the importance of working as a team for a client during their undergraduate careers.

### 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.

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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 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 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 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 reviewing basic math skills for geographers as prompted by instructor.

Outcome 5
Students will demonstrate their competence to work individually and as a team to develop and present a client-driven GIS solution; they will demonstrate this competence by delivering and presenting a GIS project.

Outcome 5 - Method 1
Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to develop a client-driven GIS solution as an embedded class project for the course: Advanced GIS II (GEO 4427). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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 1 - Result
During the 2009-2010 academic year, 40 undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and almost all behaved professionally with the clients and each other. However, one of the nine groups had some difficult internal dynamics. Nevertheless, all students in the class met expectations, among which 10 (25%) exceeded expectations working individually and as a team to deliver a client-driven GIS solution – thus meeting the 70% target. Areas needing improvement are group dynamics and communication with clients. Given these findings students could improve their skills for group working and client relationship maintenance as prompted by the course instructor and lab assistant.

**Outcome 5 - Method 2**

Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to deliver a class-embedded verbal and visual presentation of their client-driven GIS solution for the course: Advanced GIS II (GEO 4427). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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 the 2009-2010 academic year, 40 undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and almost all behaved professionally with the clients and each other. However, one of the ten groups had difficult internal dynamics. Nevertheless, all students met the expectations for making in-class presentations to the client and creating a website – thus meeting the 70% target. One major challenge during the semester was for the students to handle the dynamics on the client’s side – “point of contact” has changed for one of the projects and the students needed special help to keep up with this dynamic and make the project move on smoothly as planned. The instructor and the lab assistant stepped in timely to help with the transition, and the project was wrapped up as expected. Overall, the projects were all completed to the client’s satisfaction.

**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
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 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.

Based on the results of this sample (n=35), course instructors will continue to seek out willing clients and identify appropriate project topics. During the course, more attention will be paid to group dynamics by having students meet more often as a group with the instructor, and by having
students meet for one-on-one communication with the instructor and lab assistant, as soon as problems arise. This should help to improve students’ ability to work in groups in an environment that encompasses real world time-constrained projects. This class truly mimics real-world GIS projects, and it is to the students’ advantage to learn the importance of working as a team for a client during their undergraduate careers.

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**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 2 - 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 basic arithmetic and algebra skills. 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, 35 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 competence to work individually and as a team to develop and present a client-driven GIS solution; they will demonstrate this competence by delivering and presenting a GIS 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 competence to work individually and as a team to develop a client-driven GIS solution as an embedded class project for the course: Advanced GIS II (GEO 4426). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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 1 - Result**

During the 2008-2009 academic year, 35 undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and almost all behaved professionally with the clients and each other. However, two of the ten groups had difficult internal dynamics. Two undergraduates (6%) failed to meet expectations, 25 met expectations (71%), and 8 (23%) exceeded expectations working individually and as a team to deliver a client-driven GIS solution – thus meeting the 70% target. Areas needing improvement are group dynamics and one-on-one communication skills. Given these findings students could improve their ability to work in groups and one-on-one communication skills as prompted by the course instructor and lab assistant.

**Outcome 5 - Method 2**

Students will be evaluated during and/or at the end of the semester by instructors on their competence to work individually and as a team to deliver a class-embedded verbal and visual presentation of their client-driven GIS solution for the course: Advanced GIS II (GEO 4426). Instructors will use a grading rubric (scored from 0 – 10) to assess student competence 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 the 2008-2009 academic year, 35 undergraduate students were assessed using an embedded class project (in GEO 4427) in order to measure students’ ability to work in groups, write and present professional reports, interact with clients in a professional manner, and complete a “real world” GIS project. The course instructor, lab assistant and external client found that most students performed to a satisfactory level and almost all behaved professionally with the clients and each other. However, two of the ten groups had difficult internal dynamics. Two (6%) undergraduates failed to meet expectations and 33 (94%) met expectations for making in-class presentations to the client and creating a website – thus meeting the 70% target. Relationships with the clients and group dynamics are very important in this course. There were no problems with external relationships this academic year, as both the students and the clients acted professionally toward each other. However, issues arose within some groups: the instructor and the lab assistant tackled these as soon as they became aware of them and will continue to do so in the future. The projects were all completed to the client’s satisfaction. Given these findings, students could improve their ability to work in groups and one-on-one communication skills as prompted by the course instructor and lab assistant.

**Outcome 6**
### 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
The Geographic Information Science program prepares students for employment in local, state, and federal agencies, commercial companies, planning departments, engineering firms, utility companies, and many others. The program stresses the importance of a content-rich background in geography along with principles and techniques of Geographic Information Science: GIS; remote sensing; visualization; cartography; spatial modeling; and quantitative methods. 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 Geographic Information Science program also prepares students for graduate studies. Finally, the Geographic Information Science 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 a 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 Method 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 instructors to specify these important introductory geography topics. We will turn our attention to direct method using embedded test questions to measure success of outcomes. In addition to 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.

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 instructors to specify these important introductory geography topics. We will turn our attention to direct method using embedded test questions to measure success of outcomes. In addition to the fall, we will reinforce the need to focus on problem areas (Earth / sun relationships and climate zone factors) 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 physical geography 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 instructors to specify these important introductory geography topics. We will turn our attention to direct method using embedded test questions to measure success of outcomes. In addition to 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.
Wewill 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: 1) Students need more experience working with the interpersonal communication skills required for working with clients - especially 'difficult' clients 2) The most successful projects are those with a 'fun factor' - something that students are interested in and get excited about because the project is relevant to them. 3) Students need more experience working together in groups and learning about group dynamics.

**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 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.

<table>
<thead>
<tr>
<th>Outcome 2 - Method 1</th>
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<tr>
<td>Assessment Method #1: Syllabus Review</td>
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<tr>
<td>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. GEO2410 Topics List: 1) Earth Systems; 2) Earth Measurement / Earth-Sun Relationships; 3) Atmosphere / Temperature, Energy Budget; 4) Pressure / Winds / Global Circulation; 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.</td>
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<th>Outcome 2 - Method 2</th>
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<tr>
<td>Assessment Method #2: Course-Embedded Assessment</td>
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<td>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. 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.</td>
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<th>Outcome 3</th>
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<tr>
<td>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.</td>
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<tr>
<td>Assessment Method #1: Syllabus Review</td>
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<tr>
<td>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; 20) Use of statistical Software (Excel / SPSS).</td>
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<th>Outcome 3 - Method 1 - Result</th>
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<tr>
<td>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.</td>
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<th>Outcome 3 - Method 2</th>
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<tr>
<td>Assessment Method #2: Course-Embedded Assessment</td>
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<tr>
<td>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.</td>
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<tr>
<td>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.</td>
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</table>
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**

Assessment Method #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. It 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.


**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: “Geo Information Science – Theory and Analysis.” Students will acquire a working knowledge of at least one Geographic Information Science technique in addition to GIS: either or Remote Sensing or Cartography. Successful completion of project-based assignment(s) become part of students’ professional portfolio.

**Outcome 5 - Method 1**

Assessment Method #1


Indirect methods are not preferable and will be changed next year; however it is certainly an important first step in assessment.

**Outcome 5 - Method 1 - Result**


**Outcome 5 - Method 2**

Assessment Method #2

Course-Embedded Assessment. Locally developed examinations for GEO 3411: Map Compilation and Graphics and GEO 3416: Principles of Remote Sensing. Multiple sections and instructors of this course.

**Outcome 5 - Method 2 - Result**

Outcome 6

Outcome 6 – Program Specific: “Geo Information Science – Application.” Students will learn to work on a team to design, create and complete a client-driven GIS-based project demonstrating GIS expertise as well as professional delivery of a completed project.

Outcome 6 - Method 1

Assessment Method #1

Syllabus Review. GEO 4427: Advanced GIS II. 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.


Outcome 6 - Method 1 - Result

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

Outcome 6 - Method 2

Assessment Method #2

Course-Embedded Assessment. Locally developed evaluation of capstone class project assignments for GEO 4427: Advanced GIS II. Multiple sections and instructors of this course. Successful completion of project-based assignment(s) become part of students’ professional portfolio.

Outcome 6 - Method 2 - Result

The capstone course for this program has been fine-tuned since 2004. Students work with a real-world client to produce a professional GIS project. Students work in small teams with one student as a project manager. Students receive a Request for Proposals (RFP) from clients and develop a proposal which is presented in person to the clients. Student groups also present a progress report as well a final presentation of the deliverables. Students also keep journals of their experience. In addition to refining their GIS skills, students also develop skills using PowerPoint and Web-Page development tools. All student work becomes an on-line portfolio. http://geosites.evans.txstate.edu/~g4427. Students enrolled in this course are typically highly motivated. All student capstone projects (spring 2008) exceeded minimum requirements. However instructors suggest the following: 1) Students need more experience working with the interpersonal communication skills required for working with clients - especially ‘difficult’ clients 2) The most successful projects are those with a ‘fun factor’ - something that students are interested in and get excited about because the project is relevant to them. 3) Students need more experience working together in groups and learning about group dynamics.

Approval History

Approval History Event

Outcomes Approved Level 1
Outcomes Approved Level 2
Results Approved Level 1
Results Approved Level 2