ASSESSMENT REPORT AY2013/2014

Program(s): GIS Graduate Certificate **Department:** Geog, Soc, Hist, AfAm Studies, & Anth

Assessment Instruments and Outcomes Being Measured

This report is on assessment results based on three assessment instruments: **Student Self-Assessment, pretest/post-test,** and a **capstone-course project.** The first instrument, ***Student Self-Assessment*** instrument, is for indirect assessment of learning, while the latter two are for direct assessment of learning. The **student self-assessment** instrument consists of open-ended and closed-ended Likert-style student survey questions. The instrument surveys student opinions about how much and what specific things students have learned in the past year,

The **pretest/post-test** consists of open-ended questions on basic GIS concepts and skills that students are expected to bring to an advanced level course. The pretest, administered in the first week of the advanced level course, provides information on whether students remember some basic concepts and skills they learned in a prerequisite class and whether the instructor has to review some of the basic concepts before delving into advanced concepts in the advanced level course. The instrument assesses students' ability to:

1. Explain the geographic coordinate system in general and the concepts of latitude, parallel of latitude, longitude, meridian, and graticule in particular.
2. Explain map projection and distortions on map projections.
3. Explain the general classes of map projections with specific examples for each class of map projection.
4. Explain horizontal and vertical datum planes used for mapping in North America.
5. Explain the concept of map scale, calculate map scale, and convert between types of map scales.
6. Convert degrees, minutes, and seconds into decimal degrees, and vice versa.

The **capstone-course** project involves a semester long project which involves the development and implementation of a major GIS project. Upon successful completion of the capstone course, students demonstrate the ability to:

1. Design and implement a major/semester-long GIS project to address a significant research question(s);
2. Create spatial databases consisting of raster and/or vector data models for GIS analysis and modeling;
3. Use analytical capabilities of ArcGIS, ArcGIS Extensions, and ERDAS IMAGINE in spatial analysis and modeling;
4. Produce maps of professional quality;
5. Organize research findings into a coherent written and oral presentation.

Methods of Assessment

The ***student self-assessment*** instrument is distributed to students and students are asked to complete and return them to their instructor. Although some of the questions in this test instrument are open-ended, a judgment is made by the assessment coordinator whether responses by a particular student would indicate ***satisfaction*** or ***dissatisfaction***. If responses to the questions by the majority of the self-assessing students indicate ***satisfaction***, the program gets a ***satisfactory*** grade. If responses to the questions by the majority of the self-assessing students indicate ***dissatisfaction***, the program gets ***unsatisfactory*** grade.

The ***pretest/post-test*** is administered to students of *Geog 5830, Advanced GIS*. *Geog 5800, Introduction to GIS*, or an equivalent course or background is a prerequisite for admission into the GIS Certificate program and for taking *Geog 5830*. Students taking *Geog 5830* are given the ***pretest*** in the first week of

the course to assess some basic GIS concepts and skills that they are expected to have and their preparedness for the advanced level course. The same test is administered as a ***post-test*** toward the end of the semester to assess the effect of *Geog 5830* on students' level of understanding of those same concepts and skills covered by the *pretest*. A score of 80% or better in the pretest or post-test is considered satisfactory, and the average score in the post-test is expected to be significantly higher than the average for the pretest.

Geog 5850, GIS Application, the capstone course for the *Graduate Certificate in Geographic Information Systems (GIS),* involves the development and implementation of a major GIS project. A **project portfolio** and a **poster** approved by the instructor of the course must be submitted, and a student must attain at least a **B** to successfully complete the course and the Graduate Certificate in GIS.

Assessment Findings and Improved Student Learning

Responses to questions in the ***student self-assessment*** instrument indicate that students can list a wide range of GIS skills that they learned in the past year, that they feel that they can use GIS more proficiently now than a year ago, and that they feel they can teach other people what they learned in the past year. They expressed satisfaction with the program and a great deal of appreciation for the support they are receiving from faculty and staff. Based on the student evaluations, the program was judged to receive better than a **satisfactory** grade.

All eight five students in the Geog 5830 class took the **pretest/post-**test in fall 2013. Scores for the **pretest** ranged from 55% to 75% and the average score was 62%. The pretest indicated that:

1. Students had some understanding of the geographic coordinate system, but could not provide clear definitions of *latitude, parallel of latitude, longitude, meridian,* and *graticule*. A number of them didn't remember the difference between *latitude* and *parallel of latitude, the difference* between *longitude* and *meridian,* the difference between *latitude* and *longitude*.
2. Students appeared to have some understanding of map projections in general, but they could not define the major categories of map projections and could not provide specific examples of the different types map projections.
3. Students had problems with such basic concepts as *standard line (on map projection), map scale, scale factor* (*on map projection*), *datum planes* (*NAD27*& *NAD83), etc.* and why GIS data have to be transformed from *NAD27* to *NAD83*.
4. Students had serious problems with scale computations, the conversion of degrees, minutes, and seconds to decimal degrees, and the conversion of decimal degrees to degrees, minutes, and seconds.

The results of the pretest were very useful in that they gave the instructor insight into his students' GIS background at the beginning of the semester and helped him identify which basic GIS concepts and skills had to be reviewed to improve student learning before delving into the discussion of advanced concepts and skills.

As expected, scores for the post-test were significantly better than scores for the pretest, and the **post-test** results indicated significant learning during the course of the semester. Scores for the **post-test** ranged from 67% to 95% . The average post test score, 83%, meeting the criterion (≥80%) set for satisfactory performance and is slightly higher than the average post-test score (81%) for the previous assessment period. The average post-test scores for the past seven assessment periods, except one, met or exceeded the criterion (≥80%) set for satisfactory performance.

During the 2013/2014 academic year, **three** students completed the capstone course (*Geog 5850: GIS Application*) and completed the Graduate Certificate in GIS. All three students demonstrated their competence in using the analytical capabilities of geospatial technologies to develop and implement a significant GIS project that addressed significant research questions. All three students received a grade

of "**A**"; the GIS projects, the portfolios, and the posters were considered to be of **excellent** quality. The quality of projects completed by GIS Certificate students have been improving over the years as a result of improving student learning based on assessment results.

Decisions Based on Assessment Findings

Instructors will continue to give special emphasis to concepts and techniques that appear to present problems to students to improve student learning. Since the projects completed by the students were of quality, the students were encouraged to present them at the ILGISA (Illinois GIS Association) Fall 2014 Conference which will take place in Lisle, Illinois.

Demonstrating Student Learning

Responses to questions in the student self-assessment instrument, results of the pretest/post-test test, and the project completed for the capstone course clearly demonstrated that students had exceeded expectations.

Publicizing Student Learning

The assessment plan, the curriculum map, and the assessment report will be posted at the department's geography web page.

Accomplishments and Challenges

Among the major accomplishments related to assessment in our department is that we have managed to keep up with new technologies in GIS, remote sensing, and GPS by upgrading existing hardware and software and by acquiring new ones through various sources of funding, including grants. Our GIS lab has become a tremendous asset for teaching not only GIS and remote sensing courses but also for enhancing the teaching of other graduate and undergraduate courses in Geography, Sociology, History, African American Studies, and Anthropology and for enhancing the activities of the Neighborhood Assistance Center. Another major accomplishment is the full participation of faculty in assessment activities; faculty has accepted assessment as an important component of the teaching and learning process.

A major challenge of our program is soliciting funds for maintaining GIS and remote sensing software licenses and for continually upgrading software and hardware to keep up with new developments. While software and hardware upgrading may be required at least every two years, the kind of money required to do the upgrading may be hard to come by every two years.