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<th>Proposed Action Item Program</th>
<th>Action Items Implemented</th>
<th>Objective to be Assessed Again/Next</th>
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| 2014          | Obj. 3 Acquire and hone intellectual and practical skills: quantitative literacy and data management. | Assignment grades in
(A) GEOG 411 Spatial Analysis
(B) GEOG 413 Geographic Information Systems
At least 70% will receive a grade or score of ≥70%. | (A) manipulate data/ use formulas in Excel, 50% achieved ≥ 70%;
(B) import and rectify air photos in ArcMap software, 100% achieved ≥ 70%; | (A) Senior Exit surveys May 2013, May 2014, questions regarding preparation associated with (a) quantitative skills; (b) data collection/manipulation; (c) analytical/reasoning abilities; (d) software knowledge [respondents in 2013 were N=7, in 2014 N=8]
(B) Survey of Geography alumni graduating 2007 (N=4) & 2008 (N=2), regarding preparation associated with (a) quantitative skills; b) data collection/ manipulation; (c) analytical/reasoning abilities; (d) knowledge of relevant technology. | Mean outcomes from surveys, scored on scale of 1 (worst) to 5 (best):
(A) Seniors from 2013 and 2014, respectively: (a) 3.4, 4.0; (b) 3.4, 4.0; (c) 3.4, 4.1; and (d) 3.4, 3.75.
(B) Alumni graduated 2007 and 2008, respectively: (a) 3.3, 4.0; (b) 3.3, 4.5; (c) 3.5, 3.4; (d) 2.8, 4.0.
(C) We hypothesized that stronger quantitative skills would improve geospatial technical skills (Obj. 2). | (1) Develop/implement assessment tools for “Obj. 3 Acquire & hone intellectual and practical skills necessary to succeed in geography and related fields,” esp. w/respect to quantitative literacy, data management, & information literacy. | (1) Research/define “quantitative literacy” and “information literacy” with respect to SLO for Geography majors;
(2) Identify courses and activities within courses where “quantitative literacy” and “information literacy” will be assessed. | Objective 2: (1) new course “Advanced Cartography” developed, taught Spring 2014. (2) GIS for business planning to be offered more frequently taught next Fall 2015. (3) New assignments in GEOG 525 to be assessed Fall 2015. | 2019 |
<table>
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<tr>
<th>Year</th>
<th>Objective</th>
<th>Core Knowledge</th>
<th>Use of non-GIS proprietary software likely to be encountered in workplace or graduate school: (1) assignments and (2) test questions in GEOG 411 Spatial Analysis</th>
<th>Assignments: hypothesis testing, 86% achieved ≥ 70%; simple regression using SPSS software, 86% achieved ≥ 70%; (2) Embedded test questions: data description, 62% achieved ≥ 70%;</th>
<th>Cumulative Alumni survey results from 1998-2008 (N=37 Geography majors), question associated with knowledge of relevant technology.</th>
<th>Mean outcome from surveys, scored on scale of 1 (worst) to 5 (best) was 3.29.</th>
<th>Identify opportunities to incorporate more quantitative practice into existing courses to boost student confidence with and skill in applying basic statistical techniques. Develop new techniques course: Advanced Cartography</th>
<th>2018</th>
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<tbody>
<tr>
<td>2013</td>
<td>Obj. 2 Core knowledge of geospatial technologies and techniques common to the discipline</td>
<td>Use of non-GIS proprietary software likely to be encountered in workplace or graduate school: (1) assignments and (2) test questions in GEOG 411 Spatial Analysis</td>
<td>At least 70% will receive a grade or score of ≥70%.</td>
<td>Mean outcome from surveys, scored on scale of 1 (worst) to 5 (best) was 3.29.</td>
<td>Identify opportunities to incorporate more quantitative practice into existing courses to boost student confidence with and skill in applying basic statistical techniques. Develop new techniques course: Advanced Cartography</td>
<td>2018</td>
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<td>2013</td>
<td>Obj. 2 Core knowledge of geospatial techniques: spatial analytic processes &amp; Decision-making</td>
<td>GEOG 411: Assignments (1) Perform and interpret T-Tests in SPSS. Exam Questions (2) Correlation &amp; Regression. GEOG 413: Assignments (3) Site suitability analysis GEOG 525 Assignment (4) Characterization of vegetation in study plots</td>
<td>(1) 86% ≥ 70%; (2) 57% ≥ 70%; (3) 83% ≥ 70%; (4) 80% ≥ 70%;</td>
<td>Identify opportunities to incorporate geospatial techniques into existing courses, and to formally assess techniques.</td>
<td>2018</td>
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<tr>
<td>Year</td>
<td>Objective</td>
<td>Details</td>
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<tr>
<td><strong>2013</strong></td>
<td>Obj. 2 Core knowledge of non-software geospatial technologies and techniques common to the discipline</td>
<td>At least 70% will receive a grade or score of ≥70%.</td>
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<td>GEOG 525 Assignment</td>
<td>(A) GEOG 525 Use increment borers to collect unbroken tree-ring samples, process and code samples.</td>
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<td>(A) 100% of students carried out task under supervision</td>
<td>Incorporate and assess more non-software techniques in environment studies courses</td>
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<td>Develop new course for geography majors, focused on non-software field methods.</td>
<td>Incorporated non-software technique (dendrochronology) into GEOG 525.</td>
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<td><strong>2013</strong></td>
<td>Obj. 2 Core knowledge of geospatial techniques: geographic visualization and imagination (how we perceive and understand spaces and places)</td>
<td>GEOG 414 Assignment (1) Final project – Identify, convert and interpret imagery.</td>
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<td>GEOG 320 Assignment (2) Final project – Characterize physical geography of a region</td>
<td>(1) 89% ≥ 70%; (2) 91% ≥ 70%; (3) 10 majors &amp; 1 non-major prepared poster for presentation at professional meeting (AAG, Tampa, FL), March 2014 (3 students from the class presenting).</td>
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<td>GEOG 525 Assignment (3) Group Research Project – Estimating forest ages using historic air photos and tree-rings.</td>
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<td><strong>2012</strong></td>
<td>Review and revise all objectives for Geography Program</td>
<td>Discuss and refine assessment tools and where assessed</td>
<td>Based on the complete revision of objectives, the emphasis over the next five years will be to incorporate and assess (a) non-software techniques/technology (part of objective 2); (b) quantitative</td>
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<td>Reviewed and revised all Geography program objectives; developed 3 to 5 competency areas within each objective.</td>
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### Student Learning Outcomes Assessment

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<th>Objective to be Assessed Next Year</th>
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<tr>
<td>2014</td>
<td>For the 2014 calendar year (S14 + F14), Geosciences assessed <strong>Objective 3: To develop written and oral communication skills</strong>,</td>
<td>1. Course embedded questions, assignments, and laboratory exercises.(*)</td>
<td>1. Please see the Summary below which itemizes activities in regard to Objective 3. Geoscience students have ample opportunity to develop reading comprehension, writing and oral presentation skills. All in all, students do very well. In addition to those courses listed below (see Summary), students developed these skills in GEOS522 and GEOS593 as well.(%)</td>
<td>1. For 2014, 14 students responded. Their perceived preparation of a) oral presentation skills was 4.4/5.0 (vs. 4.45 long-term average), and b) writing skills was 4.4/5.0 (vs. 4.2 avg.). On the whole, graduating seniors are well satisfied with their preparation in communication skills.(&amp;</td>
<td>1. Increase rigor of rubrics used by Geosciences faculty to evaluate student oral presentations. 2. Expand student communications skillset to include other modes of presentation (extended abstract, poster, online, etc.).</td>
<td>1. Highlight and include quantitative skills as part of one of the objectives, perhaps Objective 1: To develop skills of analysis, synthesis, critical thinking &amp; problem solving. 2. Explore the viability of developing an in-department capstone course and/or experience, one that includes substantial components linked to further developing communications skills as well as to other learning objectives. 3. Continue to develop Objective 6 on social issues and geoethics. 4. Continue to explore ways to increase response</td>
<td>1. Increase efforts to acquire assessment data: Increase report rate from field camp directors; Increase response rate of exit surveys; Increase return rate of alumni surveys; Explore possibility for electronic / online submissions for surveys.</td>
<td>1. (for results): To increase efforts to acquire assessment data: Increase report rate from field camp directors; Increase response rate of exit surveys; Increase return rate of alumni surveys; Explore possibility for electronic / online submissions for surveys.</td>
<td>1. (for results): To increase efforts to acquire assessment data: Increase report rate from field camp directors; Increase response rate of exit surveys; Increase return rate of alumni surveys; Explore possibility for electronic / online submissions for surveys.</td>
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| other EUP students attended and successfully completed Field Camp, but directors did not report back their performances. | pleased with their preparation of oral communication (3.0/5.0 vs. 3.9 long-term average) and writing (4.0/5.0 vs. 4.0 avg.) skills. Even with limited data, results from this cycle were very consistent with those in the past. | laboratory equipment and techniques. 
2. (implementation): Geosciences established a new three-credit, lab-intensive course offering (GEOS410 – Applied Geophysics) in response to address this action item. Also, more time was spent in-class (especially GEOS513 and GEOS531) on further developing student skills. (!!!) 
3. (for tools): To re-evaluate the viability of Objective 6: To provide students with an understanding of current social and ethical issues and generate first-generation measures to assess this objective. 
3. (implementation): As an entry into the assessment of this objective, essay questions concerning social and geothermal issues were developed and given in both lower (GEOS112) and upper (GEOS531) level courses. Evaluation rubrics are being designed for these questions. Other avenues of assessment are being explored for this objective as well. (!!!) | rates for Exit and Alumni surveys. |
Notes:

(*) These measures are assessed in selected upper level geology courses. Data are gathered every time the course is offered, with every Geology major being assessed. The criterion used to measure performance is a scoring scale (proficiency ≥70%).

(**) This measure is assessed by examining GEOS 581 – Geology Field Camp course grade and/or, when available, performance ranking with respect to other field camp attendees. Data are gathered on all Geology majors who attend field camp and collected every summer.

(%) To further develop skills linked to other objectives, class time in GEOS513 and GEOS531 was devoted instead to bolstering lab and tech skills (Objective 5). Development of writing and oral presentation skills, however, will be included in new courses, GEOS410 and GEOS430. Also, an informal, in-department Professional Development (Pro-D) workshop for students focused on resume writing.

(#) For perspective, consider: a) a majority of students attending camp are typically from the host institution, which favors those students and not those from EUP; and b) EUP students merely need to pass for the credits to transfer, which provides little incentive to excel. These students have since a) received a graduate assistantship, b) gained employment in the field upon graduation, and c) graduated from EUP (in S15). Host institutions for summer 2014 camps were: Indiana, Kent State, Nevada, and Oregon.

(^) Instructions to access Exit surveys online are distributed in selected upper level Geology courses to all Geology majors who file intent to graduate. Surveys are submitted electronically near the conclusion of fall and spring semesters and a scoring scale is used to assess performance. Note that this is a new procedure where students file electronic surveys rather than hand in paper copies of surveys.

(^ ^) Data are collected every year and gathered via traditional and electronic mailing, where instructions to access Alumni surveys online are emailed to all Geology majors on 5-year and 10-year graduation anniversaries. This year, instructions were mailed twice in an attempt to increase response rates. A scoring scale is used to assess performance. Note that this is a new procedure where alumni submit electronic surveys rather than send in paper copies of surveys.

(&) Yet, knowing that these skills will be the ones most often used (if national surveys and alumni survey anecdotes are indicative), Geosciences faculty want to enhance student preparedness in terms of communication and increase those satisfaction rates.

(!) Although the surveys are available electronically and submitted online, response rates are still frustratingly low. Additional efforts are needed to bolster those response rates.

(!!) The trade-off for using more class time in these particular courses to further develop student skills with equipment and techniques is that less time was spent on developing writing and oral skills.

(!!!) We need to develop more direct and indirect measure instruments for this objective and conduct an initial assessment. Because we have struggled to arrive at meaningful measures that can be readily implemented, we considered dropping this objective altogether. Yet, because of its importance and relevance as a learning objective, we continue to explore how best to assess it. A workshop entitled “Teaching GeoEthics Across the Geoscience Curriculum” took place in summer 2014. We hoped that results from this workshop would provide the framework to integrate this objective into our curriculum and give strategies to develop the tools to assess it, but we were over-optimistic. But, more webinars, conference technical sessions and such concerning this topic are on the horizon. The Geosciences community at the (inter)national level recognizes its importance and is actively raising awareness.
### Student Learning Outcomes Assessment

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| 2014          | For the 2014 calendar year (S14 + F14), Geosciences assessed Objective 3: To develop written and oral communication skills. | 1. Course embedded questions, assignments, and laboratory exercises.(*) | 1. Please see the Summary below which itemizes activities in regard to Objective 3.(**) | 1. For 2013-2014, only 3 students responded. Their perceived preparation of a) oral presentation skills was 3.7/5.0 (vs. 3.9 long-term average), and b) writing skills was 3.3/5.0 (vs. 3.7 avg.). On the whole, graduating seniors are satisfied with their preparation in communication skills.(&)

2. With response rates being low (8 alumni) and degree affiliations ambiguous (results combined for all Geosciences majors), Alumni survey results are difficult to interpret. However, generalized results indicate that a) alumni deemed developing communications as a key to success, b) they were very pleased with their preparation of oral communication (3.9/5.0 vs. 3.9 long-term average) and writing (4.0/5.0 vs. 4.0 avg.) skills. | 1. Graduating student exit survey results.(*)

2. Alumni survey results.(^^) | 1. Highlight and include quantitative skills as part of one of the objectives, perhaps Objective 1: To develop skills of analysis, synthesis, critical thinking & problem solving. 2. Expand student communications skillset to include other modes of presentation (extended abstract, poster, online, etc.). | 1. Increase rigor of rubrics used by Geosciences faculty to evaluate student oral presentations. | 1. Increase efforts to acquire assessment data: Increase report rate from field camp directors; Increase response rate of exit surveys; Increase return rate of alumni surveys; Explore possibility for electronic / online submissions for surveys. |

1. (for results): To increase efforts to acquire assessment data:

- Increase report rate from field camp directors;
- Increase response rate of exit surveys;
- Increase return rate of alumni surveys;
- Explore possibility for electronic / online submissions for surveys.

1. (implementation): Both exit and alumni surveys are now available electronically, and graduating students and alumni can access and submit those surveys online.(!) | 2. (for results): To re-evaluate the viability of our Objective 6: To provide a liberal arts education and prepare students for employment in one of many fields where a broad familiarity with the earth sciences would be advantageous and generate first-generation measures to assess this objective. | 3. Continue to develop Objective 6 on student preparation for the workforce.(@)

4. Continue to explore ways to increase response rates for Exit and Alumni surveys. | 2. (implementation): Possibilities include For the calendar year 2015 (S15 + F15), Geosciences will assess Objective 2: To acquire a core knowledge in geology and allied natural sciences.
Even with limited data, results from this cycle were very consistent with those in the past. ($)

replacing this objective with Objective 6 (To provide students with an understanding of current social and ethical issues) from the BSGS program (!!), or rewording it to combine aspects of both or moving forward with this objective and designing the appropriate assessment tools. We are still exploring how best to a) combine the wording of these two objectives into a single objective and b) develop measurement tools to assess the objective. Nevertheless, through new program and course development, we took significant steps to better prepare our students upon entry into the workforce. (!!!)

Notes:

(*) These measures are assessed in selected upper level geology courses. Data are gathered every time the course is offered, with every Geology major being assessed. The criterion used to measure performance is a scoring scale (proficiency ≥70%).

(***) It remains difficult to draw any firm conclusions from assessments of the BA Earth Science program because the number of majors in this program is small (...but growing!). A combination of direct measures was used in our upper level geosciences courses to gauge how well all of our geoscience majors were meeting the learning objectives of their respective programs (please see Summary). The selected classes were chosen because they are either required or elective coursework for these students. Sample sizes in these classes ranged between 15 and 25, with Geology majors far outnumbering the Earth Science majors. On average, 91.6% of the students in these classes demonstrated proficiency (defined by a score of 70% or higher) on the assessment instruments used during this cycle. Earth Science majors were part of the sample group from which proficiency data were collected. We are pleased that a substantial majority of the students in the sample group were found to have developed requisite skills in reading comprehension, oral presentation and writing – all relevant to Objective 3.
To further develop skills linked to other objectives, class time in GEOS513 and GEOS531 was devoted instead to bolstering lab and tech skills (Objective 5). Development of writing and oral presentation skills, however, will be included in new courses, GEOS410 and GEOS430. Also, an informal, in-department Professional Development (Pro-D) workshop for students focused on resume writing.

Instructions to access Exit surveys online are distributed in selected upper level Geology courses to all Geology majors who file intent to graduate. Surveys are submitted electronically near the conclusion of fall and spring semesters and a scoring scale is used to assess performance. Note that this is a new procedure where students file electronic surveys rather than hand in paper copies of surveys.

Data are collected every year and gathered via traditional and electronic mailing, where instructions to access Alumni surveys online are emailed to all Geology majors on 5-year and 10-year graduation anniversaries. This year, instructions were mailed twice in an attempt to increase response rates. A scoring scale is used to assess performance. Note that this is a new procedure where alumni submit electronic surveys rather than send in paper copies of surveys.

Yet, knowing that these skills will be the ones most often used (if national surveys and alumni survey anecdotes are indicative), Geosciences faculty want to enhance student preparedness in terms of communication and increase those satisfaction rates!

Overall, the graduating Earth Science students and alumni provided moderate to high satisfaction scores for Objective 3. Results from our Exit and Alumni surveys, as scant as they are, indicate that our alumni are of the general belief that, although we have adequately trained them in communication skills, there is room for improvement on this objective as a whole (see Note (&) above). Trends for these results are consistent overall with those for the BSGS degree and the recommended actions discussed in the BSGS assessment will benefit the BAGS program. It is important to note that the BAGS program uses the same faculty and courses as the BSGS program. Traditionally, the BAGS program has been popular with Secondary Education, Earth and Space as part of a dual major, though a growing number of students are enrolling in the BAGS program alone.

During the 2014 calendar year, the department held two Professional Development (Pro-D) workshops per semester for students. (These sessions were designed for Geosciences students, but students from other science disciplines attended as well.) One focused on strategies for researching and applying to graduate schools, and the other dealt specifically with learning about employment opportunities and job-application strategies. One member of the Geology faculty was trained in the “Preparing Our Workforce” program initiated by the American Geosciences Institute (AGI) and now can speak more directly to these matters. Another is in the process of completing this training. We also incorporated excellent, newly available information (written, graphic, etc.) on career paths from this national initiative and other resources into our department brochures and other materials accessible to students. We plan to expand Pro-D offerings For example, a third workshop focusing on resume writing was added during the S15 semester. Also, we want bolster our department materials to better reflect the myriad, rich potential career paths available to all students in Geosciences. How this translates to a direct measure and/or redefinition of our Objective 6 remains nebulous. More work is necessary to fully address this Action Item and to convey the vast, expanding, growing, societally / environmentally critical career options all geosciences students have.

Although the surveys are available electronically and submitted online, response rates are still frustratingly low. Additional efforts are needed to bolster those response rates.

We need to develop more direct and indirect measure instruments for this objective and conduct an initial assessment. Because we have struggled to arrive at meaningful measures that can be readily implemented, we considered dropping this objective altogether. Yet, because of its importance and relevance as a learning objective, we continue to explore how best to assess it. A workshop entitled “Teaching GeoEthics Across the Geoscience Curriculum” took place in summer 2014. We hoped that results from this workshop would provide the framework to integrate this
objective into our curriculum and give strategies to develop the tools to assess it, but we were over-optimistic. But, more webinars, conference technical sessions and such concerning this topic are on the horizon. The Geosciences community at the (inter)national level recognizes its importance and is actively raising awareness.

(!!!) Important and substantial steps were taken in 2014 to better prepare all Geosciences students for the workforce. As part of a new BSGS track (Geology – Energy Resources), two new courses were developed, GEOS410 – Geology of Energy Resources and GEOS430 – Applied Geophysics. Both of these courses will contain components that address each of our student learning objectives, with special emphasis on content and skills beneficial to compete well in today’s workforce.