SAIL Curricular Project Submission

SAIL seminar participants should use this form to document their curricular project. The final curricular project will be made publicly available on the ACM website.

Please email your final curricular project to Cara Pickett (cpickett@acm.edu).

Overview

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Course/Module/Activity Title: Rivers in Space and Time

Course Summary:
Please provide a short description of your course or module and the expected learning outcomes for students. Be sure to include essential key words or index terms to help users find resources using web-based searches.

Course Context and Learning Goals

Context:
To help your colleagues understand how they might successfully use or adapt your course or module for their own students, please provide the following information on context.

1) If this is a course, briefly describe its type and level. If this is an activity or module, briefly describe the course in which you use it:

This assignment is part of Geomorphology, Geology 210, a course that is taught two of every three years. Course enrollment generally runs between 20 and 36 students. In most years, about half the students are junior and senior geology majors and half are undeclared sophomores or majors in other fields (especially Environmental Studies and also Archaeology (concentrators) and others). In this course, students spend about a month mapping and measuring various aspects of the Cannon River in the Carleton Arboretum. This assignment complements that field study by having students compare the Cannon to two other rivers. After this assignment is completed, students move on to study hillslope and glacial deposits, completing small assignments in each of these areas and a major final project.

2) If this is a course, briefly identify the prerequisite courses students must have taken before they can succeed in the course (or the skills and knowledge they require). If this is a module, briefly describe or list the skills and concepts that students must have mastered before they can successfully complete it:

Geomorphology has a prerequisite of one of several introductory geology courses, though junior and senior non-majors can be admitted without that pre-requisite. Some field work on rivers and directed readings are essential to student success in the module. Because it is a small group project, it's helpful if students already know each other.

3) If your project is not a complete course, briefly describe how the module or activity is situated in the overall course (e.g., as a culminating project, as a stand-alone exercise, as part of a sequence of exercises):

See above. Although this module is a stand-alone exercise, it follows a major project and set of readings and class discussions on river systems. However, I believe it can be adapted to be either an introductory assignment on rivers or a culminating project in the course. It may also be adaptable to introductory geoscience, physical geography, and environmental studies courses.

In 2013, this project continued a collaboration that will result in an exhibit in 2015-16 in the Perlman Teaching Museum at Carleton. Other parts of this collaboration include work done in Victoria Morse's Cartography course in winter 2014 and ongoing discussions among Savina, Morse and Carleton exhibits coordinator Laurel Bradley. The Cartography and Geomorphology classes in fall 2015 will contribute explanatory material to the exhibition, conduct tours, and participate in other ways.

Learning Goals:

To help your colleagues understand the role of this module in your course or curriculum, please provide a statement of the goals (what do you expect your students to know and to be able to do) that you have for students in the following three areas. Your learning goals should be stated in a form that facilitates their assessment. For example, "students will understand supply and demand" is not particularly helpful unless you can identify the evidence that will demonstrate the students' understanding.

*1) Briefly describe the **content/concepts goals** for this course or module:*

- Students will use historical and contemporary maps (and other images, including air photos) and government records to compare features of the Arno, Lower Mississippi and Cannon River at different periods;
- Students will relate topography and flood histories of the three rivers to the ways humans use the rivers and to changes in the rivers over time;
- Students will work in groups to create digital posters to illustrate the changes that have occurred along the Arno or one of the other rivers;
- Through their poster, students will demonstrate that they have grappled with some of the following "content" questions:
    - What was the nature of the river before human intervention?
    - In what ways have humans intervened on the river and how are these interventions represented on maps?

- How have human interventions affected the river: hydraulic geometry (width, depth, gradient, velocity, discharge, sediment transport), plan form (e.g., sinuosity) connections with the floodplain, effects on flood frequency, etc.?
- How, in turn, are these changes represented on the historical maps?
- How do maps of different periods represent "reality" in an urban river setting?
- For what purpose have such maps been constructed and how well do they serve those purposes?

*2) Briefly describe the **higher order thinking skills goals** for this course or module:*

- By relating directly observable features of rivers to accounts of rivers drawn from historical and cartographic sources, students will learn to operate on different scales of space and time.
- Students will compare different rivers, synthesizing the information in a way that others can understand.

*3) Briefly describe the goals you have for students learning **multidisciplinary analysis** from this course or module:*

In the Mediterranean, humans have modified rivers for a variety of purposes (navigation, irrigation, energy, food processing, etc.) at least since the Bronze Age. Millenial-scale climate changes have also affected rivers. Sorting out what's natural and what's not – and the specific effects of humans on river systems – is a central task for geomorphologists, one that requires understanding human settlement and economy in collaboration with historians, social scientists, and interpreters of literature.

In comparing maps of rivers are made for different purposes, students will be practicing multidisciplinary analysis. For instance, the navigational maps of the lower Mississippi from today's Army Corps of Engineers differ from earlier maps of the same stretches of river. The same is true for the Arno and other Mediterranean rivers. Maps made by sailors show the exact position of the river mouths and the obstacles ships will encounter coming into port. Maps made by individuals living along the rivers may show the variety of daily activities around the river, or may emphasize the bucolic surroundings, fortifications or plans for improvements, depending on the audience for whom the map was made.

For instance, Leonardo da Vinci created maps of two sections of the Arno. Upstream, in the Val-di-Chiana, Leonardo imagined a lake to replace the malarial marshes (Alexander, David, 1984, The Reclamation of Val-di-Chiana (Tuscany): Annals of the Association of American Geographers, v. 74, p. 527-550.) Downstream of Florence, while Florence was sparring with Pisa (a marginal battle in the larger fight between local city-states and foreign powers), Leonardo drew up plans to divert the Arno southward through the Funcecchio marshes, isolating Pisa and potentially providing Florence with access to the ocean (Masters, R., 1999, *Fortune Is a River : Leonardo da Vinci and Niccolò Machiavelli's Magnificent Dream to Change the Course of Florentine History,* (New York: Free Press). Recently, artist Florent Morellet's re-imagined the lower Arno Basin as it would look now if the Machiavelli/Da Vinci project had succeeded four centuries early. Pisa is a shriveled-up little town isolated from the river and the ocean (http://www.florentmorellet.com/index.php#mi=2&pt=1&pi=10000&s=1&p=7&a=0&at=0).

*4) Briefly describe any **other skills goals** for this course or module:*

Learning to read and interpret maps is a central skill for geoscience students and for many other students. Maps form the basis of spatial analysis of all forms, including Geographic Information Systems.

Description and Teaching Materials

Description:

This section should include a narrative describing what another faculty member would need to know to be able to teach or to modify your course or module. It should also include all the essential materials needed to do that (or links and references to those materials). If this is a course, you may not want to include all of the supporting materials, but you should include a representative sample.

- If the material is available on another site please provide the full url.
- If you have the materials in hand, please include them as an attachment with your final submission; be sure to clearly label the materials in the file name. Find the grading rubric and
- If they are published print materials please provide a complete bibliographic reference.
- If the activity is fully documented at another site please provide the url along with a brief (one or two sentence) description of the other site.

For all materials included, please provide a brief description of each item in the space below, identifying what it is and explaining its role in the course or module.

If you submit files as part of your course or module, remember to consider their final use in deciding on appropriate formats. Materials that other faculty are likely to modify should be provided in easily editable formats (plain text, Word files), whereas materials that will be likely only used verbatim are most convenient in formats that are universally readable (PDF format is often a good choice).

Please be sure all materials you include can be freely redistributed.

Files submitted:

1. Rivers in Space and Time_digital poster assignment (Fall 2013) .doc file
   This handout was given to the students in fall 2013 to explain the assignment, list the topics and explain how to use Prezi, the on-line tool for creating digital posters.

2. Rubric for grading digital posters in geomorphology (Fall 2013) .xls file
   This handout, created by the two student project managers, was used to evaluate the posters created by the student groups.

3. How to design an attractive (electronic) poster by Bart M. ter Haar Romeny and Jelle Barentsz
   http://luponvochs.files.wordpress.com/2008/10/how-to-design-an-electronic-poster.pdf
   This handout was prepared for radiologists submitting posters to a 2003 conference in Europe. Although these submitters did not use Prezi, the handout has great tips for those of us who are used to static posters at scientific meetings. I've searched without success for the original citation.

Teaching Notes:

This section should include notes and tips for instructors who might wish to use or build on your course or module. This should be a brief "how-to" manual for your course or module. Information such as common

areas of confusion, things that need reinforcement, practical tips, and pointers for making the best use of the activity are appropriate. Note that this section should complement, rather than repeat, the more general guidance about the teaching method provided in the methods module of which this activity is a part.

Students were given two 70-minute class periods and a four-hour lab period to work together on the assignment. The assignment was scheduled during a section of the course when I was away at a professional meeting. I've found that with group projects it's helpful to use scheduled class and lab time for at least part of the work, because students have trouble coordinating schedules to work together at other times.

After I described the different topics, students were asked to choose three or four that interested them. They were also asked if they wanted to be project managers. Based on these preferences, I formed the groups. In this way, each of the students worked on a topic of interest. Because this assignment came midway during the course and students had worked in groups from the start, they knew each other pretty well.

I created folders in the course management system with some starting resources for each of the three river systems. My main goals for this relatively short project – having students compare the river systems and design a poster to communicate those comparisons – did not include having students search comprehensively through library and on-line sources. The assignment could be modified to increase the amount of literature searching students are required to do. In that case, the assignment might be used as a culminating course project, rather than one of several assignments. I found that students did search beyond the resources provided to them, particularly on the internet. In fact, I didn't think all the student groups made enough use of the materials that were provided.

I found that it was hard to keep the student groups from converging around certain specific elements, such as the effects of major floods, even though my intent was to minimize the overlap between topics. When I do this project again, I will ask the project managers to be more attuned to the possibility of overlap and perhaps ask each group for a progress report halfway through. I'll also provide a slightly longer statement of what each topic means.

Assessment and Resources

Assessment:

Describe briefly how you determine whether students have met the goals of this course module. If you anticipate using a rubric to assess student learning, include an example of that rubric. You should indicate both how you will assess content goals as well as the ability of your students to do multidisciplinary analysis.

The rubric that was used for this assignment is attached. It covers content and design features of the poster. Posters are explicitly evaluated on the strength and detail of the comparative and contrasting information about three rivers. All topics were interdisciplinary in the sense that they required students to examine both the physical features and the human uses of river systems. Students were encouraged to include materials from a range of sources from different disciplines (e.g. literature, news accounts, scientific data), but this aspect was not explicitly covered in the rubric.

Resources:

This section should include references and links to online resources that will help other faculty use and build on your course or module. These could include supporting readings either for the content of your course or module, or references to, for example, multidisciplinary teaching and learning. If you include specific techniques, such as "clickers" as part of your course or module design, readings that explain those techniques would be helpful. Web resources should include both the url and a brief description of the site (and why it is relevant). Print resources should include basic citation information as well as a brief description of the resource.

I think that readers of this assignment can still get to one of the 2013 geomorphology posters through the following url:
Comparing delta features:
http://prezi.com/c86ijidwwhiy/?utm_campaign=share&utm_medium=copy

Examples of web sites discussing digital posters:
http://elearningfacultymodules.org/index.php/Digital_Posters_and_Digital_Poster_Sessions
http://serc.carleton.edu/viz/workshops/activities/geo_286.html

Examples of resources specific to this river assignment:
http://sitweb.provincia.fi.it/website/plantario/viewer.htm (interactive map of Arno)
2007_FINAL_MSRVNBK_WEB.pdf Army Corps of Engineers navigation maps, lower Mississippi, Cairo to New Orleans
http://rivergages.mvr.usace.army.mil/WaterControl/new/layout.cfm (streamflow and flood data, lower Mississippi)
http://www.mvd.usace.army.mil/About/MississippiRiverCommission(MRC)/History.aspx (timeline, history of engineering on the lower Mississippi)
http://nwis.waterdata.usgs.gov/nwis/peak?site_no=05355200&agency_cd=USGS&format=html – Annual Peak Discharges Cannon River, Welch Minnesota
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_022044.pdf
NRCS Rapid Watershed Assessment - undated, but post-2007