Introducing GIS via College-Sponsored Community Service Activities

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Presentation Overview

• Amherst College
• Interterm Classes
  * Original GIS Course Design
  * Early Participation
• New Interterm Courses
  * Ideas & Topics
  * Participation
  * Content & Results
  * Feedback
• Future Directions
• Acknowledgments
Amherst College

- A liberal-arts college
- 1600 students, almost all in residence
- 1:8 faculty-student ratio
- One of the Five Colleges, along with:
  * Hampshire College
  * Mt. Holyoke College
  * Smith College
  * University of Massachusetts at Amherst
Interterm Classes

- January Interterm lasts three weeks, beginning the week after New Year’s.
  * Non-credit courses, service activities, thesis research, etc.

- Student participation is optional; open to others, including Five College students, staff, & faculty.

- Information Technology has been teaching Interterm classes for years:
  * Outlook, Endnote, Dreamweaver, Photoshop, et al.

- Classes are typically one or two hours long, occasionally with multiple meetings.
Interterm GIS — Original Design

• Our first GIS course was taught to students during Interterm 2004.

• Three classes of two hours each:
  * Displaying GIS data & sharing maps;
  * Data formats and finding GIS data;
  * Importing data into GIS formats.

• The examples & exercises used a mix of national, state, and local data:
  * Census, political, orthophotos, scanned maps, etc.
Interterm GIS — Early Participation

• Unfortunately, student participation has not been overwhelming:

• At least part of this can be attributed to:
  * Less-than-active student participation in Interterm;
  * Some students had options at other times, e.g. a course we offer to summer science students;
  * Competition from a week-long Interterm class nearby!
Interterm GIS — New Course Ideas

• **Philosophy:** Make the GIS course more relevant to students by providing them with “live” data.

• **Observation:** The College has recently expanded its commitment to community engagement.

• **Connection:** Coordinate with community service and government agencies to find ways they could benefit from a GIS project, and design student activities around that.
Interterm GIS — Additional Ideas

• Prepare data in advance to focus student efforts.
• But also include some field work ("experiential").
• Involve relevant faculty and other experts.
• Teach other technologies to communicate results:
  * Web design  * Video production
• Use most of Interterm (2½ weeks).
• Give students freedom to choose projects ("self-directed").

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Interterm GIS — Two New Courses

• Discussions with faculty, a governmental agency, and a community organization encouraged us to set up two courses in parallel:

* Natural-science oriented:
  *Destructive Species and the Quabbin Reservoir: Balancing Ecological Diversity and Recreational Needs*

* Social-science oriented:
  *Meeting the Health Care Needs of Under-Privileged Populations in the Holyoke Region*
Interterm GIS — Participation

- The response to these courses was a nice surprise!

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<th>Completed</th>
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<th>Smith College</th>
<th>University of Massachusetts</th>
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<td>18</td>
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- The students came to learn one or more of these technologies (GIS or video or web development), and/or for the service opportunity —

- But every one received a basic course in GIS, including a GPS/geocaching exercise!
Interterm GIS — Design

• The courses ran M - F, 9 AM to ~4 PM, with 1-hour lunch: ~30 hours/week.

• The content evolved over the 2½ weeks:
Destructive Species and the Quabbin Reservoir
Presentations: Forestry

- **History and Management of the Quabbin Reservoir**
  Clif Read — Supervisor of Interpretive Services, Quabbin Visitors Center
  Steve Ward — Forester, Quabbin Reservoir Office of Watershed Management, Department of Conservation and Recreation, State of Massachusetts

- **Healthy Forests and Water Quality**
  Anna Martini — Professor of Geology, Amherst College

- **Massachusetts Forests**
  John O'Keefe — Museum Coordinator, Harvard Forest

[Map of Quabbin Reservoir Watershed]
Destructive Species and the Quabbin Reservoir

Presentations: Species

• Introduction to Invasive and Destructive Species
  Annie Paradis — Graduate Student in Entomology
  Department of Plant, Soil, & Insect Science
  University of Massachusetts

• The Hemlock Woolly Adelgid
  David Orwig — Forest Ecologist
  Harvard Forest

• Going Wild! Hunting, Animal Rights, and the Contested Meaning of Nature
  Jan Dizard — Professor of Anthropology and Sociology
  Amherst College

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Destructive Species and the Quabbin Reservoir

Focus: Continuous Forest Inventory

• Continuous Forest Inventory (CFI) plots were set up in the early 1960s as a means to monitor the state of the forest.

• A regular grid of spots a half mile apart, marked by a stake, with trees visually marked from that point (gray on map)

• Originally described by “forester’s directions”, GPS coordinates are now more useful — but only some known!

* Yellow — Office of Watershed Management
* Orange — Mt. Holyoke College
Destructive Species and the Quabbin Reservoir: Focus: The Hemlock Woolly Adelgid

- An invasive aphid-like insect from eastern Asia, about 1mm in size.
- Two infestations in the U.S., one per coast.
  * The latter discovered in Virginia in the early 1950s.
  * Reached Massachusetts in 1989.
- Adelgid nymphs attach themselves to needle bases and cover themselves with white wax.
- Adelgids feed on hemlock sap and inject a toxic saliva; trees often die after 4 - 8 years.
- Hemlock commonly reside on steep slopes near streams, and help reduce erosion thereon.
Spread of the Hemlock Woolly Adelgid in Massachusetts

Eastern Hemlock (green);
The Spread of the Hemlock Woolly Adelgid in the eastern U.S. as of 2003 (red)
Destructive Species and the Quabbin Reservoir: Activity: Forest Analysis

• Two stands of eastern hemlock (red) were selected that had not previously shown signs of infestation.
  * More southerly stands had, especially adjacent to the reservoir.

• The students traversed them, and rated the presence of the adelgid.
  * Scale of 0 (none) to 3 (highly infested).

• The students also looked for nearby CFI plots.
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Hemlock stands (red), adelgid presence (larger white dots), and CFI plots (yellow dots & blue stars)
Health Care Needs of the Under-Privileged in Holyoke

**Presentations: The People of Holyoke**

- **Hispanic Americans**  
  Carleen Basler —  
  Professor of Anthropology and Sociology  
  Amherst College

- **Challenging Structural Inequality and Building Partnerships in Holyoke**  
  Myrna Breitbart —  
  Professor of Geography & Urban Studies  
  School of Social Science, Hampshire College

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Health Care Needs of the Under-Privileged in Holyoke

Presentations: Health Care

• The Holyoke Health Center
  Jay Breines — Director

• Access to Health Care by the Uninsured
  Jessica Reyes — Professor of Economics
  Amherst College

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Health Care Needs of the Under-Privileged in Holyoke

Activity: Diabetes

• The Holyoke Health Center (HHC) has many diabetic patients.
• An important treatment effort is to teach patients better ways to eat.
  * In-home cooking demonstrations are well-received.
  * Where to site them?
• HHC provided us with a list of their diabetic patient’s addresses.
• Cleaned up, randomized, geocoded.

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Health Care Needs of the Under-Privileged in Holyoke

Activity: Home Health Visits

• The Holyoke Health Center (HHC) sends many “promotoras” to patients’ homes for health visits.

• Another group of students mapped the location of visits, along with the locations of the diabetic patients.
Health Care Needs of the Under-Privileged in Holyoke

Activity: Siting a New Health Center

- The Holyoke Health Center (HHC) also operates the Chicopee Health Center.
- They’re expanding it and looking for a new location for it.
- HHC provided us with a list of their new patient’s addresses.
- Cleaned up, randomized, geocoded.
Health Care Needs of the Under-Privileged in Holyoke

Activity: Community Resources List

• One group of students worked with a local social worker to update a list of community resources.
  * Childcare and Infant Programs
  * Youth Programs and Recreation
  * Education, Jobs, and Training
  * Parental Support
  * Housing, Food, and Heat
  * Health; Counseling and Mental Health
  * Crisis Prevention and Hotlines

• They produced a wall map of these resources — and bus lines — that’s now at the HHC, and a brochure.
Student Survey Results

• A post-course survey obtained 1 response from a Quabbin student, 10 from Holyoke students.
• The design of the courses was highly rated.
• The technology training was highly rated.
• Students frustrated by their lack of “meaningful contribution”.
• Students felt they didn’t have enough time to “design their own project” and also complete it.
• Holyoke students didn’t feel the need for GPS.
Response to the New Courses

• **Service Recipients:** Although the “products” of these courses were limited, the organizations we worked with seemed appreciative and wanted to continue again this January.

• **Students’ Follow-Up:**
  * Two students took a semester-long GIS course at Smith.
  * One student did a summer research project on atmospheric mercury that recently won a GIS Day prize!
  * A few students have continued to work with the HHC.
Future Directions

• **Quabbin Course:** In the interest of providing some student options, a second activity, tracking the browsing impact of moose, will be added.

• **Holyoke Course:** An effort will be made to prepare additional activities in advance.
Acknowledgments

• Peter Schilling, Director of IT at Amherst College, suggested expanding beyond the courses’ initial GIS focus.

• Scott Payne, Director of Academic Technology Services, was instrumental in designing the courses.

• The rest of the Academic Technology staff made contributions to the design, and were essential parts of the training and staging of the courses: Janet Price, Marcus DeMaio, David Moran, Colleen Keenan, John Kunhardt, Paul Chapin, Bridget Dahill.

• Our librarians, Susan Kimball and Susan Edwards, who taught part of the GIS classes (finding data on the web).

• The expert speakers referenced earlier.

• The staff at Mass DCR and the Holyoke Health Center, who provided some of the data we used and sometimes worked with the students.

• And, of course, all of the wonderful students!
Resources

- **Quabbin Course Web Site:**
  - [http://www.amherst.edu/~ccsp01](http://www.amherst.edu/~ccsp01)

- **Holyoke Course Web Sites:**
  - Diabetes: [http://www.amherst.edu/~ccsp04](http://www.amherst.edu/~ccsp04)  
    [http://www.amherst.edu/~ccsp05](http://www.amherst.edu/~ccsp05)
  - Home Health Visits: [http://www.amherst.edu/~ccsp02/](http://www.amherst.edu/~ccsp02/)
  - Siting a New Center: [http://www.amherst.edu/~ccsp03/](http://www.amherst.edu/~ccsp03/)
  - Community Resources List: [http://www.amherst.edu/~ccsp06/](http://www.amherst.edu/~ccsp06/)
External Image Credits

- **Massachusetts Department of Conservation and Recreation:**
  http://www.mass.gov/dcr/parks/central/quabbin.htm
  http://www.mass.gov/dcr/waterSupply/watershed/quabbinshed.htm

- **Harvard Forest:** http://harvardforest.fas.harvard.edu/research/hwa.html

- **U.S. Forest Service:** http://na.fs.fed.us/fhp/hwa/

- **MassGIS:** http://www.mass.gov/mgis/

- **City of Holyoke:** http://www.holyoke.org/

- **Holyoke Community Health Center:** http://www.hhcinc.org/