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# Interdisciplinary Access to Geographic Information Science: Peer Teaching in Higher Education

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## Value of Geospatial Education

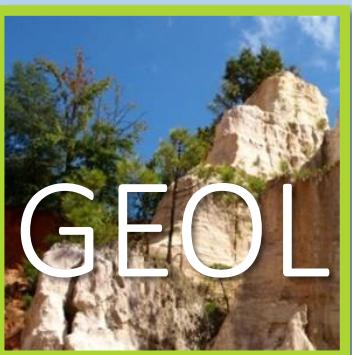
Access to geospatial knowledge in higher education requires broad inclusion of **spatial concepts** in courses **across multiple disciplines**. Geospatial competency is required to meet the needs of a rapidly globalized world and is a vital component of modern science education. Geospatial education provides students with proficiency interpreting quantitative and qualitative information and exposes students to technical concepts such as spatial analytics and data management. Despite these numerous benefits, incorporating geospatial concepts and hands-on geographic information systems (GIS) experiences within course curriculum can be a challenge for educators.

The objective of this project is to **support inclusion of geospatial activities within a variety of interdisciplinary higher education courses**.

## Pedagogical Approach

- **Open educational resources** (OER) support reuse and increase access.
- Student leaders facilitate GIS exercises within courses through **peer teaching** and encourage non-science majors to thoughtfully engage with spatial concepts.
- Interactive, **experiential learning** exercises explore geospatial topics through **practical applications**.

## TARGET SUBJECT AREAS FOR GEOSPATIAL LEARNING:

GEOSPATIAL  
TECHNOLOGYGEOSPATIAL  
ENGINEERINGENVIRONMENTAL  
SCIENCE

GEOLOGY



GEOGRAPHY

ENVIRONMENTAL  
STUDIES

## Methods: GIS Interactive Experiences

In Fall 2021, upper level undergraduate students presented custom **geospatial exercises** in nine introductory courses. **Customized GIS exercises** used hands-on activities, short lecture, and worksheets to explore a key study through a geospatial approach. Current modules include precision agriculture, deforestation, and wildfire analysis.



To create enriching short interactions, our team developed custom GIS exercises focused on individual topics. Overly complex websites can intimidate new users and distract from focused learning. Proprietary software and lengthy lab exercises are difficult to integrate within a course schedule. To support focused learning, we used simple web apps, worksheets and engaging presentations.

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## Peer-Teaching Framework

### Peer-Teaching Benefits:

- student-led **peer teaching** encourages multilevel learning
- introductory-level students are interested in learning from advanced students
- **student leaders share their own research**
- student teachers gain **confidence**, leadership, and public speaking proficiency

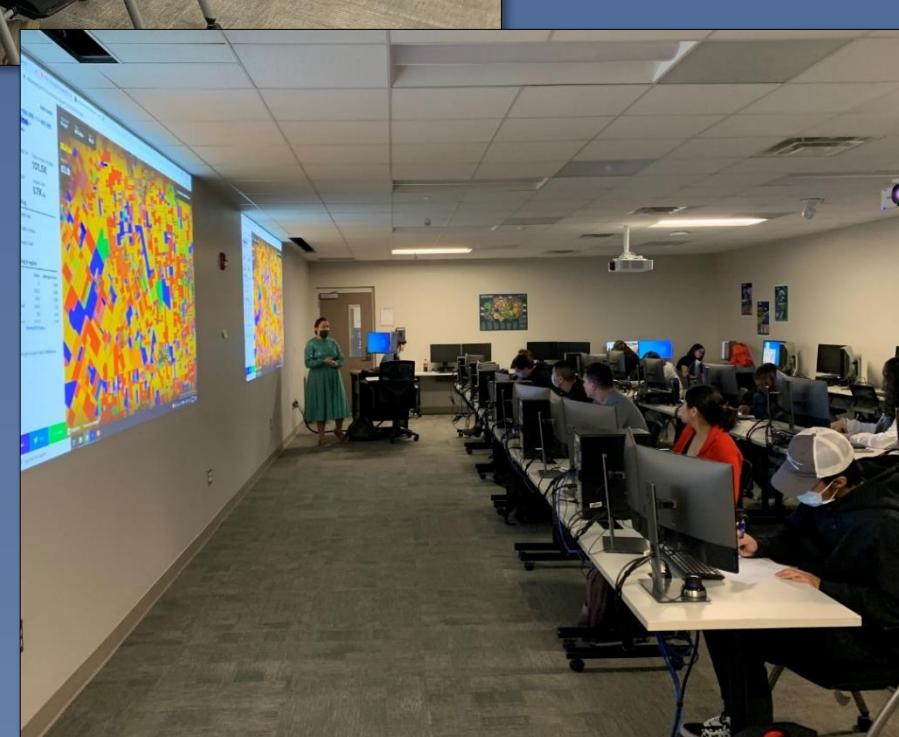
### Strategies for Success:

- **train** peer-teachers ahead of time
- generate a detailed **presentation schedule** to guide learning
- **scaffold** learning modules: guided presentation followed by independent, hands-on learning & worksheets
- **applied examples** increase awareness of geographic theory through practical uses.
- emphasize **local connections** and **place-based** analysis.
- **anonymous survey** for student feedback

## Student Survey Responses (n=61)



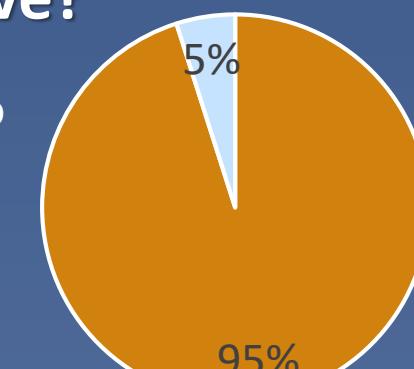
| Professor  | Course                       | # of Students |
|------------|------------------------------|---------------|
| Caldwell   | Env Studies & Sustainability | 10            |
| Caldwell   | Env Studies & Sustainability | 8             |
| O'Sullivan | Env Studies & Sustainability | 23            |
| O'Sullivan | Env Studies & Sustainability | 8             |
| Sun        | Intro to Physical Geography  | 24            |
| Sun        | Intro to Physical Geography  | 24            |
| Sun        | Intro to Human Geography     | 28            |
| Ignatius   | Intro to Physical Geography  | 24            |
| Ignatius   | World Regional Geography     | 19            |
| TOTAL      |                              | 168           |



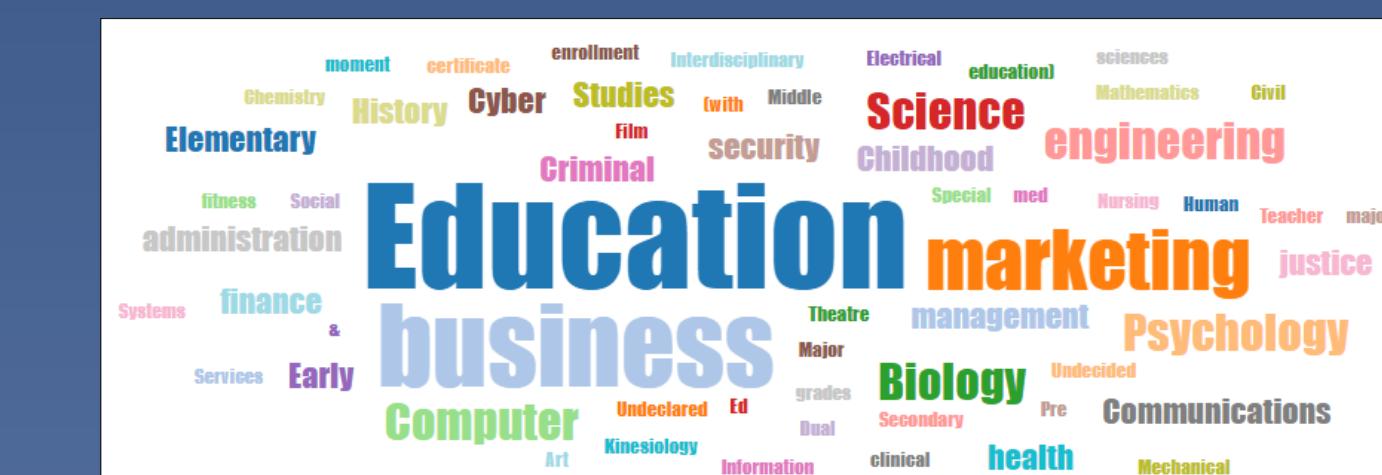
### Was today's session informative?

■ yes

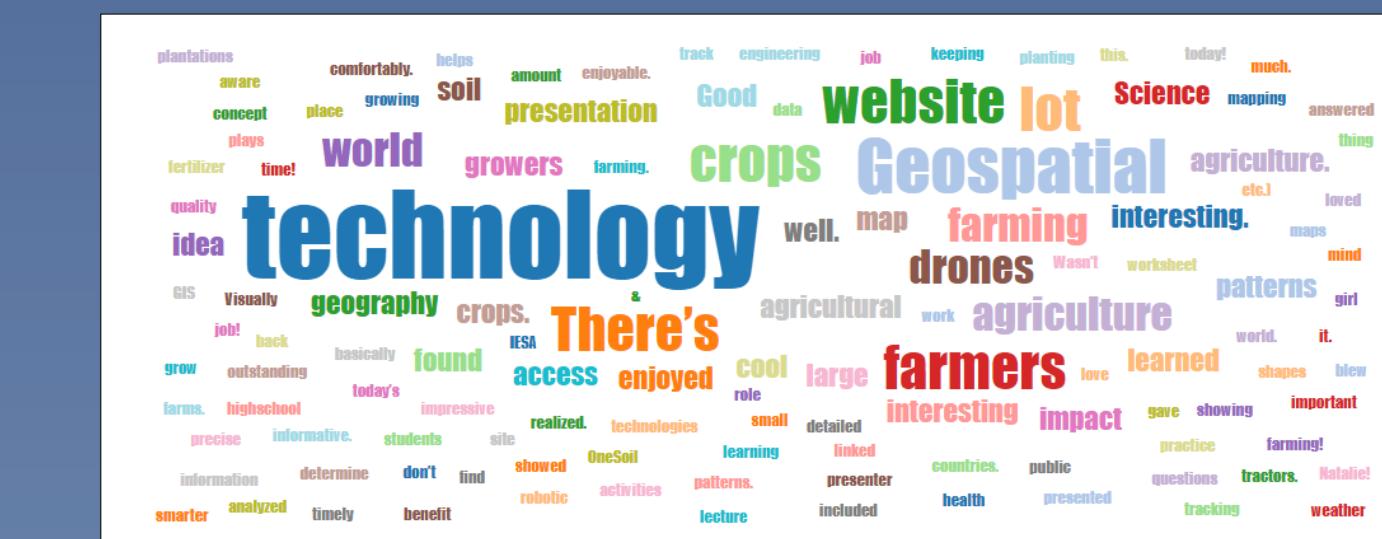
□ no



### What is your major?



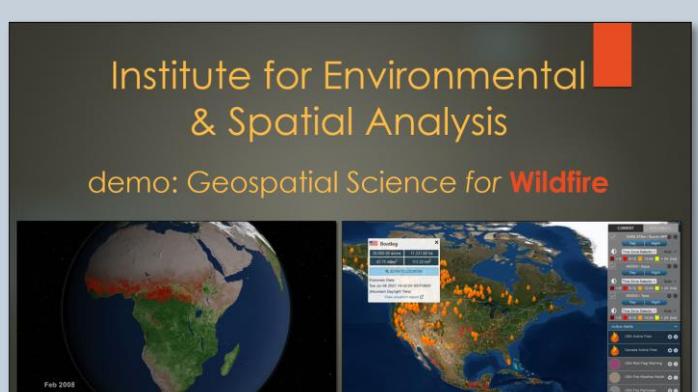
### What was the most interesting thing you learned today?



## Lessons Learned

We note that peer-teaching is not a substitute for expert-led instruction by faculty. However, science-based educational literature and preliminary findings indicate student-led teaching serves as a beneficial method of engagement and a complement to traditional classrooms.

**Future modules** will include exploration of local land cover change, coastal erosion, environmental justice, and climate change impacts. **Future outreach** will include high schools, non-traditional students, and the general public. Lastly, we will continue to track whether this effort assists with recruitment to our B.S. program and certificates.



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