GEOS 3733 – Geospatial Data Science in Public Health

Background

Data Science is a discipline which teaches how to work with, analyze, and effectively use large and complex datasets in a variety of domains. Geospatial data are associated with locations on the earth, and require specialized tools and analytical methods, such as geographic information systems (GIS). Geospatial Data Science, then, teaches how to use GIS and related technologies to most effectively create and use these unique and powerful datasets.

Applicability

Some of the key skills in geospatial data science include 1) collecting, storing, and processing geospatial data; 2) principles of cartography (map design) and spatial data visualization; 3) modeling how people or objects move across the landscape; 4) using spatial statistics to detect and describe spatial patterns; and 5) modeling areas at risk of various hazards. Within the domain of Public Health, such skills might be used to: 1) help plan and direct surveillance projects to ensure geographic representation; 2) map the distribution of various disease burdens or healthcare resources; 3) examine spatial access to screenings or specialized care in a region; 4) identify clusters of rare diseases and start exploring possible environmental causes; and 5) developing community risk indices for specific health hazards based on sociodemographic and environmental data, such as the CCVI (COVID-19 Community Vulnerability Index) used by the CDC.

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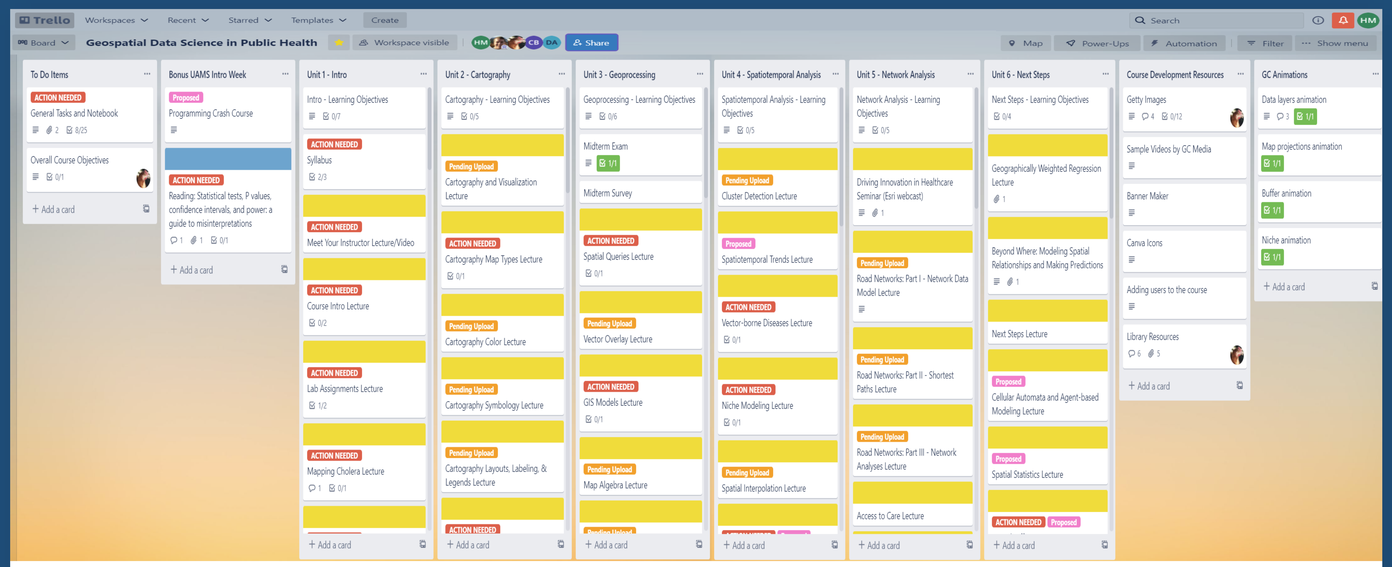
Developing a new undergraduate-level course focused on Geospatial Data Science in Public Health



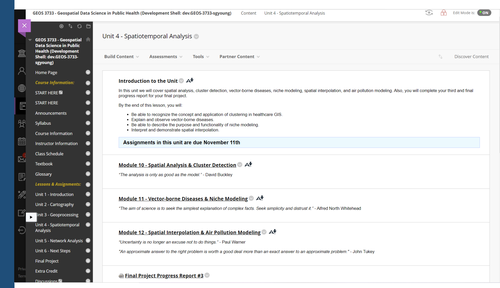
The development of the course is tracked via a Trello board. On the far left there is the To Do section which allows us to itemize and track all actions that need to take place before the launch of the course. The course will have six units and a bonus starting week for students at UAMS to attain relevant programming knowledge. On the far right there are also resources relevant to the development of the course, such as literature linkage and lecture animations. Finalized materials are put on the Blackboard development shell (as seen on the right).

Importance

More than ever before, students interested in pursuing careers in public health and other health-related fields need to know how to perform high quality data analysis, how to work with complex and potentially sensitive datasets including geospatial data, and how to effectively disseminate results to a wide audience through data visualization and communication. Data science education is therefore more relevant than ever before for students seeking careers in public health and healthcare.

Progress

Thanks to unprecedented cooperation between UAMS and UAF, the course is set to be offered Fall 2022 at both schools for the first time ever! We have also been working with Global Campus to not only ensure accessibility and good instructional design, but also to develop high quality animations to enhance the lectures. The implementation of the class on Blackboard is ongoing, but a sample section of it is displayed below.



Broader Impacts

This DART Seed Grant project will strengthen educational ties between UAMS and UAF, and will also share the newly developed curriculum as part of the "Data Science for Arkansas" initiative, which shares course materials with postsecondary institutions across the state to help extend data science training resources to as many students in Arkansas as possible.

Hayden McDonald

Dr. Sean Young