Integrating Learning Progressions into High School Students’ Experiences with Geospatial Thinking and Technology in their Communities

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Context

• Jesup W. Scott High school, Toledo, Ohio
• ITEST - funded by NSF “Advancing Geospatial Thinking & Technologies in Grades 9-12: Citizen Mapping, Community Engagement, and Career Preparation in STEM”

Purpose

• To advance geospatial thinking and technologies
• To raise awareness of geospatial career opportunities

Learning Progressions

• Progressively increase in complexity as students interact with content and improve skills
• Assist educators to design curriculum & develop learning modules

Familiar areas : Pre-test

• In this above image, students are decoding the latitude/longitude of the hidden treasure by understanding the graffiti
• Students used information from geocaching.com website
• At the beginning of the workshop, students were asked to mark the areas they frequented and were familiar with, in green colour.
• Above image is an example from a student.

Familiar areas : Post-test

• In this above image, students are decoding the latitude/longitude of the hidden treasure by understanding the graffiti
• At the end of the workshop, students were again asked to mark the areas they frequented and were familiar with, in green colour.
• Image on the right is an example from a student.
• There are differences in both the image as the perception changed after they analysed the area during the workshop.

Student Topics

• Students examined crime, housing, and community needs

How do abandoned houses define the neighborhood?

Can the abandoned lots and buildings be made into youth centers?

Learning Progression Activities

• Map Reading and Geography Questions
• American View Remote Sensing Memory Game
• Geoguessr Game
• GPS Treasure Hunt
• Data Collection with GPS & cameras
• Google Earth & ArcGIS Online

Map Reading and Questions

• In the above image (left), students were given a map of USA and asked basic questions related to various locations.
• In the above image (right), students were asked basic questions related to map reading by giving them a map of Toledo.

GPS Treasure Hunt

• Students had great fun flying a drone!
• This image below is a picture captured by the drone

American View Memory Game

• The above image is a Remote Sensing game. Students had to match 2 similar locations by clicking on the earth icon.
• This game was competitive as students raced to finish in the shortest time.

Data Collection and Analysis

• Students did fieldwork and collected data with GPS units, cameras, and written observations
• They also examined secondary data and worked with ArcGIS Online

ArcGIS Online Cook Book

• The above image, is the step by step instruction for using ArcGIS Online – an Open Source website for citizen mapping.

Students’ Presentation

• Image on the right is an example of students’ map
• Students presenting their work

Partners

Hilario Davis, Project Evaluator, Teacher Advisory Committee; Toledo Public Schools; United Way Schools as Community Hubs; City of Toledo

References

Huynh, N.T., Solem, M., Bodnar, S.W. (2014). A Road Map for Learning Progressions Research in Geography
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