Advancing History and Geography Education in the Classroom Using GIS

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Overview

This work discusses the implementation and response to a one-day workshop on GIS for educators.
Rationale

Why geography and history together?

Due to classroom time structural limitations, the more content and knowledge that can be efficiently incorporated into one social studies lesson the better.

Why dual-encoding?

The ability to integrate geography and history lessons to bring more geography into the classroom given the visual and nonverbal nature of geographical content.

Dual encoding is a **theory of cognition** about how the brain learns text based and image based materials in conjunction.

Results of dual encoding indicate that **learning and retention** of knowledge in memory improves in both subjects.
Rationale

Why GIS?

Fundamental reasons for use of GIS in the K-12 classroom include:

- use of local examples,
- the ability to analyze change,
- problem-solving, and
- use of technology and connections with STEM (McClurg & Buss 2007)

Compatibility with dual-encoding and teaching
Methods

- One day hands-on workshop at Kansas State University in Manhattan, KS

- Surveys for evaluation
  - Pre and post on the day of workshop (Sept 2013)
  - 6-month follow-up (Mar 2014)
  - 12-month follow-up (Sept 2014)
Workshop Outline

} Intro to GIS and how to use it in the classroom
  } Teaching with maps, subject integration, & dual-encoding

} Online GIS resources
  } Esri Story Maps, ArcGIS Online, National Geographic Map Maker, state Esri site license, & GeoMentor Program

} Discussion with a GIS professional

} Learn how to make a GIS web map using ArcGIS Online

} Identify at least one resource to use in the classroom
  } Participant big task = identify 1-2 pre-made maps, story maps, or personally make maps that would be usable in their classroom
They worked during their break time!
Workshop Participants

What grade level do you teach/work with? (Circle all that apply).

- K-5th: 19%
- 6th-8th: 19%
- 9th-12th: 31%
- College: 19%
- Informal Education: 12%

Have you had any GIS-related training?

- Yes: 46%
- No: 54%
Workshop Participants

**Pre-Survey** \( N = 13 \)
- Paper survey given on-site day of workshop

**Post-Survey** \( N = 11 \)
- Paper survey given on-site day of workshop

**6-Month Post-Survey** \( N = 7 \)
- Response rate = 64%
- Online survey sent to participants
- Given 30 days to complete survey
Survey Topics

} **Pre-Survey:**
} - Teaching demographics & practices
} - Awareness of GIS resources
} - Interest in GIS

} **Post-Survey:**
} - Consideration to engage in new teaching practices
} - Comfort with using newly learned GIS skills & resources

} **6-month Post-Survey:**
} - Engagement with new teaching practices
} - Exploration and use of GIS
} - What kind of GIS and activities used
Findings from the Pre and Post Surveys

- Participants were better prepared to use dual-encoding in their teaching.

- Most reported teaching standards and/or subject together and using maps.

- Participants gained much greater awareness of Esri and National Geographic resources for teachers, as well as learner-oriented resources.

- Participants reported that the workshop equipped them with basic classroom ready knowledge of GIS.

- The majority felt comfortable using the GIS resources learned.
GIS is not such a “mystery.”

I can do this! My students are about to get mapped!

I always joke at my NPS site that I’m not the science-y type.

GIS was a “Science-y” term I avoided. Now that I know what it is, watch out! It’s a history type now.
Themes of the Six Month Follow Up Survey

- Of the seven respondents, two (28.57% of the sample), are retired and/or outside of the teaching field now.
- Approximately half of the respondents have used dual encoding since the workshop.
- All (who can) have made a greater effort to teach with maps.
- Respondents reported visiting the NatGeo MapMaker website the most, followed by Story Maps, then ArcGIS Online.
- Only one built a web map.
- Two participants implemented a GIS and they reported feeling comfortable doing so.
### Six-Month Follow-Up Survey

<table>
<thead>
<tr>
<th>If you <strong>have implemented</strong> GIS in your classroom, please share what and how you implemented it.</th>
<th>If you <strong>have not used</strong> GIS in your classroom, please share why you haven't done so.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorporated a <strong>training session</strong> for my elementary pre-service students as part of a course I teach.</td>
<td>Right after I attended the workshop the students and I explored several sites including Esri's Story Maps and National Geographic's interactive maps. We did this whole class, however, I <strong>haven't implemented</strong> GIS in the classroom because our computer access to class set of computers is limited. I'm a reading teacher so our primary focus is communications although I also teach social studies for a shorter amount of time. I'm hoping to use the summer to explore the resources and implement them this fall. The students enjoyed and were motivated by the Esri opportunities.</td>
</tr>
<tr>
<td>Used it to have students <strong>create a map</strong> using National Geographic mapmaker. They were allowed to select the layers they wanted to add.</td>
<td></td>
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</table>
Questions That Arise

} How do you get more in-service teachers involved?

} How can we use our interested retired/non-teaching professionals to help GIS education?

} How do you get participants to re-visit the sites available on the internet?

} Mixed responses for implementation after 6-months, how do we achieve greater implementation?
Lessons Learned

} Successes
} Connecting geography and GIS to other disciplines (like history)
} Dialogue with a GIS professional
} Demonstrating numerous resources as well as programs for further training

} Challenges
} Technology-induced frustration
} Generating or finding standards aligned resources
} Recruitment of participants for non-mandated topic

} From article in May 2014 issue of The Geography Teacher
Conclusions/Suggestions

- Teachers are interested in using GIS in their classrooms and the one-day workshop can make an impact.

- Curricular changes and professional development need pushed so teachers will make the time to implement.

- A greater quantity of ready-to-go local and (standards-based) lessons need to be handed to teachers.
Next Steps

} Application of knowledge gained into next GIS for educators workshops

} Two workshop series’ planned for fall 2014 and spring 2015 (funded by the National Council for Geographic Education Miller Research Grant)

} 12-month follow-up survey in September 2014

} Make teachers and administrators aware of ConnectEd
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Questions? Comments? Thoughts?
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