

# Advancing History and Geography Education in the Classroom Using GIS

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# Overview

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



# Rationale

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- } 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

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## } 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

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- } 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

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- } 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

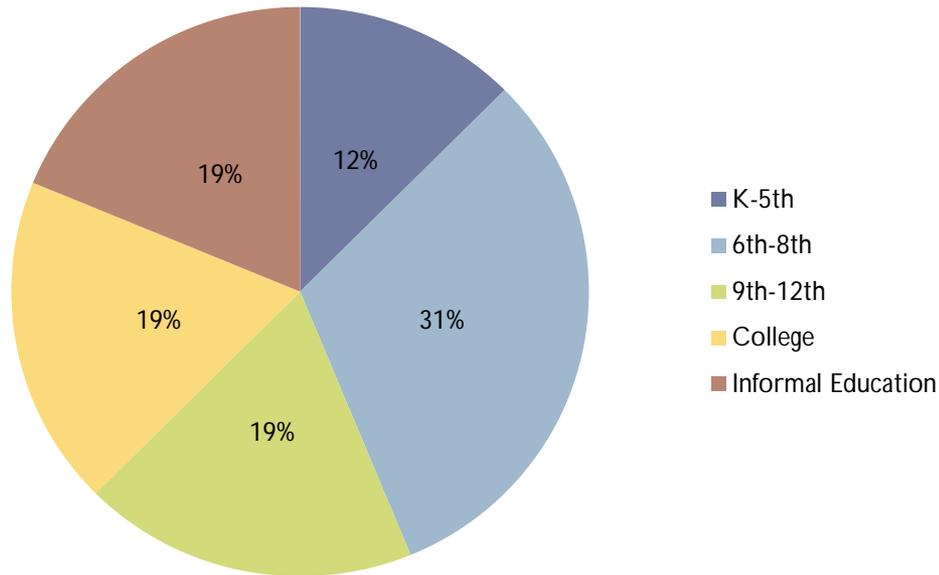


They worked during their break time!

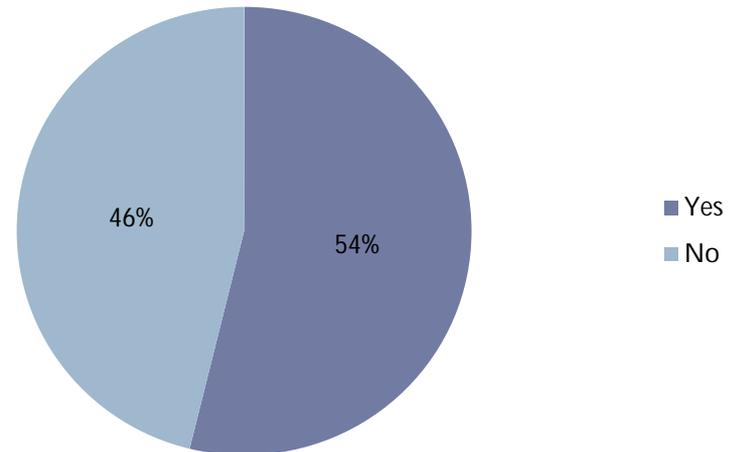


# Workshop Participants

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



Have you had any GIS-related training?



# Workshop Participants

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- } **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

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## } **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
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# Findings from the Pre and Post Surveys

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- 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"

Story map/visuals  
great learning tools,

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

I'd like to see an advanced  
session as a follow-up, perhaps  
bringing in GIS users from a  
variety of fields to work side-by-  
side with educators.

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

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- } 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

If you have implemented GIS in your classroom, please share what and how you implemented it.

Incorporated a **training session for my elementary pre-service students** as part of a course I teach

Used it to have **students create a map using National Geographic mapmaker**. They were allowed to select the layers they wanted to add.

If you have not used GIS in your classroom, please share why you haven't done so.

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 haven't implemented 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.



# Questions That Arise

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- } 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

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## } 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

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# Conclusions/Suggestions

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- } 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

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- } 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



# Acknowledgements

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# Thank you!

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Questions? Comments? Thoughts?

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