# Bringing Space to the Core:
## Developing Undergraduate Curriculum in Spatial Reasoning

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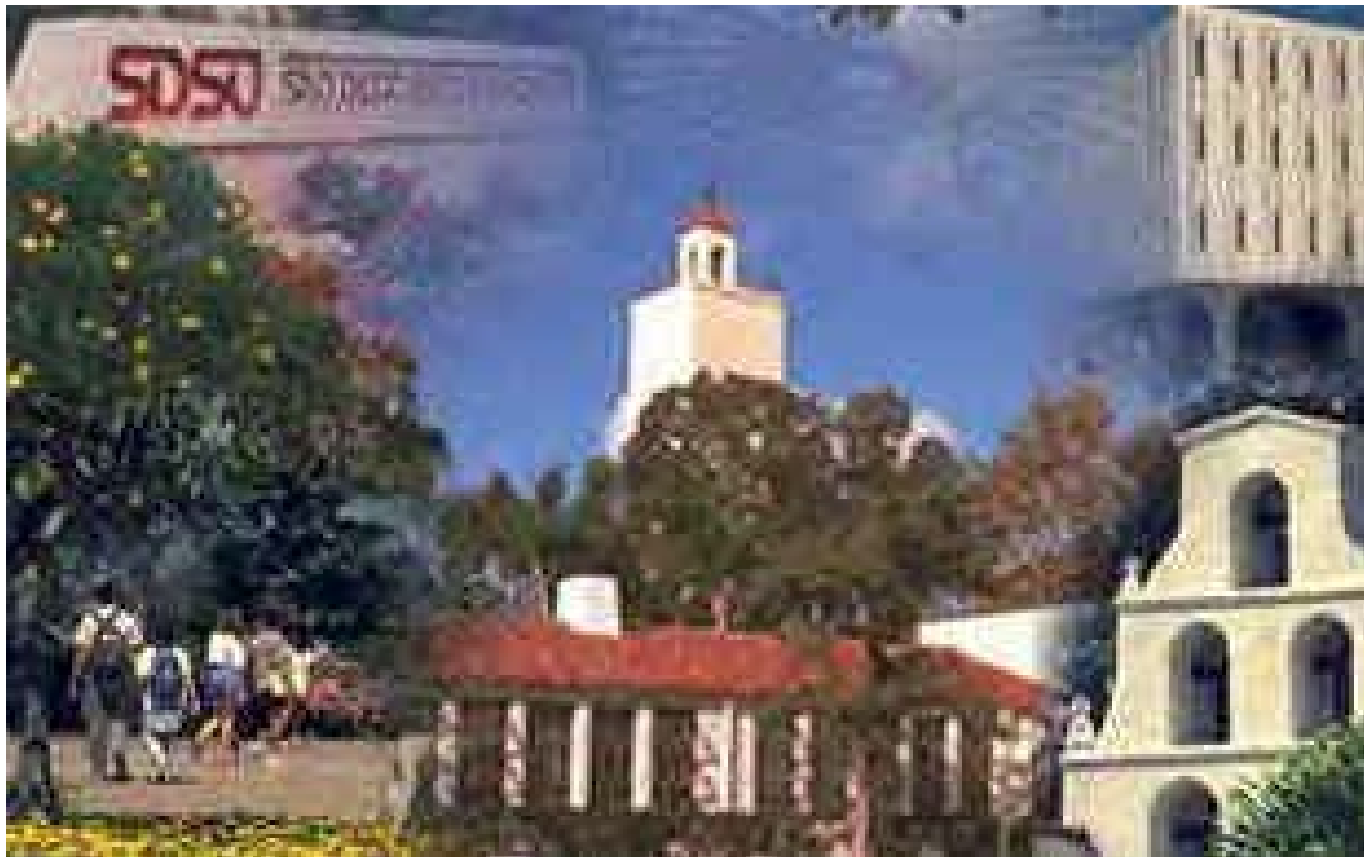
# Path to the Core……

- The SPACE experience
- Project: Flood Hazards
- Using GEODA in the classroom as a tool in Inquiry-based learning
- Injecting Spatial Reasoning into Core Curriculum at Southern Illinois University

# Adventures in SPACE

SAN DIEGO STATE UNIVERSITY



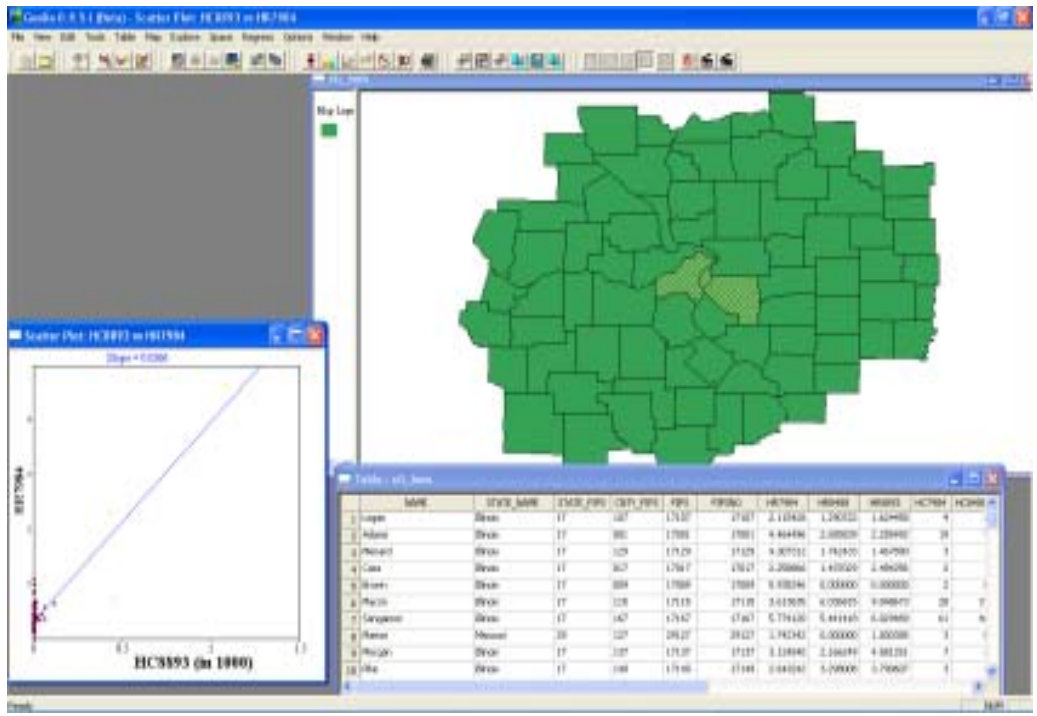
# SPACE Highlights

- Overview of spatial thinking
- Designing curricula
- Participatory planning with GIS
- Space/Time analysis demonstration

- **#1 HIGHLIGHT: GEODA**

# GEODA

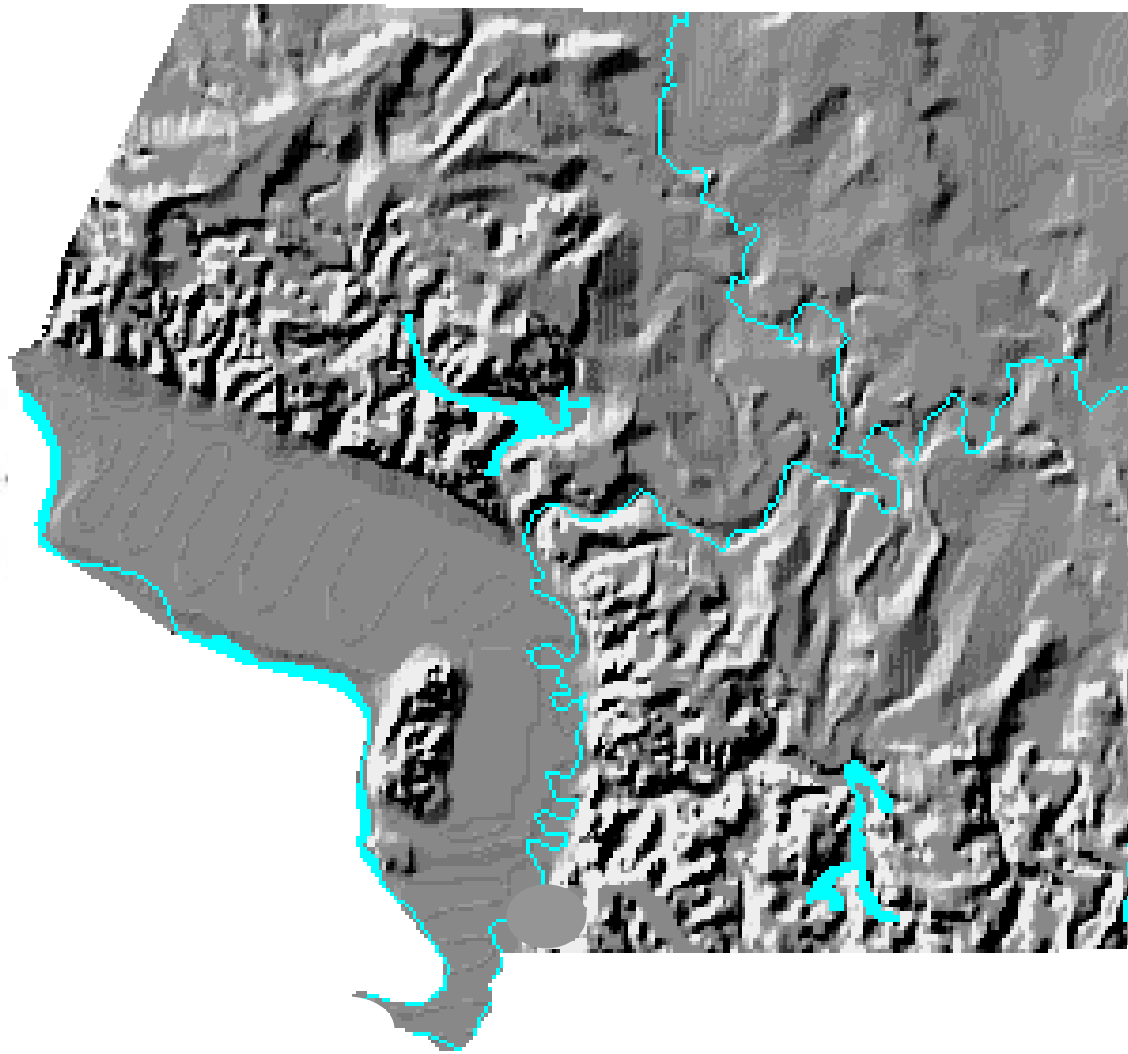
- Based on a single shapefile
- Simultaneously see data, maps and graphs.
- Interact with the data--able to explore relationships between variables, and see if these relationships have a spatial component.
- Run spatial statistics.



# My project: GEODA and Environmental Geography

Lesson:

Explore flood vulnerability in Jackson County, IL.

Jackson County Illinois

- Data:
  - 2000 US Census
  - FEMA floodplain data

- Challenge: to combine social and physical data in a single shape file

Question for students:

*What populations are most vulnerable to experiencing floods?*

- Explore the data with GEODA
- State conclusions

  Are your conclusions defensible?

  What assumptions must we make about the data?

# Objectives

- Visualize the spatial extent of flood hazards.
- Describe the spatial distribution of populations within the county.
- Explore spatial data and spatial relationships.
- Create and test hypotheses.
- Identify assumptions.
- Communicate the results.

# Inquiry-based Learning

- Instead of teaching “about science”, students actually “do science”.  They learn to ask scientific questions and must develop and use scientific reasoning to discover the answers to their questions.

- **How GEODA facilitates Inquiry**
  - Intuitive
  - Teaches or reinforces concepts of spatial reasoning and quantitative relationships
  - Brings large quantities of data to one's desktop
  - Easy to develop guided exploration to introduce the software
  - Engaging
  - Students automatically come up with questions to test
  - Adaptable to various ages/skill levels
  - Free!

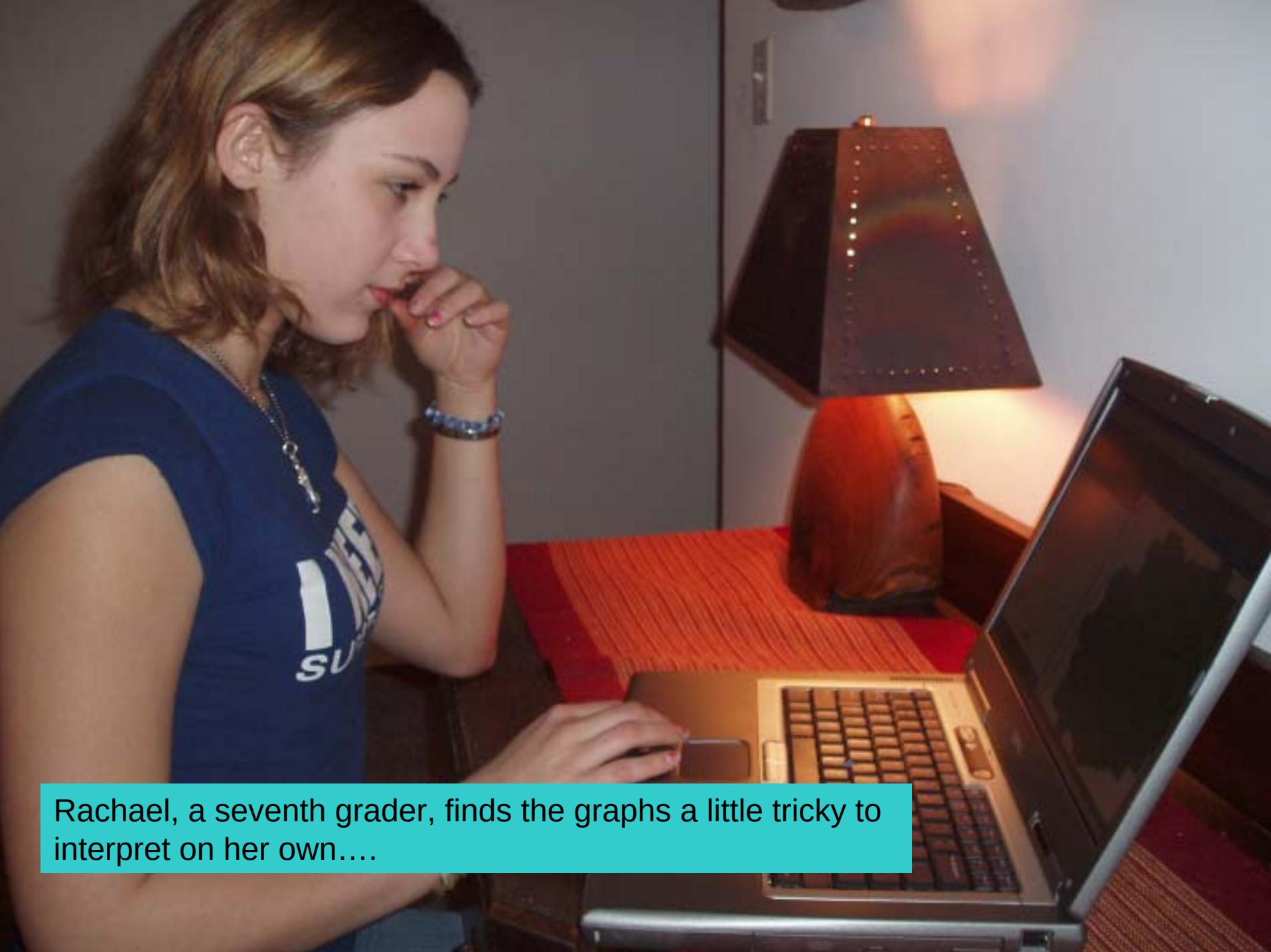
Implementing GeoDA in the classroom:

John, David, and Andrew (college students) first explore GeoDA in a Geography Field Methods Class.


They identify high-crime areas of St. Louis….

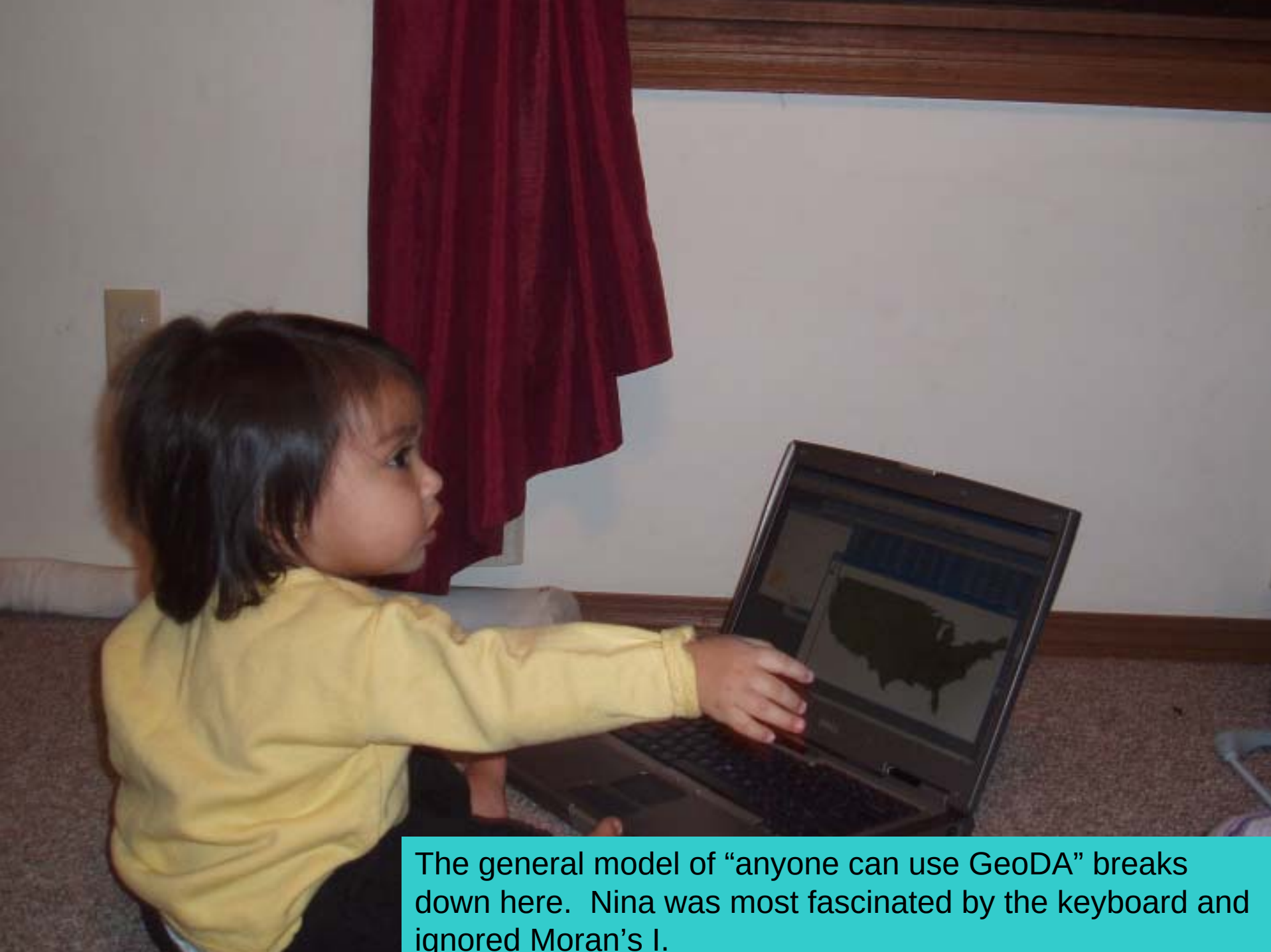

nd show their hearty approval of the software.


GeoDa can be used in K-12 education as well.
Emily, a high-school junior, picks up the basics almost immediately.



Rachael, a seventh grader, finds the graphs a little tricky to interpret on her own….


…and her shirt says it all.



The general model of “anyone can use GeoDA” breaks down here.  Nina was most fascinated by the keyboard and ignored Moran’s I.

# Implementation:  Core Curriculum

Geography 100: Environmental Conservation

- Department Goal: Increase numbers of undergraduate majors

- My Goal:

  Introduce spatial reasoning to innocent young minds

# Possible GEODA lab projects for Environmental Conservation

- Explore patterns of world population growth.
- Predict factors involved in global patterns of species diversity.
- Introduce concept of environmental equity by combining census and pollution data.
- Investigate placement of urban parks and the communities they serve.

# Best is yet to come…..

I am looking forward to refining the skills I developed at the SPACE workshop, implementing these methods in the classroom, and maintaining contact with a new set of colleagues using similar approaches.