

Facilitator:
Daniel Edelson

Participants:
Dedre Gentner
Anjan Chatterjee
Anne Pollard Haywood
Thomas Baker
Kim Kastens
Alexander Murphy
Michael Goodchild
Susan Levine
Andrew Marcus
Andrew Milson
Injeong Jo
Sandra Metoyer

- Danny opened the discussion by asking each to respond to; what/where do you see opportunity for spatial thinking and geography?
 - Andrew Milson:
 - Better understanding of psychological processes behind spatial concepts
 - Dedre:
 - Identification of outcomes and concepts
 - Gearing curriculum to the outcomes
 - Aligning maps (as a tool for assessment)
 - Identifying key geography concepts that can be applied in spatial cognition research
 - Anjan:
 - Excited about the use of spatial symbols as a method to explore spatial thinking in spatial cognition research
 - Considering ways to capitalize on the symbols in research
 - Use of maps to stimulate “experiences in” place
 - Sandra:
 - Opportunities to bridge between spatial cognition research and education context
 - Injeong:
 - Opportunity to explore spatial language terms associated with geography education spatial terms
 - Anne:
 - Communicating the complexity and importance of spatial thinking and geography education to the public
 - Opportunity for a broader audience
 - Tom:

- Encouraged by the outcomes of classroom teachers use of spatial language in early elementary
- Kim:
 - People electing geosciences are likely spatial [thinkers] and with practice get to where leaps in spatial thinking are possible. But, we don't know how we get there. What are steps required to enhance spatial reasoning? Spatial cognition research can help to identify the steps of reasoning so we can break it down to our students.
- Alec:
 - Opportunity to better understand what spatial language and tools would put students in a better position to geographic thinking.
 - Challenge: geographic stuffs are hard to control in an experimental setting
- Michael:
 - Assumption that a map is always available and all the world is well; the mapped is flawed. With an increase in mapping by the "average person", the potential of mapping lies with the average person.
 - Opportunity for a balance between consumption and production of geographic information.
 - Much research focuses on the consumption of maps, but opportunity for investigating the spatial cognitive issues in the production of geographic information.
 - Kim: "Making maps is a fabulous way to understand maps."
- Danny:
 - Opportunity to prepare a citizenry
 - What consensus of skills should a geographically literate citizen have?
 - What underlying spatial skills are needed for the geographic skills?
- Andrew Marcus:
 - Kids' map making exercises
 - Opportunity for a translation between psychology and geography (e.g. shared meaning of buffer or an agreement not to use it as a term)
- Susan:
 - Opportunity to explore spatial skills fostered through geography
 - Opportunity to explore influence of home on spatial thinking skills
 - Opportunity to study students' trajectory over time; what do they arrive with and how is does this changed with formal education over time?
 - Opportunity to study the influence of AP human geography on spatial thinking skills; what are their spatial skills as they enter the course compared to exiting the course?
- Anjan: Cartograms' combination of the familiar with the unfamiliar may encourage/facilitate questions and comparison. Comparisons among maps are

analogous to distribution of activity across the brain. The brain has a geography to it.

- Representations out of geography (such as maps) are comparable to each other. It provides an opportunity for comparison and analogy.
- Physical shape of features on maps provides a starting point for compare/contrast. In a sense, it provides a template or point of consistency among the maps.
- Maps provide more scaffolding for the skill of compare/contrast than other fields (for example comparing two essays in English where no template or feature is obviously shared).
- Alec: Value of maps over stories?
 - Dedre: Mapping can make many variables sensible
 - Danny: Representations in geography are comparable, which is an interesting feature
 - Kim: comparing and contrasting are more visible and clear in geography (than music, for example)
- Andrew Marcus: Sequence of spatial understanding?
 - Alec: However, people learn differently (brain works differently) so may not be well established
 - Susan: People start from familiar environment to unfamiliar environment
 - Alec: Is it tendency or expertise?
- Discussion on a cognition sequence and how that might vary on a continuum for “all citizens” versus the “professional geographer”
 - Question brought up for other life pathways
 - Other pathways could also be considered “professional geographers” especially if the job skills required spatial analysis and high level of spatial thinking skills
 - Professionals outside of geography may not readily claim professional geographer status
 - Need for educating citizenry, professional geographers and others, regarding the importance of geographic and spatial literacy to their personal careers and daily life.
- Anjan: Important to consider adult learning and child learning separately.

Summary:

There is excitement and interest with research on the influence of symbology on spatial learning, specifically with maps.

There is a political agenda to help bring to light the importance of spatial learning and geography literacy.

Research in spatial cognition is needed to guide and direct geography education research.