• “an online space to **gather resources** as we **develop the body of knowledge** around the ideas of spatial thinking.”

• “The wiki should be a vehicle to help **scholars** and **practitioners** **formulate research questions** regarding the nature of spatial thinking in different knowledge domains and **formulate appropriate pedagogic strategies**.”
teachspatial.org

...spatial thinking is pervasive: it is vital across a wide range of domains of practical and scientific knowledge; yet it is underrecognized, undervalued, underappreciated, and therefore underinstructed.

National Research Council 2006 report: Learning to Think Spatially

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### Sources

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boundary

Source: Golledge (1995)

Given that location has been selected as the critical differentiating characteristic of inclusion or non-inclusion in a spatial distribution, it must be evident that the first concept that can be derived is that of a boundary. A boundary identifies that segment of the global environment that contains a particular spatial distribution. It is obvious that boundaries can be defined with varying levels of precision and can be more or less real or artificial. For example, once the member set of a spatial distribution is identified, it can be represented by a closed boundary or polygon (p. 37).

connection

Source: Golledge (1995)

Connection and linkage. Using principles such as nearest neighbor, proximity, similarity, etc., one can derive a concept of join or link; thus ideas of connection or linkage can be derived. Adapting principles such as minimizing pairwise distance and using single-link assumptions, connections can be made between members of distributions. To pursue connectivity globally, precise locational information is
Golledge (1995)

Title:
Primitives of Geographic Knowledge

Author(s):
Reginald G. Golledge

Type:
article

Site use:
Concept reference
Bibliography

Discipline:
Geography

Abstract:
A minimal set of primitives for building sets of spatial concepts is presented. These are needed for understanding the many GIS being circulated today. Using primitives of identity, location, magnitude, and time, simple and more complex spatial concepts can be derived. These ultimately become embedded in spatial language. Implications for HCI are discussed and the types of interactive mode (e.g., visual, tactile, auditory) most appropriate in specific HCI contexts are elaborated.

Full reference:
Cognition and the geosciences

Source:
Kastens and Ishikawa (2006)

"From our discussion of geoscientists' tasks, spatial thinking in the geosciences can be summarized as follows:

1. observing, describing, recording, classifying, recognizing, remembering, and communicating the two- or three-dimensional shape, internal structure, orientation and/or position of objects, properties, or processes;
Resources

Teaching Resources
- Student projects
- Syllabi
- Lesson plans
- Textbooks

CSISS Classics
These essays summarize and illustrate major contributions to spatial thinking in the social sciences. They appear in their entirety on the csiss.org website and partially here.

Interesting Links
- Teaching materials
- Research
- Spatial cognition
- GIS - Open source
- GIS - Commercial
- Spatial analysis
TeachSpatial Blog

a 'spatial concept' concept space

Submitted by admin on 9 March 2009 - 1:37pm

The figure below illustrates a semantic distance measure between the aggregated spatial concept verbiage for seven disciplines considered so far on this site.

![Diagram of 7 disciplines within a 'spatial concept' concept space]
teachspatial.org

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NRC report excerpts
- Spatial thinking (2)
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- Spatial structure and spatial operations

NRC 2006 Report: Learning to Think Spatially (excerpts)

Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum

This 2006 report by the Committee on Geography of National Research Council can be viewed online for free, and is also offered for purchase as downloadable PDF files by chapter, and as a bound print volume.

Although GIS is an implementation focus, the report offers much useful analysis of a general nature. We have selected some excerpts and organized them in this 'book' you can page through.

Spatial Thinking

Spatial thinking is based on a constructive amalgam of three elements: concepts of space, tools of representation, and processes of reasoning. It depends on understanding the meaning of space and using the properties of space as a vehicle for structuring problems, for finding answers, and for expressing solutions. By visualizing relationships within spatial structures, we can perceive, remember, and analyze the static and, via transformations, the dynamic properties of objects and the relationships between objects. [p 3]

It is the links among space, representation, and reasoning that give the process of spatial thinking its power, versatility, and applicability. Spatial thinking is multifaceted in its operation: just as there is no single recipe for how to think verbally or mathematically, there is no single way to think spatially. Instead, the process of spatial thinking comprises broad sets of interconnected competencies that can be taught and learned. [p 25]
Concepts of space-time dynamics
Submitted by Don Janelle on 13 March 2009 - 1:51pm in Spatial Thinking - general discussion

I'm interested in concepts that specifically bridge concepts of space with concepts of time. For example, 'velocity' links distance with a time unit (km/hr), 'acceleration' links changes in velocity over time. None of these ideas appear in the initial set of source documents. Can you suggest others that should be included?

Add new comment

Spatiotemporal Dynamics
Submitted by Andy Anderson on 16 March 2009 - 7:53am.
One that's probably pretty common in geography is stream flow, or more generally volumetric flow:

Volume / time = cross-sectional area * speed

This can vary along the length of a water course due to variations in input. Remember the flooding issues along the Mississippi a few years back? Every town along its lower 2/3 was preparing for the crest to arrive, which developed upstream where there were heavy rains.

--- Andy

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hosted by spatial@ucsb :: comments and questions to webmaster
AAG session: Spatial Concepts Curriculum for GIS and Design
Submitted by admin on 16 March 2009 - 8:02am
in Conference

Start: 24 Mar 2009 3:10 pm
Timezone: US/Pacific
Location: Capri 107, Riviera Hotel, 1st Floor
complete description at AAG site

Session Description: Panelists will discuss the development of a curriculum in spatial thinking and the integration of design into GIS. The central questions are:
(1) To what extent are the fundamental spatial concepts that lie behind GIS relevant in design?
(2) To what extent can the fundamental spatial concepts of design be addressed with GIS?
(3) Is it possible to devise a curriculum to develop spatial thinking in both GIS and design?

The panelists will present the new initiatives, findings, and unresolved questions that arose from a meeting of more than thirty GIS scholars, design researchers, and education specialists, who considered these issues in December 2008.

Add new comment | Calendar

hosted by spatial@ucsb :: comments and questions to webmaster
Create content

Blog entry
- A blog entry is a single post to an online journal, or blog.

Forum topic
- A forum topic is the initial post to a new discussion thread within a forum.

Link
- Web links of interest

Reference
- A reference cited on this web site or listed in a Resources: References section

Schema
- Schemas interpret, synthesize, and/or model aspects of spatial thinking that draw on and interact with core concepts like those listed on this web site. They may be classifications of terms, diagrams illustrating concept relationships, pedagogical frameworks, etc.

Teaching Resource
- A teaching resource contribution
Create Schema

Schemas interpret, synthesize, and/or model aspects of spatial thinking that draw on and interact with core concepts like those listed on this web site. They may be classifications of terms, diagrams illustrating concept relationships, pedagogical frameworks, etc.

You can insert images inline, or add them to this listing as an attachment.

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Description:

Show summary in full view
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