Appraising the Spatial Thinking Skills Taxonomy: Advancing Assessment in Geography Education

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Concise List or Best List?

In "Wanted: A Concise List of Neurologically Defensible and Assessable Spatial Thinking Skills" (2006), Philip and Carol Gersmehl raise a series of important issues related to the development of a spatial thinking skills taxonomy, including its subsequent assessment. They are right to suggest that taxonomic consensus may be hard work and difficult to achieve, and they are to be applauded for their initial 'heavy-lifting.' This commentary is meant to continue a needed, open disciplinary conversation, and I hope that these observations do more than present the authors with peer-review *redux*. The Gersmehls' twin goals – defining the need and then establishing the taxonomy – will each be treated in turn.

As an opening note, I would caution that 'conciseness' for our spatial skills list has its charms, but let's move slowly and let our list size fall where it may. We should be certain first that we are comprehensive (fully recognizing of course that new research, both geographic and neurological, will redefine what is comprehensive). Perhaps we should wish first for the Best List, the Right List, or the Appropriate List. If it can also be concise, then all the better.

Establishing Need

The need for an essential spatial skills list is well-justified. Continuing with the authors' tripod metaphor (assessment, teacher training, materials), the assessment leg is a shaky one. Just what exactly are we hoping to assess if we do not have an agreed upon set of skills or any notion of what mastery of said skills might constitute?

The authors briefly trace a number of key steps toward developing a taxonomy. Beginning first with the Five Themes of Geography, this evolutionary process concludes with the recent NRC report, *Learning to Think Spatially* (2006). The emphasis on the Five Themes as a beginning strikes me as an odd starting point given that it is not a spatial skill set, but rather an

organizational scheme to highlight areas of emphasis unique to the discipline. Pattison's Four Traditions of Geography (1964) could be viewed similarly. As it relates to spatial thinking skills, the authors' concern with the inadequacy of the Five Themes (a topic further developed in Phil Gersmehl's *Teaching Geography* (2005)) is best relegated to another discussion. Remember, too, that one of the reasons the Five Themes has been embraced is its simplicity – its conciseness! To their credit, the Gersmehls recognize the circular definitional problems of the National Geography Standards (1994) in this regard (i.e.: geographic skills are ones that involve geography), and note the important work of individuals to articulate lists of spatial thinking skills. The work of Bednarz (2004) is noted in particular, but curiously Golledge's (2002) presidential address to the Association of American Geographers on this topic has been omitted.

Before turning to the proposed taxonomy, the authors quite reasonably establish criteria for the taxonomy that includes priority, exclusivity, logical sequence, and exhaustiveness. I do hesitate a bit, however, with the notion that sequence can be arranged for places beginning with "those aspects of spatial thinking that involve only a *single* place" [emphasis mine]. Is that ever true? Do we ever truly think only about a single place? I don't believe that we do, especially given that the Gersmehls have chosen to deal with geographical as opposed to micro or ultra-macro scales. The authors note later that "the human brain does not appear to have a mechanism for encoding absolute location." Accordingly, our distinction of *any* place is necessarily *relative* to another in some way. I have not yet discerned what is the appropriate 'low end' for the taxonomy, but do think that this point needs elaboration and discussion.

The List: What's In, What's Out, What's Up for Grabs

I will admit to some early confusion: do we have a list of eight (abstract), ten (text), or eleven spatial skills (my count)? Overlooking the three spatio-temporal and the two "organizing" skills at present, I do have a few thoughts on the main eleven skills. Six skills – Making a Spatial Comparison, Graphing a Spatial Transition, Identifying a Spatial Analog, Discerning Spatial Patterns, Assessing a Spatial Association, and Defining a Location (remembering my earlier concerns for this skill's taxonomic placement) – provide little difficulty for me, and I assume that general consensus about their importance would be easy to achieve. Spatial analog identification, pattern discernment, and association assessment strike me as among the most useful and crucially significant skills to foster. For the remaining skills, I believe that building anew is less productive than providing a few suggestions for refinement.

Three skills – Describing Conditions, Tracing Spatial Connections, and Fitting a Place into a Spatial Hierarchy – suffer from a desire to wrap readily understood concepts with new terminology when Site, Situation, and Scale

would suffice. The rationale to use the new terms ("mnemonically useful alliteration") is not strong, nor is the case that the terms are confusing in interdisciplinary settings. If situation has a "different set of connotations for historians," cannot the same be said for *aura*? My concern is this. Making students aware of the skills will be a challenge. Informing teachers will be a challenge. Why would we want to retrain *geographers* as well? As such, let's rid ourselves of new terminology for already understood concepts when no compelling reason to add them exists.

Finally, regarding *aura* and *region*, apparently you can count me among those "who have only a blurry notion of their definitions." As stated, if you are measuring the influence of something on surrounding areas, it is an aura. But if the focus is drawing a line around those places, it is a region. The distinction is messy on two counts. First, when one conceptualizes a zone of influence, whether in one's mind or by putting pen to paper, you are delimiting a boundary. It is a region, period. The second issue is that the authors are using aura to explain gradations in space – a decay process we can identify for virtually any phenomenon. As with site and situation, terms exist already to describe this. Meinig (1965) referred to core, domain, and sphere. Resource managers often describe the concept of externalities. My point is simple, here. Adding aura inference as a separate skill not only confuses, but is slicing the pie a bit thin.

Reaching back to my undergraduate history degree, I read with interest about the spatio-temporal skills. I remain uncertain, however, that these are separable skills. I don't know how one can think about situations – 'spatial connections' – without thinking about how they have and will change. Likewise, I do not see how one can think of spatial analogs or patterns as being entities that exist without some form of temporal variability. I would enjoy more opportunities to explore these connections; they would appear to be vital to sustain cross-disciplinary understanding. One final quibble with the other "organizing" forms of spatial thinking is that the authors might want to revisit their example of the Gulf Stream and Europe as a spatial exception (Seagar, 2006), or at least explain the case better.

Clearly, overall I do find much to recommend in this first taxonomic iteration. But other practical concerns override my initial enthusiasm. They relate to geographic *content* and integration within a challenging education environment.

Where from Here?

The taxonomic desire is commendable and makes sense. Skill identification leads to better assessment, and then better materials and teacher training. Clearly, assessing skills is important. But so is assessing content

knowledge. I would go one step further than the authors and suggest that one leg of the tripod is equally shaky – our training of teachers in disciplinary *content*. It is rare to have undergraduate teaching programs that mandate geography instruction. Without even the most basic introduction to geography *content*, how can we expect teachers to appreciate the various nuances in spatial thinking that a taxonomy would suggest? Our experience in South Carolina is illustrative.

A recent revision of the state's social studies academic standards has largely eliminated geography content. Geography has been relegated to a skill set, lumped together in an appendix of Literacy Elements[1]. Students are to be able ask geographic questions (sound familiar?), interpret information from maps, construct maps to display information, and so on. Understanding population, climate, movement, culture, regions, site, situation – the traditional core topical areas, among many others, of the discipline – has been excised in favor of developing a vague set of spatial skills. The Gersmehls note in Caveat number 1 that "spatial thinking is an important part of geography, but it is not all of geography." Agreed! And so I worry a bit – justifiably so, I think, given our local experience – that the promotion of spatial skills slowly eats away at content instruction if not approached cautiously. This need not, and obviously should not, be the case.

And so the challenge: how do we merge the two? Where does this taxonomic development fit within existing content and standards? Where does this fit in with the current high-stakes testing environment?

Geographers have long lamented our ill-understood academic strengths, and much of this is due to our breadth of coverage. We see *everything* as containing a geographic component. We use mathematics as a tool, we engage the human and the physical together, and we use rich language to describe our world. Accordingly, we appear schizophrenic to some. "Just what is it you geographers do?" is an unfortunately familiar question. Regaining a sane appearance can be achieved with a core set of skills, an area of focus. We can start with terminology that is accessible and not *redefining* what we already know and accept. Consensus for this skill set may be, in the end, the easiest part. The challenge will be bridging the social and physical science divide, and the domains of other core disciplines such as math and language arts to make the benefits of a spatial perspective clear. This list, setting aside the minor differences revealed here, is a healthy beginning.

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[1] Literacy Element proficiency is distinguished by grade level. *Introduce* refers to the grade level at which the student explores the literacy element. *Demonstrate* refers to the grade level at which the student is expected to show a mastery of this element. Ex: Literacy Element I. Use maps to observe and interpret geographic information and relationships. K-2 Introduce, 3 and up Demonstrate. See *South Carolina Social Studies Academic Standards*, 2005.