Teaching to Think Spatially

In 2006, the National Geographic Society published a survey in which they determined that sixty-three percent of Americans, age eighteen to twenty-four, could not find Iraq on a map despite the fact that the United States of America was at war with Iraq and had been since 2003 (NGS, 6, 2006). Beyond the fact that students consistently cannot locate places on maps, students have a difficult time making connections across space. Students struggle to answer the "where" and "why" questions in regards to spatial thinking. The lack of student efficacy in spatial thinking is a result of a lack of teacher efficacy in the content, the curriculum and value of geography, and the role of geography within the social studies. So then, how do geography teachers improve spatial thinking among K-12 students?

In an increasingly globalized world, geographic literacy and the ability to think spatially are becoming more and more important. If the United States of America is to remain the hyperpower of the world, it will require students to understand relationships and connections across space. Throughout the United States of America, geography is making a resurgence as a stable part of national and state social studies curriculums. In 1984, *The Guidelines for Geographic Education* identified five themes of geography that are still used to create geography curriculums today (Mohan, 19, 2009). During the 1990s and 2000s, a renaissance in geography education led to the creation of national standards and a national assessment framework. In 2001, the Advanced Placement exam in Human Geography was added by the College Board. Despite, the rebirth of geography education, students still lack the necessary skills to think geographically across space.

One reason for the lack of student efficacy in spatial thinking is a lack of teacher efficacy in geography. In, *Teacher efficacy in geography: A mixed methods study of formal and informal*

teacher education, Audrey Mohan describes one of the major issues in geography education today as a lack of teacher efficacy in geography (Mohan, 21, 2009). She attributes this to four major problems. First, geography teachers have little to no coursework during their undergraduate studies in geography. Mohan takes this even further, stating that teachers not only need coursework in geography, but they also "need coursework that directly parallels the curriculum they are expected to teach" (Mohan, 2, 2009). There are six types of teacher knowledge, according to Mohan. One of the most important is pedagogical content knowledge. This type of knowledge is used when teachers "integrate content and pedagogy in the most appropriate way to teach students" (Mohan, 2, 2009). As Teachers acquire pedagogical content knowledge, students' ability to think spatially will improve, as will achievement and understanding of the global community.

A second reason Mohan describes is that certification programs in social studies do not require geography for licensure (Mohan, 1, 2009). As a result, teachers do not acquire content knowledge or pedagogical content knowledge. Both of these types of knowledge are necessary for students to acquire the ability to think spatially. During teachers' service years, Mohan states as a third reason for a lack of teacher efficacy in geography, they do not receive "ongoing professional development opportunities to ensure that geography teachers are equipped with the appropriate skills to be effective in the classroom" (Mohan, 2, 2009). Professional development can be used to teach content knowledge on the use of Geographic Information Systems (GIS) and Global Positioning Systems (GPS). Using GIS and GPS in the classroom can enhance students' ability to think spatially. In participating in quality professional development opportunities, teachers acquired enhanced content knowledge (for example, how to use GIS and GPS) and pedagogical content knowledge (for example, how to teach the use of GIS and GPS),

which made them more effective teachers (Mohan, 23, 2009). More effective teachers that are well-versed in not only the content, but also in the pedagogy to teach the content, will lead to an increase in students' ability to think spatially.

A fourth and final reason for ineffective geography teachers is a lack of teacher self-efficacy. Geography teachers do not have confidence in their ability to teach geography. This is a result of a lack of content knowledge and pedagogical content knowledge. Teachers that are confident and think they are effective results in higher student achievement and as a result acquire the ability to think spatially (Mohan, 138, 2009).

Gerard Zam and David Howard, in *Bridging the Gap: Between Geography and Education Standards at the University of Toledo*, detail further how important teacher preparation is in creating geography teachers that know the content and pedagogy to teach the content. Zam and Howard argue that in order to achieve better teacher preparation in geography, colleges of education and geography departments must work in synch with each other to promote and enhance geographic and spatial thinking (Zam, 2005).

Even with appropriate teacher training and professional development, current national and state curriculums do not adequately support spatial thinking for K-12 students. In *Reconceptualizing Geography as Democratic Global Citizenship Education*, William Gaudelli and Elizabeth Heilman, argue that geography education needs to be re-evaluated and higher value must be placed upon geography education (Gaudelli, 2649, 2009). National and state policies focus on math and science as primary contents of interest. Numerous times during his administration, President Barack Obama has stated that his primary focus in education is to improve student achievement in math and science. As a result, social studies and geography education take a back seat. Gaudelli and Heilman argue that American's "geopolitical,

environmental, and economic fates are increasingly interconnected" (Gaudelli, 2648, 2009), therefore to understand the world in which Americans live, greater focus must be placed on geography education at the national level.

Gaudelli and Heilman further examine geography education by stating that the most common forms of geography teaching are didactic and disciplinary. Didactic geography focuses on memorization and regurgitation. While this type of geography education answers many of the "where" questions, it does not answer the "why" questions. It is the "why" questions that demonstrate geographic and spatial thinking. The second form of geography teaching most commonly used is a discipline approach. A discipline-centered type of geography education "positions students as budding geographers who attempt to construct (or replicate) knowledge of a discipline to develop geography-informed thinking" (Gaudelli, 2649, 2009). Discipline-centered geography education begins to teach students how to think geographically and spatially, but Gaudelli and Heilman argue that the most effective way to teach students how to think spatially centers on democratic practice (Gaudelli, 2650, 2009).

Democratic-centered geography education focuses on global citizenship education in an effort to provide real-world issues to students and allow them to interact in a global community. This type of geography education, above didactic and discipline centered, allows for a majority of students to use previous experiences and events to understand and think spatially and geographically about contemporary problems (Gaudelli, 2674, 2009).

Another reason why students lack the ability to think spatially is a result of the position and role of geography within social studies. Geography is often seen as a secondary subject or as Zam and Howard put it, the "Step-child in the field of social studies education" (Zam, 25, 2005). In the case of the Michigan Department of Education, geography is coupled with United States

History and World History (Michigan, 2007). As a result, geography is not a standalone subject. While the Michigan Department of Education identifies the National Geography Standards as being used to create the states social studies standards, it is reasonable to assume that during one academic year that all of the National Geography Standards and all of the National Standards in United States History can be taught and fully developed in every student to promote spatial thinking.

The National Council for the Social Studies (NCSS) provides a useful framework for developing geography education for enhanced spatial thinking. Of the ten themes of social studies, provided by NCSS, at least four the themes directly relate and promote spatial thinking. This framework, however, is often mutually exclusive from state standards in numerous states (Zam, 26, 2005). In 1994, President George H.W. Bush signed the *America 2000*, which was a blueprint for education reform. In it, he identified geography as one of the core subjects (Mohan, 19, 2009). In order for spatial thinking to improve among K-12 students, states need to develop social studies curriculum that create geography as a separate discipline within the social studies and not a topic to be discussed as it relates to other disciplines (as is the case with the State of Michigan).

Geography education has taken a back seat to the other disciplines in the social studies for many years. As a result, students entered the world without the ability to think spatially. As the lone hyperpower in the world, many Americans come across as naïve and ignorant of global events and issues. To remedy this problem, students need to be taught how to think spatially. To accomplish this task, geography teachers must be well-prepared with content knowledge and content pedagogy knowledge. This will increase teacher self-efficacy in geography and enhance spatial thinking among students. Higher value also needs to be placed on geography. As cultures,

economies, and governments globalize, the ability to think spatially in a globalized world will become more important. The job of a teacher is to prepare their students for real world. To effectively do this, teachers need to equip their students with the ability to think spatially.

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