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What's Wrong and What's Right with Geography Education in the USA?

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Abstract Geographic Education in the United States generally receives less attention than many other subjects, and surveys have found that most students lack proficiency. The resulting level of geographic literacy in the general population carries significant implications for national and international competitiveness and decision-making. This paper reviews factors leading to deficiencies in US Geography Education, including lack of emphasis compared with subjects more prominently tested, teacher preparation and in-service training, curricula design, and high student mobility rates. We also review positive trends, including developing more rigorous sets of learning standards and geographic skills, and support from interested organizations and State educational agencies for encouraging student interest and participation in assessments and contests. We examine selective resources for teaching and learning geographic concepts and skills, many available online from federal and nongovernmental agencies. Finally, we consider the potential for learning geography through such informal science education venues as museums and mass media.

Key-words: geography education, United States, geographic literacy, deficiencies, positive trends.

1. Introduction

It is well known that organized study of Geography in US schools remains a low priority, even as demand rises for geographic knowledge to solve local and global problems, and geographic information systems become ubiquitous in the United States and across the world. The need for geographic literacy is critical in many fields, such as making workplace, societal, and personal decisions. Most US schools still provide only map reading and place name memorization, with too little training in geographic reasoning. National assessments find that less than a third of US high school students perform at a proficient level, with more than two-thirds having only partial or no mastery of geography concepts. This paper reviews selected aspects of the current status of pre-college (kindergarten-high school grade 12, K-12) Geography Education in the United States. It describes recent efforts by major organizations to work with schools in the creation of resources and opportunities for improving national geographic instruction and developing international partnerships. It also examines geography education taught outside formal curricula through selected informal learning environments, such as museums, television, and videogames.

2. What's Wrong with Geography Education in the USA?

Formal studies, such as the National Assessment of Educational Progress, consistently find that the majority of US students test below proficiency in Geography (1). The 1994 NAEP rated only 28% of US students as Advanced or Proficient, and the 2014 testing placed only 27% in these categories. The next Geography NAEP is scheduled for 2018, but few people expect significant improvements will be identified.

A US Government Accountability Office report found that more than half of social studies teachers spend 10 percent or less of their time on geography (2). The USA has no National Standards, curriculum or testing program, unlike in many nations. Each State sets its own regulations. Most States do not require geography courses in middle school or high school. As of 2013, only 17 States required a geography course in middle school and 10 states required a geography course for students to graduate from high school.

Part of the problem comes from a lack of funding dedicated to teaching geography, and part to recent State and National focus on the more widely tested subjects of reading and mathematics. Other weaknesses in the current system arise from misconceptions by school administrators about what should be included in geography education, lack of teacher preparation and professional development, poor quality of educational materials, and limited use of geographic technology in the classroom.

Many elementary school teachers (grades k – 5) attain their teaching license with little or no formal coursework in this field. One typical teacher preparation program requires a single course in Physical Geography, in which the emphasis is described as the study of maps, weather, and climatology (3). Most teachers rely on and teach only what is presented in

textbooks chosen by their schools, bringing little personal experience to their instruction. In most secondary schools, Social Studies is the umbrella subject under which Geography is taught, together with other concepts such as history, civics and economics. Most teachers have greater strength and interest in the latter areas than in geographic concepts.

Some topics included in geography education in other countries - such as physical geology, weather and climate, and rocks and resources - are taught as part of Earth Science courses in US schools. Many States are beginning to change approaches to learning as they implement the "Next Generation Science Standards" (4). Among the Disciplinary Core Ideas included are "Earth Materials and Systems," "The Role of Water in Earth Systems," "Weather and Climate," "Biogeology," "Natural Resources," "Natural Hazards," "Human Impacts on Earth Systems," and "Global Climate Change." But most Earth Science teachers have training in areas more closely assorted with the geosciences, and may rarely consider the geographic aspects of what they present. In addition, students in many States have not had opportunities to study Earth Science during high school, where the emphasis has been on biology, chemistry, and, sometimes, physics.

Four major geography education organizations developed "Charting the Course: A Road Map for 21st Century Geography Education" (5.) This was a response to recognition by business leaders and policy makers that Americans lack critical geographic understanding and reasoning skills necessary for 21st Century careers and civic life. Among their finding is that assessment should be closely aligned to educational goals, and studies have found that geography assessments current focus on only a few areas of source content, evaluate at the lowest cognitive levels, and rarely evaluate ability to apply geographic knowledge. There is a constant need to develop high-quality assessments which will inform decision-making by geography teachers, administrators, policy-makers, and students. Instructional materials need revisions so they engage students in learning major ideas of geography and guide them toward skills of applying what they learn to solve problems. Teachers must be prepared to use materials in best instructional practices. Continuing research is required to identify what are the best practices for teaching and learning in geography classrooms. Related to all this is greater recognition of the American Public to understand the value of geography education and the need to improve it.

Another significant factor affecting achievement in many US schools is the great mobility in student populations. In many districts, few students attend from kindergarten through grade 12 graduation and study what, on paper, is a coordinated K-12 curriculum. Schools receive large numbers of students from other districts and/or countries in every grade throughout the year. These newcomers bring a wide range of background knowledge and languages, much unaligned with the district curriculum. Recent studies indicate the strong negative correlation between mobility and graduation rate. One found that the bottom 25% of schools by graduation rate had a 51% mobility rate, compared with the top 25% with a 12% mobility rate (6) There are numerous reasons for student mobility, but all result in disruptions to effective learning and greater potential for missing opportunities to obtain a complete education (7).

Many States require passing standardized examinations for graduation that are constructed with the assumption students have studied their unified K-12 curriculum. Students coming partway through the K-12 experience may never have learned significant portions of the course material, especially in an area such as geography, where a focus on local physical features and communities may be presented in the elementary grades, then assumed to be known by older students, although they may have been living far away when the content was taught. Few schools have effective strategies to deal with such mobility and assist students in catching up to the posted Standards.

For these and other reasons, US geography education often possesses weaknesses that have significant impact on creating future citizens with adequate geographic literacy. Many finish school with little awareness of the histories, cultures, economies, and relationships with other countries. Not having an awareness that they are missing important knowledge, many Americans will show little interest in seeking to remedy such weaknesses as adults. This, of course, may lead to missed opportunities for developing positive connections and other socioeconomic benefits on all sides.

3. What's Right with Geography Education in the USA?

On the other hand, there are many positive achievements that seek to address some of the challenges. Here are selective examples of such good practices.

National Geography Standards

The National Council for Geography Education developed "Geography for Life," a voluntary Framework to guide exemplary curriculum development (8). As written, these National Geography Standards set out a comprehensive, well-organized framework for US educators. The structure for these National Geography Standards includes 6 "Essential Elements" which are subdivided into 18 "Standards." Each "Essential Element" is considered vital and a part of the entire structure. Each "Standard" contains a set of related ideas and approaches to the subject matter of Geography.

The 6 "Essential Elements" are:

- Essential Element 1: The World in Spatial Terms
- Essential Element 2: Places and Regions
- Essential Element 3: Physical Systems
- Essential Element 4: Human Systems
- Essential Element 5: Environment and Society
- Essential Element 6: The Uses of Geography

Standards associated with "1. The World in Spatial Terms" include: using maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective; creating mental maps to

organize information about people, places, and environments in a spatial context; and learning to analyze the spatial organization of people, places, and environments on Earth's surface.

"2. Places and Regions" explores: the physical and human characteristics of places; recognizing the concept of "regions" as a key to interpreting Earth's complexity; and understanding how culture and experience influence people's perceptions of places and regions.

Many of the aspects included in "3: Physical Systems" are studied by US students as parts of their Earth Science curriculum. Standard 7 deals with physical processes and systems which create, maintain, and modify the features that constitute Earth's surface provide the necessary background for all human activity on Earth (9). Most of these are studied through Earth Science, either as a separate middle or high school course or as part of integrated K-12 science programs.

Similarly, Standard 8 focuses on characteristics and spatial distribution of ecosystems and biomes on Earth's surface (10). Students study much of this through biology, Life Science, and/or Advanced Placement Environmental Science courses during their K-12 experiences. (More about the Advanced Placement program will be described below).

"4. Human Systems" constitutes what most people think of as "geography education": human populations, cultural mosaics, patterns and networks of economic interdependence, patterns and functions of human settlement, and how cooperation and conflict influence division and control the Earth's surface.

Physical systems affecting human society and changes in the distribution and importance of resources belong to "5: Environment and Society." Finally, "6: The Uses of Geography" examine applications of geography to interpret the past and present, and plan for future interactions.

Further explanation and discussion about the National Geography Standards Index is worth exploring (11.) Accompanying the Standards are five important "Geographic Skills" that students should master to gain necessary tools and techniques to think geographically (12). These are described as:

- Asking Geographic Questions
- Acquiring Geographic Information
- Organizing Geographic Information
- Analyzing Geographic Information
- Answering Geographic Questions

Analyses of recent assessments measured against these documents, however, found that over 44% of geography assessments focus on just three of the sixteen content standards. Only one practice, the analysis of geographic information, is assessed in more than 5% of the test items. Almost all require students to perform only factual recall or gather information from maps, graphs, and texts. Few require higher-order cognitive demands (5).

It is clear that we know what should be done to improve Geography Education. It is to be hoped that as more geography teachers at all levels receive pre-service and in-service training to implement the National Geography Standards, there will be improvements in student performance, and we will be closer to achieving the goal of creating greatly improved instructional programs and assessments that produce a geographically literate citizenry.

National College-Readiness Assessment Testing

As noted, there is no official national testing program in the USA, but two major programs are widely used to assess college-readiness of students.

One is the ACT (American College Testing) program, now the most widely used (13). From its founding 1959, the ACT test consisted of four parts: English, Mathematics, Social Studies, and Natural Science. In 1989, the Social Studies portion was changed to a Reading section, with a Social Studies component. Studies have 35 minutes to respond to four ten-question passages from prose fiction, social studies, natural science, and humanities.

Skills included in the Social Studies National Standards also are tested in the Science Reasoning test. This 35-minute, 40-question section includes data representation, research summary, and conflicting viewpoint formats. Recently, an optional Writing section was added in which students have 40 minutes to respond to a given prompt about broad social issues. Students are required to analyze three different perspectives and show how their opinion relates to these perspectives.

The other major testing programs are administered by the College Board (14). Founded in 1900, this organization administers the SAT (Scholastic Aptitude Test), the other widely-used admissions exam, the Advanced Placement (AP) program, and other assessments. While the SAT and related examinations focus on general readiness for college and achievement in certain course areas, the AP program provides students with opportunities to study at a college level, then take an exam which may lead to the awarding of graduation credits and/or placement into upper level courses upon admission to college.

Advanced Placement Human Geography

Of particular interest here are the challenges of the Advanced Placement Human Geography course and exam (15). The official overview (16) explains:

> The AP Human Geography course is equivalent to an introductory college-level course in human geography. The course introduces students to the systematic study of patterns and processes that have shaped human understanding, use, and alteration of Earth's surface. Students employ spatial concepts and landscape analysis to examine socioeconomic organization and its environmental consequences. They also learn about the methods and tools geographers use in their research and applications. The curriculum reflects the goals of the National Geography Standards (2012).

This 2-hour 15-minute exam requires students to explain and apply key and supporting geographical concepts. Section 1--Multiple Choice takes 1 hour. Students must define, explain, and apply geographic concepts, and interpret geographic data. Section 2—Constructed Response requires that students synthesize different topical areas, analyze and evaluate geographical concepts, and supply appropriate real-world examples to illustrate geographic concepts. They must also interpret verbal descriptions, maps, graphs, photographs, and/or diagrams, and formulate responses in narrative form.

The AP website provides helpful information about how to prepare for the exam and sample questions. To encourage students to enroll, the website indicates that taking AP Human Geography can be useful in 20 college majors, ranging from cultural studies to natural and social sciences to engineering. They also provide a list of 71 career areas in which background in human geography can be valuable. Teachers can find extensive supportive materials on the AP Human Geography Course Home Page (17).

Fewer than 70,000 registered in 2010, the first year it was offered, but nearly 160,000 did so in 2015, and in 2017, approximately 200,000 students took the exam (18). However, there are concerns that many of these were 9th graders getting their first exposure to college-level coursework. As a consequence, the trend of score distribution shows a decline. When the first test was administered, most takers were seniors and more than 60% scored 3 or higher, on a 1-5 scale. Most recently, only 49% scored 3 or higher, and more than 33% received 1, the lowest score. Students did relatively well on multiple-choice questions dealing with such topics as population, industrializations, and economic development. In the 2017 exam, they did much better on the free-response question concerning rate of natural increase in human populations, but many seemed not to have learned about New Urbanism, the subject of the other free-response question.

The National Geographic Society

Foremost among geographic organizations in the USA is the National Geographic Society (19). This nonprofit scientific and educational organization dedicated to exploring our planet, protecting wildlife and habitats, and helping assure that students in K-12 are geographically literate. For nearly 130 years, they have funded groundbreaking scientists and explorers and shared their findings with the world through its magazine and other print, TV, video, and digital products.

The National Geographic Society educational website provides numerous educational resources for teachers and students (20). One example of available educational units is "Landscape Investigation Guidelines" (21). This unit challenges high school students to participate in social science inquiry by applying spatial thinking to real-world situations focused on fish, wildlife, and other natural resources as integral parts of landscapes. It provides a model for study aligned with the K-12 social science and geographic standards. It is designed to coordinate with existing curriculum.

The education website also provides links to 47 "Lessons" (defined as a set of activities designed to accomplish specific learning goals) (22), and 467 "Activities" (the smallest level of learning experience, designed to fit into one class) (23). The educational website also provides links to resources that support teachers and students interested in additional references, mapping, programs, and blogs. It also provides links to magazines and other available print resources.

The "National Geography Bee"

The National Geographic Society sponsors the National Geography Bee (24). Eligible students in grades 4 – 8 (approximately 9 – 14 years of age) in registered public, private, and homeschools in the USA and its territories, as well as those in Department of Defense Dependents Schools across the globe follow strict guidelines to seek the right to participate in State Level and National competitions. In 2017, students from more than 10,000 schools competed.

The "Geo Bee" website provides supporting lesson plans and study resources (25). These include videos and other materials to interest and teach students about the Geography of the U.S.A., North and South America, Europe, Asia, and Australia. There are also teaching materials about World Geography (time zones, World Heritage sites, and migration); geography of the Ocean; and biodiversity and ecosystems.

Examples of Geography Curricula in USA School Districts

Although, as noted, there is no National Curriculum, many States and school districts have created their own guidelines. New York City, the largest public education system in the USA, with more than 1,000,000 students, has issued "Scope and Sequence" documents to guide teachers at the K-8 (26) and 9-12 (27) levels. Both are designed to be comprehensive resources that integrate the National Standards (8), New York State Social Studies Core Curriculum (28), New York State Social Studies frameworks (29), and the Common Core Learning Standards (29).

In many of these documents, teaching and learning Key Ideas and Conceptual Understandings center around "The Ten Unifying Themes" (26):

- Individual Development and Cultural Identity
- Development, Movement, and Interaction of Cultures
- Time, Continuity, and Change
- Geography, Humans, and the Environment
- Development and Transformation of Social Structures
- Power, Authority, and Governance
- Civic Ideals and Practices
- Creation, Expansion, and Interaction of Economic Systems
- Science, Technology, and Innovation
- Global Connections and Exchange

Students in New York State high schools must pass a set of "Regents" exams to meet graduation requirements. ("Regents" refers to the New York State Board of Education.) These exams have been administered annually or more frequently for many decades. They are based on the Core Curriculum for each subject and constructed through a rigorous protocol process that includes classroom teachers and State Education Department officers. Of particular interest here is the "Global History and Geography" Regents Exams. Past examinations are available for study by students and teachers preparing for the test, as well as others seeking test questions (30).

As one example of what is available to guide teachers in other States, examine the New Jersey Student Learning Standards for Social Studies (31). Selected themes from geography education have also been included in a document created to foster inclusion of other subjects as students prepare for the English Language Arts section of the Common Core State Standards Initiative (32). This, together with the Mathematics Standards, has influenced many State assessment programs in recent years, but extensive criticism for a variety of reasons has resulted in diminished emphasis of such testing (33.)

Examples of US Government Geographic Education Resources

Many online resources suitable for teaching geographic concepts are available from agencies of the United States Government. For example, the Geographic Names Information System (GNIS) is the official Federal and national standard and repository for domestic geographic names data (34). GNIS includes information about all types of physical and cultural geographic features in the United States, associated areas, and Antarctica. It does not include highways and roads. Recognized names, current and historical, and other useful characteristics are available to all users.

GNIS is among the many resources available through the United States Geological Survey (USGS) "Maps" website (35.) This is now a primary source of geographic information system (GIS) data, having expanded from the earlier USGS mission of printed maps and other resources. Online resource topics, in addition to Geology, include Biology and Ecosystems, Climate and Land Use Change, Energy, Environmental Health, Remote Sensing and Geospatial Data, Minerals, Natural Hazards, Planetary Science, and Water.

There are many other government agency websites that provide web-based resources suitable for use in geographic education lessons. Among these are the National Weather Service (36), whose home page shows a color-coded map of current Active Alerts showing weather hazards. The National Oceanic and Atmospheric Administration's "Climate.gov" site (37) provides graphics dealing with such geographic themes as El Nino-La Nina forecasts and sea ice conditions. Additional useful maps and other data snapshot graphics are available in the "Maps & Data" section.

One of the best sources for imagery, including videos and animations, that can be utilized for creating geography lessons comes from NASA (38). These, like other US government resources, are free and available to all.

Educational Resources from Non-Governmental Organizations (NGO)

Useful geographical education resources have been developed by non-governmental organizations. One example of these comes from CIESIN (the Center for International Earth Science Information Network) (39.) CIESIN was established as an NGO nearly thirty years ago to provide information designed to help scientists decision-makers, and the public better understand changing relationships between humans and the environment. CIESIN became a Center within the Columbia University Earth Institute (40) about twenty years ago. The Earth Institute is a world class program that combines research in the social and physical sciences, education, and practical solutions to help guide decision-makers at many levels on a path toward Sustainability.

CIESIN provides many Internet resources (41), including the NASA Socioeconomic Data and Applications Center, Intergovernmental Panel on Climate Change Socioeconomic Data Distribution Centre, Population-Environment Research Network, and others.

Another source of resources useful to teaching geographic concepts are the American Meteorological Society's "DataStreme" websites. "DataStreme Earth's Climate System" (42) provide current and historic climate information, climate variability and climate change assessments and models. It also provides links for teaching societal interactions and climate policy.

The "DataStreme Ocean" website (43) provides a wide variety of Internet resources providing information and maps about the Earth System, Physical and Chemical Oceanography, Geological and Biological Oceanography, and Atmosphere/Ocean Interactions.

Informal Educational Resources

As important as formal USA K-12 educational programs are, the reality is that much more teaching and learning of social studies and other subjects takes place through informal venues.

Foremost among these are museum displays. One example are the geographically-related exhibits at the American Museum of Natural History in New York City (44). These include the Halls of African Peoples, Asian Peoples, South American Peoples, Mexico and Central America, Pacific Peoples, Eastern Woodlands and Plains Indians, and Biodiversity. Each day, thousands of visitors from around the world pass through these exhibits and learn important geography information by reading signs posted with displays. Similar displays educate people in museums across the globe.

The Smithsonian National Air and Space Museum has offered the "Geography from Space" contest annually since 2007 (45.) It is conducted each November during National Geography Awareness Week. Contestants strive to identify geographic locations on Earth from satellite or aerial images

and brief clues. Questions range from identifying countries and mountain ranges to natural features, such as the Grand Canyon, and human-created structures, such as the Suez Canal.

Regional museums often provide permanent exhibits focused on local geography. One example is the "Geography 101" exhibit in the Children's Museum of Blackburg, Virginia (46). It is designed as a hands-on geographic learning experience for ages 3-8. It includes a live weather station, giant satellite wall, and floor murals.

Many professional societies and associations provide online and print resources that are readily available to teach aspects of geography education. One example is the Minerals Education Coalition, which provides a large collection of web- and print-materials pertaining to economic uses of natural resources (47.)

During the 1980s, geography education became popularized through a television program called "Where in the World Is Carmen Sandiego?" There were 295 shows broadcast between 1991 and 1996, each of which involved contestants trying to find a "rare stolen object" through solving clues about countries. (Adding to the show's appeal was a cappella music performed at the beginning, end, and between segments.) Many of these original shows are available through the International Movie Data Base and YouTube links (48). More recently, Houghton Mifflin Harcourt released an app designed for children ages 7 -12 called "Carmen Sandiego Returns: A Global Spy Game for Kids (49).

4. Conclusions

Mastery of important geographic education concepts and skills remains weak among students in USA schools. The relatively low importance given to teaching most aspects of geography will probably have significant implications for future problem-solving and decision-making. At the same time, many valuable resources are available to teachers and students. It is possible that increased interest resulting from changing political and socioeconomic conditions will lead to greater emphasis on enhancing Geography Education.

Widespread accessibility to electronic communications offers opportunity for creating partnerships between schools in the USA and other countries. Mutual benefits may include raising awareness of the importance of mastering geographical skills and applications, as well as abilities of students to communicate in other languages. So, it may be possible to turn the current worries and concerns into the beginnings of valuable multinational education cooperation.

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O que está errado e o que está certo com o ensino de Geografia nos EUA?

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Resumo A educação geográfica nos Estados Unidos geralmente recebe menos atenção do que outros tópicos. Pesquisas têm demonstrado que estudantes não possuem a proficiência adequada em Geografia. O nível de letramento geográfico da população em geral possui implicações significativas para a competitividade e para as decisões a níveis nacionais e internacionais. Este trabalho avalia os fatores que levam às deficiências no ensino de geografia nos Estados Unidos, incluindo a falta de ênfase dada à disciplina em comparação com outros tópicos, o treinamento de professores, o design dos currículos e as altas taxas de mobilidade estudantil. O texto também avaliar tendências positivas, incluindo o desenvolvimento de padrões mais rigorosos para o aprendizado de habilidades da geografia, o suporte de organização e de agências estatais que estimulam o interesse e a participação dos estudantes em avaliações e concursos. O trabalho examina os recursos seletivos para o ensino e aprendizado de habilidades e conceitos de geografia, geralmente disponíveis online por agências federais e não-governamentais. Finalmente, o texto considera o potencial de aprendizado geográfico através de ambientes não formais, a exemplo de museus e da mídia de massa.

Key-words: educação geográfica, Estados Unidos, letramento geográfico, deficiências, tendências positivas.

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