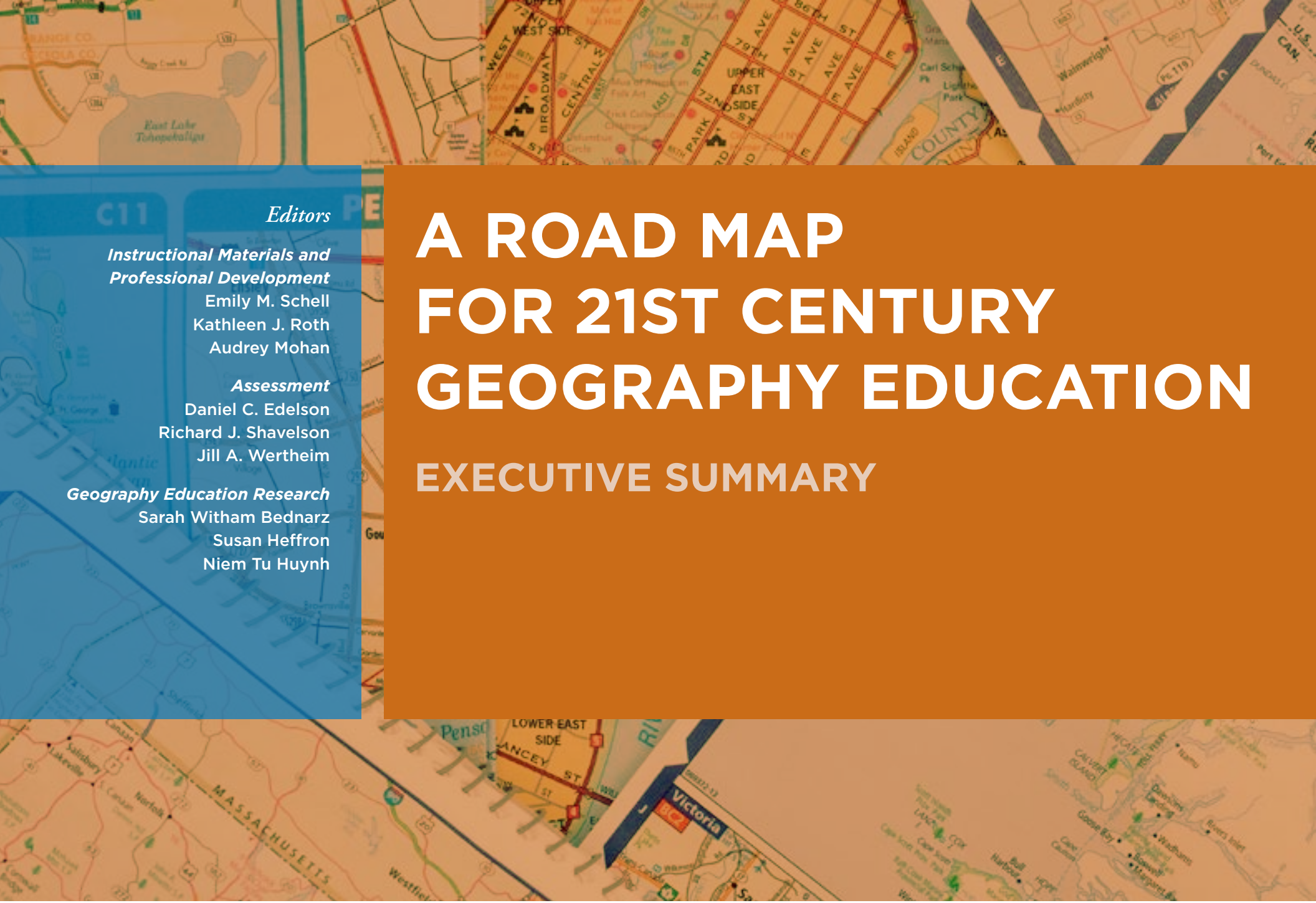

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A ROAD MAP FOR 21ST CENTURY GEOGRAPHY EDUCATION

EXECUTIVE SUMMARY

These executive summaries were created by the Road Map for 21st Century Geography Education Project.

Road Map for 21st Century Geography Education Project

Daniel C. Edelson, Principal Investigator
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The Road Map for 21st Century Geography Education Project is a collaboration between the National Geographic Society, the Association of American Geographers, the National Council for Geographic Education, and the American Geographical Society. The views expressed in the report are those of the authors and do not necessarily reflect the views of these organizations.

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Information about the project and copies of reports are available at http://natgeoed.org/roadmap.

The **National Geographic Society** is one of the world's largest nonprofit scientific and educational organizations. Founded in 1888 to "increase and diffuse geographic knowledge," the Society's mission is to inspire people to care about the planet. It reaches more than 400 million people worldwide each month through its official journal, National Geographic, and other magazines; National Geographic Channel; television documentaries; music; radio; films; books; DVDs; maps; exhibitions; live events; school publishing programs; interactive media; and merchandise. National Geographic has funded more than 10,000 scientific research, conservation and exploration projects and supports an education program promoting geographic literacy.

The **Association of American Geographers** (AAG) is a nonprofit scientific, research, and educational society founded in 1904. Its 11,000 members from more than 60 countries share interests in the theory, methods, and practice of geography (including GIScience, geographic education, and geographic technologies). The AAG pursues its mission through its many conferences, scholarly publications, research projects, educational programs, topical specialty groups, and its extensive international network of colleagues and organizational partnerships, which encompass professionals working across public, private, and academic sectors all around the world.

The **National Council for Geographic Education** (NCGE) works to enhance the quality, quantity, and status of geography teaching and learning in primary, secondary, university, and informal educational settings. It develops and promotes curricular materials and two journals, fosters best practices in pedagogy and geotechnology, connects educators through online communication and through its annual conference, supports research in geographic education, recognizes exceptional supporters and teachers of geography, and collaborates with other organizations that have similar goals.

The **American Geographical Society** is an organization of professional geographers and other devotees of geography who share a fascination with the subject and a recognition of its importance. Most Fellows of the Society are Americans, but among them have always been a significant number of Fellows from around the world. The Society encourages activities that expand geographical knowledge, and it has a well-earned reputation for presenting and interpreting that knowledge so that it can be understood and used not just by geographers but by others as well—especially policy makers. It is the oldest nationwide geographical organization in the United States. Its priorities and programs have constantly evolved with the times, but the Society's tradition of service to the U.S. government, business community, and nation-at-large has continued unchanged.

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Context and Goals for the Road Map for 21st Century Geography Education Project

The State of Geography Education in the United States

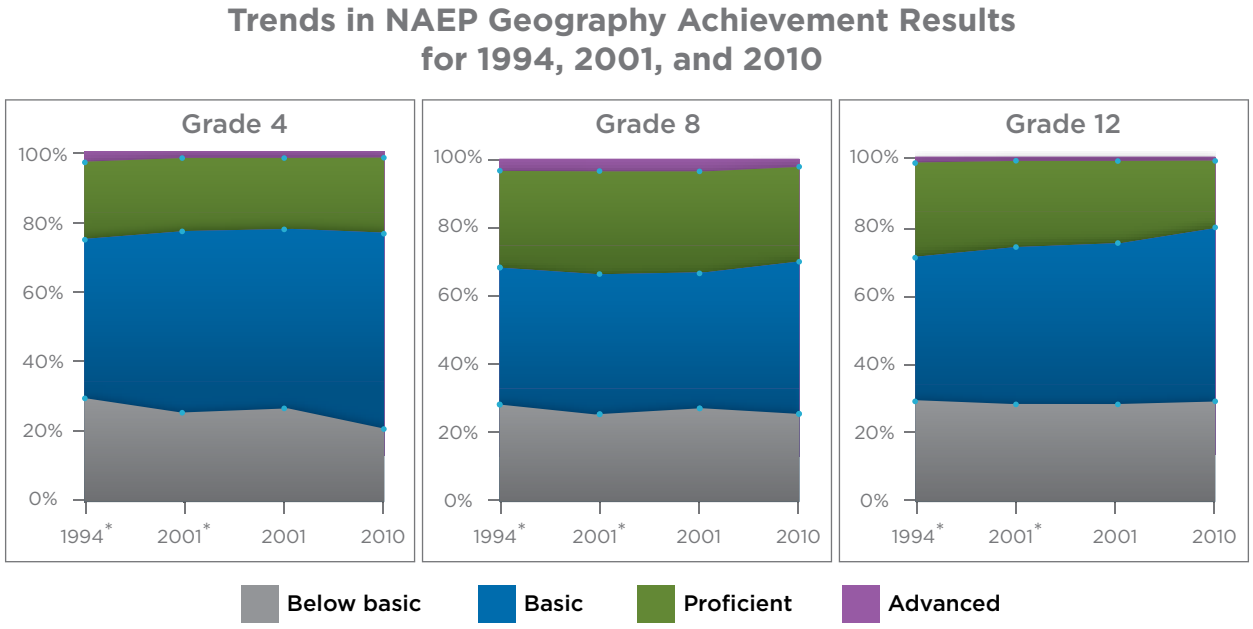
This report is one of three synthesis reports on geography education from the Road Map for 21st Century Geography Education Project. The Road Map Project has been a collaborative effort of four national organizations: the American Geographical Society (AGS), the Association of American Geographers (AAG), the National Council for Geographic Education (NCGE), and the National Geographic Society (NGS). These organizations share a concern that the dismal state of K–12 geography education across the United States is a threat to our country's well-being, and by extension, the well-being of the global community. The project partners share the belief that geography education is essential for preparing the general population for careers, civic lives, and personal decision making in contemporary society. It also is essential for the preparation of specialists capable of addressing critical societal issues in the areas of social welfare, economic stability, environmental health, and international relations. The Road Map Project partners fear that by neglecting geography education today, we are placing the welfare of future generations at risk.

While inspiring examples of highly effective geography education can be found in every part of the United States, the amount of geography instruction that the overwhelming majority of students receive, the preparation of their teachers to teach geography, and the quality of their instructional materials are inadequate to prepare students for the demands of the modern world.

Assessments of geographic concepts and skills confirm the failure of our educational system in geography, indicating that the overwhelming majority of American students are geographically illiterate. The 2010 National Assessment of Educational Progress (NAEP), known as "The Nation's Report Card,"(National Center for Education Statistics, 2011) found that fewer than 30% of American students were proficient in geography; more than 70% of students at fourth, eighth, and 12th grades were unable to perform at the level that is expected for their grade (NCES, 2011, Figure 1). At 12th grade, more than 30% of students scored below "basic," indicating that they had not mastered even foundational geographic concepts or skills.

From the NAEP results and other data, we conclude that an overwhelming majority of high school graduates are not prepared to do the ordinary geographic reasoning that is required of everyone in our society in the course of caring for themselves and for their families, making consequential decisions in the workplace, and participating in the democratic process. Furthermore, we conclude that more than 30% of high school students

Figure 1. Comparison of Results for Students in Grades 4, 8, and 12 on National Assessment of Educational Progress (NAEP) Geography Test in 1994, 2001, and 2010



*Test administrations in which accommodations were not permitted

Source: NCES, 2011

are so far behind that it is unlikely they will ever reach proficiency. To compare with textual literacy, this level of geographic illiteracy is analogous to having 70% of high school graduates unable to read a newspaper editorial and identify the assumptions, evidence, and causal connections in its argument.

The Importance of Geography Education

K–12 geography education is critical preparation for civic life and careers in the 21st century. It also is essential for postsecondary study in a wide range of fields, from marketing and environmental science, to international affairs and civil engineering.

Everyone in modern society faces personal decisions that require geographic reasoning. These decisions, such as where to live and how to travel from place to place, can have an enormous impact on one's life. We also must make decisions that have far-reaching consequences, such as which products to buy and how to dispose of them. While these decisions may seem insignificant, when they are multiplied by the number of people making them each day, they have enormous cultural, economic, and environmental repercussions for other people and places. Finally, in our democratic society, we all participate in societal decision making about public health, social welfare, environmental protection, and international affairs. In this era of such global challenges as ethnic and religious conflict, growing populations in poverty, increasing competition for limited natural resources, and degradation of the environment, it is essential that all members of society be prepared to make these decisions. Geography education helps prepare people for these tasks.

In addition, we need to provide young people with the opportunity to develop the understanding and interest to pursue the geography-dependent careers that are critical to our national interests. The Geo-Literacy Coalition, a consortium of businesses including Google, CH2M HILL, Esri, and the U.S. Geospatial Intelligence Foundation, had the following to say about the importance of geography education for our nation (National Geographic, 2011):

> [America's] inattention to [geography education] stands in contrast to the demand for geographically literate individuals in the workforce. There is substantial demand in both the public and private sectors for people who have the ability to interpret and analyze geographic information. The number of jobs for such analysts is growing rapidly, while the supply of Americans who can fill them is not. By not preparing young people for careers that depend on geographic reasoning, we are leaving ourselves vulnerable.
>
> In our global economy, the understanding and analytical skills developed through geography education are essential to make well-reasoned decisions about where to conduct business, how to conduct business in particular locations, and how to transport materials and goods from one location to another. Critical business choices such as where to build facilities, how to design a supply chain, and how to market to different cultures all require geographic reasoning.
>
> These skills are equally important for emergency preparedness, defense, intelligence, and diplomacy. In our government and military, we need individuals who understand the dynamics of specific locations well enough to prepare for and respond to emergencies. We need analysts who are able to track people and events around the world and put appropriate responses forward for decision-makers. We need people who are able to operate on the ground in every kind of foreign context and can read the cultural and physical landscape appropriately.

This Road Map Project is taking place against a backdrop in which many members of the global community are renewing their commitment to geography education. In Australia, a national curriculum is being introduced for the first time. In England, geography is a component of the recently introduced English Baccalaureate. In most of the world, geography holds a higher place in the K–12 curriculum than it does in the United States. In most countries, geography is required every year through age 16, in addition to history or other social studies subjects. In fact, the United States is almost unique in its treatment of geography as part of a single curriculum with history, government, and economics.

The Road Map Project partners believe that we, as a society, have a responsibility to prepare all young people for their personal needs and civic responsibilities, and we have a further responsibility to prepare sufficient numbers of young people for geography-dependent careers. We are not currently living up to those responsibilities, and we fear the consequences that our society will suffer if we continue to neglect geography education.

The Need for a "Road Map" for Geography Education

Over the past several decades, a small but dedicated community of geographers and educators has harbored concerns about the state of geography education and

has worked diligently to improve geography education. Their greatest success has been in establishing a firmer place for geography in K–12 education. The Elementary and Secondary Education Act (ESEA) of 2001 (January 8, 2002) recognized geography as a core academic subject, and all 50 states now have K–12 standards for geography. Geography has been included in the National Assessment of Educational Progress since 1994, and the College Board established an Advanced Placement exam for Human Geography in 2001.

However, these successes in improving the place of geography in the educational system have not been followed up with the levels of effort or resources necessary to bring about widespread improvement in the quality of instruction. As a result, educators and students who have had the good fortune of being impacted directly by the efforts of the geography education reform community have benefited enormously, but they represent a small minority. As measured by NAEP, there has been no broad improvement in students' learning of geography during the 17–year period of testing.

The project partners launched the Road Map Project with the goal of increasing the scale and accelerating the pace of efforts to improve geography education to meet our responsibility to prepare young people for the world they will inherit. The partners have two goals for this work:

- first and foremost, to make future efforts to improve geography education more strategic, focused, and coherent, so they can have greater and more enduring impact; and
- second, to provide a rationale for establishing requirements for geography education and allocating resources to improve geography education that accurately reflect its importance for our society.

This work targets the three audiences that are in the best position to effect improvement in our system of public education:

1. **Front-line professionals:** educators, teacher educators, developers, and researchers who directly influence instruction, assessment, and research;
2. **Policy makers:** individuals at national, state, and local levels who establish the goals and processes for public education; and
3. **Funders:** decision-makers in government and private organizations who provide the funding to support public education.

In planning the project, the partners identified five critical issues for improving geography education:

1. preparation and professional development of teachers,
2. instructional materials to support classroom instruction,
3. assessment of learning outcomes and instructional effectiveness,
4. research on teaching and learning, and
5. cultivation and maintenance of public support.

The partners divided these issues among four efforts, deciding to address the first four issues through synthesis reports to be developed by three committees of experts identified by the project partners:

The ***Instructional Materials and Professional Development Committee*** considered the current state of the instructional materials for teaching geography and the preservice and inservice education that teachers who are responsible for geography education receive. Based on this analysis and a review of the literature on the design of instructional material and the design of teacher professional development, the Committee formulated recommendations and guidelines for both instructional materials and professional development that will lead to improvements in instruction and in learning outcomes.

The ***Assessment Committee*** studied the current state of assessment in geography and reviewed its history. Based on their analysis of existing assessment practices and a review of the literature on assessment as a support for improving educational outcomes, the Committee formulated guidelines for developing assessment instruments and for conducting assessment that will lead to improvements in instruction and outcomes.

The ***Geography Education Research Committee*** reviewed the existing education and cognitive science research literature to identify gaps in our ability to answer significant questions about geography education based on research. Drawing on this analysis, the Committee formulated recommendations for research questions and approaches that will build a knowledge base to guide improvement efforts for geography education in the future.

For the final issue—developing and maintaining public support for geography education—the partners did not believe the existing knowledge base on public beliefs and attitudes about geography education would support the development of a synthesis report at this time. Instead, the partners initiated a pilot study of public beliefs and attitudes under the direction of the American Geographical Society.

Road Map for 21st Century Geography Education Project

Instructional Materials and Professional Development

Recommendations and Guidelines for Instructional Materials and Professional Development in Geography Education

Editors

Emily M. Schell, Kathleen J. Roth, Audrey Mohan

National Council for Geographic Education
Washington, DC

A Report from the Committee on Instructional Materials and Professional Development of the Road Map for 21st Century Geography Education Project

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Executive Summary

Never before in human history has it been more important for a person to be geographically literate. Our world is astoundingly complex and increasingly interdependent—economically, environmentally, politically, socially, and culturally. But the unsettling reality is that many teachers and most students are not yet geographically literate. Currently, American students are not even provided opportunities to learn enough geography to understand the very basic aspects of the world in which they live. Without explicit intervention and a dedicated focus on geographic literacy by educators, curriculum developers, and policy makers, U.S. children will be unable to thrive in the global marketplace, unlikely to connect with and care for their natural environment, and unsure about how to relate to people from other parts of the world. One thing is abundantly clear; if American children hope to participate in our democracy and play a strong leadership role in our world, they must possess geographic knowledge, skills, and perspectives. Simply put, if our children are not taught to think geographically, their success and the success of our nation and world in the 21st century are in jeopardy.

This statement emerged from a highly motivated group firmly committed to the goals, importance, and teaching of geographic literacy. The Instructional Materials and Professional Development Committee of the Road Map Project convened to identify the needs for geography education in the 21st century. These needs span every grade level in our nation's formal and informal education systems in public and private education. These needs extend beyond the stand-alone geography course, and they exist in science, technology, mathematics, social studies, arts, and English language arts courses as well. These needs can and should be addressed through carefully designed and properly implemented instructional materials and professional development.

When the needs for geography education are met, this Committee envisions teachers and students actively engaged in generating questions, exploring solutions, and making decisions about personal, local, national, and global issues. We envision learning experiences that captivate students' attention, develop their inquiry and thinking skills, and increase their understandings of the physical and cultural aspects of place. All the while, students are effectively using geospatial technologies—in and out of the classroom—in meaningful ways to access, evaluate, analyze, produce, and share information. These learning experiences also should inspire and support teachers who share their ideas, challenges, student work, and resources in professional learning communities. This vision requires serious attention to two interrelated features of education: the materials developed and adopted for use in classrooms as well as the professional development provided for teachers who will transform this vision to reality.

Recommendations

The goal of this Committee was to create research-based recommendations and guidelines to support: the key knowledge, practices, and dispositions that students and educators must possess; strategies for supporting the professional development of educators; and the design and evaluation of engaging and effective instructional materials in geography. Therefore, this report provides 10 important recommendations for educators, developers, policy makers, and funders to seriously consider in supporting student learning, teacher learning, and large-scale collaboration and change in the field of geography education through instructional materials and professional development. Summarized below, each recommendation is presented in the full report with a core argument and supporting research, vignettes of each recommendation in practice, examples of alignment to other standards, additional information about recommended strategies or principles, and recommended readings.

To support student learning in geography...

Recommendation 1: Focus instructional materials on big ideas and practices of contemporary geography across subjects and grade levels.

Instructional materials support teachers in making important decisions about what to teach and how to teach it. Most of these teachers are not geographers and may need assistance in determining the big ideas (i.e., fundamental principles, concepts, and themes) and appropriate practices of geography to teach their students. Therefore, instructional materials should focus on big ideas, which are identified in the second edition of *Geography for Life: National Geography Standards* (Heffron & Downs, 2012), to help students make sense of geography and continue developing key understandings across learning experiences. Furthermore, instructional materials should illustrate how geographers "think" about questions and problems, providing students with models for "thinking

geographically" and creating opportunities for students to practice this type of thinking. Instructional materials should convey a sense of purpose for learning big ideas and practices and should include a strategic sequencing of learning experiences within and across grade levels. In addition, the materials should include geographically accurate content that honors diverse perspectives.

Recommendation 2: Design instructional materials that build upon students' prior geographic knowledge and experience and challenge students' thinking.

Students are naturally curious about how the world works—both in terms of physical processes and human experiences. Geography is a discipline that can excite this curiosity, and it also can build upon and enrich the knowledge students have developed about their world. Instructional materials should capitalize upon this potential by demonstrating to students that geography is a dynamic and active discipline that is relevant to their daily lives. Acknowledging and building on the ideas and experiences students bring to the classroom is an important component in the learning process. This allows students to strengthen their conceptions while addressing any misconceptions they might have about various aspects of geography. Therefore, instructional materials in geography need to offer classroom activities that elicit students' ideas, and provide information and tools for teachers to anticipate and respond to these ideas. Connecting to or drawing from the rich diversity of students' prior knowledge and experiences relevant to geography, materials should include learning opportunities that take advantage of students' curiosities and interests and include thoughtful questions, discussions, and other activities to challenge student thinking.

Recommendation 3: Develop instructional materials that use teaching strategies to engage all learners in meaningful explorations of geography.

To make day-to-day instructional decisions, all teachers need to be equipped with a diverse repertoire of methods and strategies proven effective to teaching geography. Instructional materials are potentially the most useful resource for helping teachers craft productive learning experiences that meet the needs of their students. Developers of such materials can thoughtfully design learning experiences based on contemporary geography, and on the likely experiences students bring to the classroom, to help teachers understand and utilize the best teaching methods and strategies available. At present, many of the instructional materials in geography utilize limited methods for conveying content—typically promoting direct instruction through lecture, reading, and recitation. Most students do not respond well to these learning conditions, and such modes of instruction do not take advantage of one of geography's greatest assets—that it is a dynamic discipline with a high degree of relevance to students' lives. Programs should engage students in asking questions about contemporary geography issues and problems. They should immerse students in the study of their local geography and connect geography to students' lived experiences. Programs should use teaching methods that capitalize on geographic tools to create vivid firsthand and vicarious experiences, engage all students using diverse modes of instruction, and attend to the inevitable differences among students in a classroom. Programs should build disciplinary language and engage students in the application of geography content and practices within a broad range of contexts.

To support teacher learning in geography..

Recommendation 4: Design instructional materials to be learning tools for teachers.

The design and implementation of most instructional materials focus on supporting *student learning*. Developers provide guides to help the teacher navigate features in the materials but, for the most part, the idea of designing instructional materials to support *teacher learning* is not at the forefront of developers' plans. Given the importance of teachers in shaping what students learn, it makes sense that curriculum developers should pay more attention to what teachers know and how teachers make decisions about their curriculum. Recently, some developers have proposed design features to support teacher learning from the materials. These features are not simply step-by-step instruction manuals, or "how-to guides" for using materials. Instead, the materials serve to support teacher learning as well as to guide student learning. Teacher learning is a complex process of building and integrating knowledge of the discipline with knowledge of teaching practice and student learning (Davis & Krajcik, 2005). Given such complexity, designing instructional materials to be educative for teachers is no simple task. This requires developers to step outside their comfort zone and take a new look at the purpose and goals of materials design.

Recommendation 5: Develop and implement professional development programs that enrich teachers' knowledge of contemporary geography and how to teach it.

Teachers need to have two fundamental types of knowledge to design and carry out meaningful learning experiences for their students: content knowledge and pedagogical content knowledge. In other words, to teach geography well, teachers must have a deep knowledge of the discipline, and how to teach it, in order to improve student learning of the big ideas and practices of geography. However, many teachers of geography do not enter the profession with rich understandings of geography concepts and how to teach them. In most schools, geography is taught as part of the social studies or science curriculum; in elementary schools, geography also may be integrated into reading and writing activities. In these cases, coordinated teaching and learning of the big ideas and practices of geography often is limited. Furthermore, knowledge of geography and how to teach it is not static but changes as disciplinary knowledge develops over time. This means that content-focused opportunities for professional development in geography are essential—even for teachers with adequate preparation in geography—at the outset of and throughout their teaching careers. These opportunities should focus on enhancing teachers' knowledge of geography and how to teach it, and they should give teachers the opportunity to do geography themselves. Programs should include geography content to prepare teachers for skillful instruction within the discipline and to improve teachers' understanding of instructional strategies and methods proven most effective in engaging students in learning specific geographic big ideas and practices.

Recommendation 6: Design and implement coherent and sustained professional development programs with clear and measurable goals.

Professional development programs should create excitement and curiosity for learning geography and should leave teachers eager and prepared to help students develop rich understandings of geography. Professional development designers and providers must recognize teachers as learners, engage them in reflective practice, and encourage their commitment to teaching the discipline over the course of their careers. Professional development programs should promote a meaningful and relevant learning environment for teachers while moving beyond the "one-shot" workshop approach to create a vision of professional development as a sustained process throughout a teacher's career. The aim of high-quality professional development in geography is to help teachers continually reflect on their current teaching so that they include research-based best practices that are tailored to meet the needs of their specific students and contexts. Therefore, professional development should be guided by a vision of effective geography teaching and learning, and should use a model based on a theory of teacher learning with clearly articulated goals and measurable outcomes. Professional development should attend to the needs, challenges, and constraints of local teachers, schools, and communities and should provide specific and usable approaches to bridge the gap between the vision for the professional development and the reality in schools. Programs should develop a plan that clearly considers the logistics and requirements of implementing high-quality professional development in concordance with the program's vision and goals. Finally, program developers should recognize that change is gradual and sometimes difficult in educational settings and, thus, programs should provide for ongoing support and sustainable professional learning activities for teachers.

Recommendation 7: Enhance preservice teacher education programs to emphasize teaching geography across subjects and grade levels.

Most teachers begin their professional development in preservice education programs to build their proficiencies in teaching. Preservice education programs for elementary and secondary educators who will teach geography in a single or interdisciplinary learning environment should provide the necessary teaching and learning experiences to ensure proficiency in teaching contemporary geography. Unfortunately, current teacher preparation programs lack emphasis on teaching geography in preparing both elementary and secondary teachers. Therefore, high-quality preservice education for prospective teachers should provide coursework that promotes a wide and balanced understanding of geography, helps preservice teachers develop geographic perspectives and skills, and prepares them to teach students to use geographic thinking and reasoning effectively. In addition, field placements should allow preservice teachers to observe, inquire about, benefit from, and practice with the most effective models and examples of geography instruction during their field placements, student teaching, and internship teaching experiences. Preservice teachers should have knowledgeable, experienced, and motivating mentors who support and guide their early teaching experiences in geography.

To support large-scale collaboration and change...

Recommendation 8: Develop and fund extensive research and evaluation in geography instructional materials and professional development.

Instructional materials and professional development programs should be studied to determine what is working and what is not working within programs, and how varied program components contribute to improve teacher knowledge and practice as well as student learning. Both research and evaluation are vital tools for gathering empirical information about instructional materials and professional development. As such, research and evaluation should be pursued to help create a research base, provide evidence, and inform decision making in geography education. The geography education community should engage in a strategic research agenda about instructional materials and professional development. Research questions should be connected, focused, and should build upon the findings of previous studies within geography education and related areas of study, advancing the knowledge in this field. For research and large-scale change to occur, funding is required to support programs seeking to advance this agenda. Three promising areas for future research in geography education include design-based research, learning progressions, and uses of technology tools for learning.

Recommendation 9: Create opportunities for sustained and authentic collaboration among geographers, education researchers, and practitioners.

A broad range of individuals representing various academic fields and occupations have expertise in geographic education. Geography professionals, K–16 education practitioners, and education researchers/developers play interrelated roles in creating high-quality instructional materials and professional development programs. Too often in creating instructional materials and professional development, the contributions of one key group or another are non-existent or merely symbolic. We encourage geographers, educational researchers, and practitioners to collaborate in ways that are authentic and sustained throughout the development process—from inception to implementation, evaluation, and revision. Project-specific collaboration is the first step in creating long-term change in the field, but it alone is insufficient. Geographers, education researchers, and practitioners need to develop a culture of collaboration that exists independent of grant-funded and time-delimited projects. Geographers need forums for understanding geography education; practitioners need forums for understanding the dynamic field of geography and how it pertains to the world beyond the school walls; and developers need access to both geographers and practice settings to meld designs with research findings. These forums will require significant resources to develop and sustain, including both funds and the commitment of individuals and groups across multiple professional communities.

Recommendation 10: Design and disseminate tools and exemplars to inspire and support educators, developers, and policy makers in leading the implementation of these recommendations.

Most education materials and tools—student textbooks, teacher guides, educational games, simulations, and the like—are designed to support teachers and students in the classroom. Very few are designed specifically to support and guide professional development leaders and designers, teacher educators, instructional materials developers, researchers, and policy makers. Geography education leaders need new tools and illustrative examples to support them in developing a deep and shared understanding of contemporary geography education and to guide them in changing the ways they support, fund, and develop instructional materials and work with teachers. Carefully developed tools and illustrative examples, such as accessible videocases of effective teaching strategies for preservice educators and web-based maps of student learning progressions about central concepts and practices in geography, will support these leaders and help the field develop and implement instructional materials and professional development programs that meet the needs of today's learners.

Taking Action

When this Committee first convened, the members clearly stated their intent to develop a report that is *useful* in the field of geography education. We recognize that it takes a diverse and committed audience of geographers, educators, researchers, developers, funders, and policy makers to enact large-scale change, and we developed this report with every important audience member in

mind. Therefore, the report can be used flexibly and for a variety of purposes for different groups within that audience. For example, part of this report can be used by administrators to lead materials adoption meetings and by publishers to guide the development of materials. Another part can be used by Geographic Alliance coordinators to create professional development programs, and yet another section can be used by researchers to develop grant proposals. Developers, educators, funders, and policy makers can use the recommendations and guidelines in this report to assist them in designing, sharing, and implementing research-based instructional materials and professional development programs that support effective teaching and learning in geography.

Various stakeholders can support the vision of this Committee and address the goals of this report in multiple ways. We provide some examples of such actions in a section of the report titled "Taking Action," including the following:

Local, State, and National Policy Makers and Funding Organizations

- Provide financial and political support for school and informal education programs that prepare students for careers requiring an understanding of geography and geospatial skills, currently one of the highest U.S. job-growth areas.
- Advocate for state and federal legislation that supports the teaching and learning of geography (e.g., the Teaching Geography Is Fundamental Act).

Curriculum Developers

- Craft materials that incorporate effective and engaging strategies and methods and that are designed in collaboration with teachers who use these strategies to help students develop deep understandings of geographic big ideas and practices.
- Develop materials that focus on depth of geographic understanding around big ideas and practices rather than on superficial coverage of content (i.e., geography facts).

Professional Development Providers and Developers

- Use the recommendations and guidelines in this report to support the development, implementation, and evaluation of successful professional development programs.
- Provide opportunities for long-term and sustained professional development in geography.

Teacher Educators and University Faculty

- Develop collaborative relationships among education; geography; and science, technology, engineering, and mathematics (STEM) faculty to support geographic literacy of the college students who will lead tomorrow's classrooms.
- Promote alignment and integration of preservice education program components to present a cohesive and coordinated approach to understanding geography big ideas and practices.

Teachers

- Provide dedicated instructional time each day throughout the year for sustained learning of geography.
- Avoid teaching geography as simply a litany of locations—the "where" constitutes the basic alphabet of geography, but sophisticated geographic thinking focuses on the "why there?" and the complex connections between places.

District and School-Level Administrators

- Identify, hire, and support teachers with geographic expertise (or the willingness to learn via inservice professional development).
- Demonstrate to parents that geographic literacy is a priority in the school and district.

Parents/Caregivers

- Read stories that are set in diverse places around the world.
- Advocate for geography in your school's curriculum.

While the Committee understands that barriers exist preventing many classrooms from being adequately equipped for this vision of geographic learning, and we acknowledge that educators have competing demands for limited resources, including time for professional development, we assert that the benefits of a geographically literate population are well worth the costs of overcoming these barriers. Reformers, educators, and leaders today promote 21st century learning as preparing students for college, career, and good citizenship. Effective teaching and learning of geographic literacy prepares students—and their communities—for success in all of these areas.

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Road Map for 21st Century Geography Education Project

Assessment

Recommendations and Guidelines for Assessment in Geography Education

Editors

Daniel C. Edelson, Richard J. Shavelson, Jill A. Wertheim

National Geographic Society
Washington, DC

A Report from the Assessment Committee of the
Road Map for 21st Century Geography Education Project

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Executive Summary

Introduction

Student assessments typically are viewed simply as indicators of educational progress, but this report is based on the recognition that the utility of assessments can extend far beyond this role in education. For example, the results of student assessments can provide critical information for decision making in education policy and practice. In addition, what is being assessed and how it is assessed becomes a means to communicate goals and priorities to teachers, students, and other stakeholders in K–12 education.

This report explores how changes and improvements in assessment practices can support efforts to improve K–12 geography education. The report is one of three reports developed as part of the National Science Foundation-funded Road Map for 21st Century Geography Education Project, a collaboration of four national associations committed to improving geography education—the National Geographic Society, the Association of American Geographers, the American Geographical Society, and the National Council for Geographic Education. The other two project reports focus on geography education research and on instructional materials and professional development for geography.

This report begins by laying out a set of issues critical for the design of assessments that support instructional improvement and by reviewing current assessment frameworks and practices in K–12 geography education. The second half of the report contains a proposal for a new approach to assessment in geography that will enable assessment developers to address the critical issues in assessment design. As with the other Road Map Project reports, this one places a particular emphasis on how to move geography education toward a balance between developing geographic knowledge and learning to engage in geographic practices. Specifically, this report follows the balanced approach to geography education called for in the second edition of *Geography for Life: National Geography Standards* (Heffron & Downs, 2012), the national standards document that also was developed through a collaborative effort of the four Road Map Project partners.

Background

The four partners launched the Road Map Project because they share a concern that the poor state of geography education in America is a threat to our country's well-being, and by extension, to the well-being of the global community. The partners share the belief that geography education is essential for preparing the general population for careers, civic lives, and personal decision making in contemporary society. They also believe it is essential for the preparation of specialists capable of addressing critical societal issues in the areas of social welfare, economic stability, environmental health, and international relations. They fear that by neglecting geography education today, we are placing the welfare of future generations at risk.

While inspiring examples of highly effective geography education can be found in nearly every part of the United States, for the overwhelming majority of students, the amount of geography instruction they receive, the preparation of their teachers to teach geography, and the quality of their instructional materials are inadequate to prepare students for the demands of the modern world. Assessments of geographic concepts and skills expose the failure of our educational system in geography, confirming that a vast majority of American students are geographically illiterate. The 2010 National Assessment of Educational Progress (NAEP), known as "The Nation's Report Card," found that fewer than 30% of American students were proficient in geography, meaning that more than 70% of students at fourth, eighth, and 12th grades were unable to perform at the level that is expected for their grade (National Center for Education Statistics, 2011). At 12th grade, more than 30% of students scored below "basic," indicating that they had not mastered even foundational geographic concepts or skills.

The Value of Assessment for Improving Geography Education

This report takes the position that the primary purpose of educational assessment should be for making informed decisions. Because they typically regard assessment as a separate activity from instruction, educators, students, parents, and policy makers often overlook invaluable ways assessments can support and improve teaching and learning. The report describes four ways that assessment results can contribute to improvements in teaching and learning by providing evidence that guides critical decisions.

1. The results of assessments can inform teachers' instructional decisions. When assessments are integrated into instruction, they can improve its effectiveness by enabling the teaching and learning process to be tailored to students' specific needs.

1. The results of assessments can be used to inform decisions about students' academic programs. Assessments introduced at appropriate intervals can be used to measure a student's proficiency against benchmark goals for that student at that point in his or her academic career. The results of these assessments can be used to inform decisions about that student's academic program.
2. The results of assessments can be used to inform decisions about the function and effectiveness of educational programs. Aggregated results of student assessments can be used as part of program evaluation. Used in this way, assessments can inform decisions about program selection, program implementation, and other aspects of instruction. They also can be used in evaluations of the performance of classes, schools, and larger units that might reveal challenges that need to be addressed; likewise, they can be used to inform decisions about where to focus resources.
3. The results of assessments can be used to build a knowledge base for future decision making. Assessment results used for research enable examination of broader questions than those revealed by the performance of a specific student or program. They can be used to examine general questions about teaching and learning geography, such as what makes one approach more effective than another, or how students develop spatial learning skills. The results of these studies can inform efforts to improve education over longer time scales.

Considerations in the Design of Assessments

Designing accurate and useful assessments is extremely challenging. Four of the key decisions in the design of assessments are:

1. **Selection of goals:** What are the specific content and practices required for the competencies being assessed?
2. **Item characteristics:** What are the characteristics of the item that will be used to assess a competency (e.g., task type, response mode, scoring system)?
3. **Item quality:** How will the technical quality of the item be measured (e.g., validity, reliability, fairness)?
4. **Cost effectiveness:** How much time and resources are required to create, administer, and score the assessment?

In making these design decisions, assessment developers must carefully consider the *nature of the content and practices* to be assessed, the *context* in which they will be administered, the *population* whose competencies will be assessed, and the *purposes* for which the results will be used.

One way developers of assessments minimize the challenge of addressing these considerations is through assessment frameworks. An assessment framework plays the role of an outline in writing or a functional specification in engineering. Frameworks provide guidelines for making decisions in the development of an assessment.

Contemporary assessment frameworks use a two-dimensional framework to lay out the content and cognition targets for an assessment, their relative importance, and item characteristics. A comprehensive assessment framework also provides guidance on item quality and cost constraints.

Because of the role assessment frameworks can play in guiding the design of assessments, this report focuses on the development and dissemination of new assessment frameworks as a means to guide the development of high-quality assessments that evaluate 21st century knowledge and skills.

Assessment in Geography Today

To determine how well current assessment projects are aligned with the goals of geography education, as described in *Geography for Life*, this report examines the nature of existing assessment frameworks and current assessment practices in K–12 geography education.

Assessment Frameworks in Geography Education Today

There are currently three prominent assessment frameworks being used in K–12 geography education in the United States:

- **National Assessment of Educational Progress in Geography (1994, 2001, 2010).** The NAEP geography framework is the basis for assessments that are used in a national evaluation of geography education outcomes at grades 4, 8, and 12.
- **Advanced Placement Human Geography (2000).** The framework for Advanced Placement Human Geography (APHG) guides the design of the examination used by the College Board to determine if high school students who have completed an AP course in human geography have achieved a level of mastery equivalent to successful completion of an undergraduate course in the subject.

- **National Assessment of Educational Progress for Science (2008).** The NAEP Science framework is the basis for assessments that are used in a national evaluation of science education outcomes at grades 4, 8, and 12. It includes concepts and practices that are included in Geography for Life, such as, Earth processes, ecology, human-environment interaction, data analysis, and communication.

This report concludes that these three frameworks place too little emphasis on geographic practices to accurately assess students' mastery of the goals outlined in *Geography for Life,* although the NAEP Science framework serves as a model of how to assess other scientific practices.

Assessment Practices in Geography Today

This report includes the findings of a study, commissioned for the report, of existing K–12 geography assessments. The study was conducted to gather in-formation about how well current assessment practices reflect the goals of *Geography for Life,* and how well they implement the principles of effective assessment design described above.

The study found the content evaluated by current assessments is unevenly distributed across the goals described in *Geography for Life*. For example, 40% of all items across both large-scale and classroom assessments evaluated knowledge from only three out of the 16 content standards, and far fewer items assessed content from the *Environment and Society* category compared with any other content area. The study also found that geographic practices are not being widely assessed. Only 30% of large-scale geography assessment items required that students use any geographic practices at all. *Analyzing geographic information* was assessed in 21% of all large-scale items, but other geographic practices were rarely assessed (Figure 1).

The study found that assessments are largely failing to probe deep understanding. More than half of the large-scale assessment items required only declarative knowledge (e.g., *knowing that*), often at the level of recognizing a definition. Only 28% assessed students' procedural knowledge (e.g., *knowing how*), which includes reading and gathering information from maps, graphs, and texts. And, only 17% of geography items required schematic knowledge (e.g., *knowing why*), which includes explaining an unfamiliar context by drawing on general geographic principles or models.

Finally, the study revealed widespread problems with item quality. Of the items studied, 60% were judged to have problems that could impede students' ability to accurately represent what they know and what they can do with their geography knowledge.

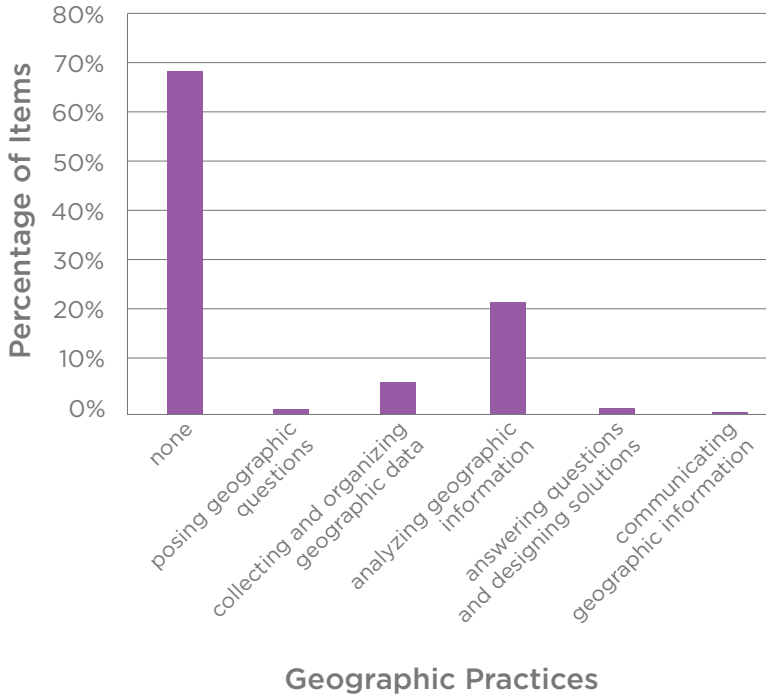
The report's review of current assessment practices reveals that both assessment frameworks and actual assessments do not reflect the balance between assessing what students know and their ability to apply their knowledge that is required to evaluate the development of 21st century geography competencies. Even within knowledge and practices, the review of assessment items reveals a large imbalance, as well.

A 21st Century Assessment Framework for the Geographical Sciences

This report introduces a new assessment framework to serve as a blueprint that guides the development of a new generation of geography assessments. Called a *21st Century Assessment Framework for the Geographical Sciences* (AFGS21), its goal is to support the design of assessments that are aligned with the goals of the national geography standards.

AFGS21 was designed to be a general assessment

Figure 1. Frequency Distribution of Large-Scale Geography Assessment Items That Target Each Geographic Practice



framework that would cover all of K–12 geography, with the idea that it will be a template for more specific assessment frameworks for specific contexts, audiences, and purposes. The report also lays out a process for creating specific assessment frameworks from AFGS21 and for using those frameworks to develop assessments.

The two dimensions of AFGS21 are designated as *content* and *cognition*. The categories in the content dimension are defined by the content standards in *Geography for Life*. The categories in the cognitive dimension are divided into *knowing and understanding* and *geographic practices.* The geographic practices, in turn, are divided into six categories. A central feature of the framework is a matrix that is used to blend the two dimensions systematically, articulating the specific performance expectations to be assessed. The contents of a cell within the matrix might describe a geographic concept that students would be expected to know or understand, or a cell might refer to the application of a geographic practice using a particular concept.

The report describes a process for developing specific assessment frameworks from AFGS21 that begins with defining the subset of content and cognition to be assessed, and the detailed process continues through the stage of specifying the desired distribution and characteristics of items. The assessments developed through this process and implemented by teachers, program and material developers, and researchers have the potential to be powerful tools for advancing the goals of geography education reform.

Road Map for 21st Century Geography Education Project

Geography Education Research

Recommendations and Guidelines for Research in Geography Education

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Executive Summary

Introduction

In our rapidly changing, interdependent, and complex world, the importance of "the geographic advantage" (Hanson, 2004) and geography education is evident. Geography education provides critical preparation for civic life and careers in the 21st century. It also is essential for postsecondary study in a wide range of fields from marketing and environmental science to international affairs and civil engineering. In the modern world, every member of society increasingly is called on to make decisions that have far-reaching consequences. Geography education helps prepare people to make these decisions.

Yet the current state of geography education in the United States is a concern. Although examples of excellence in geography education can be identified in every part of the country, they are the exception. More typically, the amount of geography instruction that students receive, the preparation of their teachers to teach geography, and the quality of instructional materials are inadequate to prepare students for the demands of the modern world.

Assessments of geographic concepts and skills confirm the failure of our educational system to provide students with an adequate understanding of geography. The 2010 National Assessment of Educational Progress (NAEP), known as "The Nation's Report Card," indicated that the overwhelming majority of American students are geographically illiterate (National Center for Education Statistics, 2011). It found that fewer than 30% of American students were *proficient* in geography, meaning that they were able to perform at the level that is expected for their grade. More than 70% of high school graduates are not prepared to do the ordinary geographic thinking required in the course of caring for themselves and their families, making consequential decisions in the workplace, and participating in the democratic process.

We need better and more research before we can understand even the most fundamental ways individuals develop proficiency in geography. The current state of geography education across the United States is a threat to our social, political, and economic well-being.

A Road Map for 21st Century Geography Education: Geography Education Research

The Road Map for 21st Century Geography Education Project focuses special attention on the practices of thinking geographically and doing geography, that is, the behaviors that comprise geographic inquiry and problem solving. The project adopts the learning goals of the second edition of *Geography for Life: National Geography Standards, Second Edition* (Heffron & Downs, 2012) to provide a structure outlining what students must know and what they must be able to do to be geographically proficient.

This report focuses on two questions, posed as charges to the Geography Education Research Committee: (1) What areas of research will be most effective in improving geography education at a large scale? (2) What strategies and methodologies can relevant research communities develop and adopt to maximize the cumulative impact of education research in geography?

The first question is addressed in Chapter 2. This Committee suggests two strategies to improve geography education research: (1) careful consideration of education research in related fields, including science and mathematics education, more specifically, research in learning progressions or trajectories and related instructional interventions; and (2) creation of a framework for geography education research. The framework consists of two parts: the practices of geography and four key research questions. The geographic practices, which *Geography for Life* argues are essential to learning and thinking proficiently in geography, are:

- formulating geographic questions;
- acquiring, organizing, and analyzing geographic information; and
- explaining and communicating geographic patterns and processes.

To understand in depth how students learn each of these geographic practices, four education-related key research questions are proposed. These questions are applicable to geography learners of all ages and educational backgrounds, whether they are engaged through schools or informal communities. The four key research questions are: (1) How do geographic knowledge, skills, and practices develop across individuals, settings, and time? (2) How do geographic knowledge, skills, and practices develop across the different elements of geography? (3) What supports or promotes the development of geographic knowledge, skills, and practices? (4) What is necessary to support the effective and broad implementation

of the development of geographic knowledge, skills, and practices? Together, the practices of geography and key research questions provide an agenda and direction for geography education research.

The second question posed to the Committee, "What strategies and methodologies can relevant research communities develop and adopt to maximize the cumulative impact of education research in geography?" is addressed in Chapter 4. The Committee recommends connecting the relatively small community of geographers and others who conduct research in geography education with the broader community of scholars from the learning sciences, education, and related fields. This cooperation and collaboration will inform, assist, and enable more generative activities such as developing a suite of exemplars that can be used in geography and other fields. It also will encourage studies that align to the key research questions suggested previously; are situated in a problem context; focus on the core ideas, knowledge, skills, and practices of geography; draw from research about cross-cutting themes and foundational concepts from other disciplines; and use common tasks, measures, and assessments.

Recommendations

The report concludes with 13 recommendations to improve research in geography education and, thus, to develop a more geographically proficient and literate society.

The Committee's recommendations are organized around the two key charges to the Geography Education Research Committee. A hierarchical order of recommendations is not implied as both charges are equally important. The Committee leaves it to the individuals and groups reading and responding to this report to prioritize the recommendations.

Recommendations Focused on Charge 1

What areas of research will be most effective in improving geography education at a large scale?

Recommendation 1
The Committee recommends that geography education researchers engage in systematic efforts to identify learning progressions in geography both within and across grade bands (e.g., grades K–4, 5-8, 9-12).

Recommendation 2
The Committee recommends research that examines the components and characteristics of exemplary geography curricula.

Recommendation 3
The Committee recommends research to investigate the characteristics of effective geography teaching.

Recommendation 4
The Committee recommends research about fieldwork and its impact on learning geography knowledge, skills, and practices.

Recommendation 5
The Committee recommends that research about teacher preparation in geography be conducted with the goal of determining what is needed to produce educators able to understand and teach for student mastery of the content and practices of geography.

Recommendations Focused on Charge 2

What strategies and methodologies can relevant research communities develop and adopt to maximize the cumulative impact of education research in geography?

Recommendation 6
The Committee recommends interdisciplinary and multidisciplinary approaches, drawing on relevant research results.

Recommendation 7
The Committee recommends that geography education researchers follow established principles for scientific research in education (National Research Council, 2002), and that they collect data scientifically from large samples of students in schools, other learning environments, and laboratory settings.

Recommendation 8
The Committee recommends researchers develop and study exemplary programs, curricula, tasks, measures, and assessments to build the body of knowledge about effective geography teaching and learning.

Recommendation 9
The Committee recommends building partnerships with formal and informal educators to conduct research in a range of learning contexts and to share findings among the community of geography education researchers.

Recommendation 10
The Committee recommends the creation or designation of an institution to coordinate the implementation, dissemination, and knowledge transfer of research results.

Recommendation 11
The Committee recommends development of "learning research" opportunities. Pre- and post-doctoral training programs, similar to the National Science Foundation's (NSF) Fostering Interdisciplinary Research on Education (FIRE), can prepare participants for a range of career opportunities that promote and disseminate geography education research.

Recommendation 12
The Committee recommends the development and publication of a handbook that includes online tools and exemplars and that suggests areas in need of additional research.

Recommendation 13
The Committee recommends that the National Assessment of Educational Progress (NAEP) Geography assessment be conducted at more frequent and regular intervals and that more funding for greater analysis of the test results be provided.