Making a Place for Space

Roger M. Downs
Halfway through preparing his talk, Roger realized that he was preaching to the choir.
Case Statement

--rationale & justification for a campaign
Case Statement

-- rationale & justification for a campaign

-- focus on problems to be fixed or solved
Case Statement

-- rationale & justification for a campaign

-- focus on problems to be fixed or solved

-- identifies proposed resolution
Case Statement

-- rationale & justification for a campaign

-- focus on problems to be fixed or solved

-- identifies proposed resolution

--- anticipates major questions:

... Why us? Our organization
... Why now? The problem
... Why you? The audiences
“Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make big plans; aim high in hope and work.”

Daniel Burnham
Goal

Every student should graduate with a working understanding of the theory & practice of spatial thinking
Rationale: 1

Spatial thinking is an essential underpinning to life in the physical & virtual worlds.
Rationale: 2

Geospatial tools & technologies are integral to everyday life, business, research, & government.
Rationale: 3

Students must be informed, wise, & ethical in their use of a wide range of spatial thinking tools.
Rationale

Spatial thinking is an essential underpinning to life in the physical & virtual worlds. Geospatial tools & technologies are integral to everyday life, business, research, & government. Students must be informed, wise, & ethical in their use of a wide range of spatial thinking tools.
Basis for The Case
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Computers help us to answer questions about matters ranging from the future of the world's climate to the workings of the body's cells. Computer output, however, can seem to be little more than mounds of dry data, completely disconnected from the dynamics of the original event. To better connect the answers to the questions, we have come to use visualization techniques such as computer graphics, animation, and virtual reality—all pioneered with NSF support.
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**Visualization**

A way to see the unseen
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GIS and the Future of Humanities Scholarship

GIS Regional Workforce Analysis

The Heldrich Center will perform two tasks to better understand the workforce demand and educational supply dynamics related to GIS in the southern New Jersey area. First, the Center will perform a detailed assessment of the GIS-related workforce and skill needs of employers. Second, the Center will develop a profile of existing GIS education and training activities at the community college and four-year college levels, as well as major programs at the secondary level. These activities will be used to clarify the gaps that exist between the skill needs of local employers and the current capacity of the region's education system to meet these needs. Project deliverables will identify key findings on the nature of the demand for GIS workers in the region, the current capacity of the region to meet those needs, and suggested action steps for building new educational programs that address important gaps between employer demand and educational supply in the region.
Structural Challenges
Disciplinary Silos
Space plays a minor role in the college curriculum.
Models for Change
From 1990 to the end of 1999, the Library of Congress and the National Institute of Mental Health of the National Institutes of Health sponsored a unique interagency initiative to advance the goals set forth in a proclamation by President George Bush designating the 1990s as the Decade of the Brain: "to enhance public awareness of the benefits to be derived from brain research" through "appropriate programs, ceremonies, and activities." To achieve this public recognition, the LC/NIMH Project on the Decade of the Brain sponsored a variety of activities including publications and programs aimed at introducing Members of Congress, their staffs, and the general public to cutting-edge research on the brain and encouraging public dialogue on the ethical, philosophical, and humanistic implications of these emerging discoveries.
House and Senate Resolutions

Presidential Proclamation
Activities

--public symposia in DC
--congressional breakfasts
--public TV programs
--op-ed columns
--books
--BrainWeb & Brainy Kids Online
--Brain Awareness week
Brain Awareness Week (BAW) is the global campaign to increase public awareness of the progress and benefits of brain research.

Every March, BAW unites the efforts of partner organizations worldwide in a celebration of the brain for people of all ages. Events are limited only by the organizers’ imaginations and include open days at neuroscience labs; exhibitions about the brain; lectures on brain-related topics; displays at libraries and community centers; classroom workshops; and more.
The Decade of Behavior 2000 - 2010

Research Award Recipients

About the Decade of Behavior
What is the Decade of Behavior? /// Exploring Behavior Week /// Who is Involved /// Participate!

Announcements from Foreign Affiliates

News
Articles/Press /// Research Awards /// Distinguished Lectures

Publications
Behavior Matters Booklet Series /// Smithsonian Lectures

Seminars

Resources
Posters, postcards, banners /// Finding Funding

Upcoming Deadlines

Call for Nominations for Distinguished Lecturer
Deadline: December 15, 2008

Nominate a Grad Student for Exploring Behavior Week
Models for Implementation
The Santa Fe Institute is a private, not-for-profit, independent research and education center, founded in 1984, where leading scientists grapple with some of the most compelling and complex problems of our time.

Researchers come to the Santa Fe Institute from universities, government agencies, research institutes, and private industry to collaborate across disciplines, merging ideas and principles of many fields -- from physics, mathematics, and biology to the social sciences and the humanities -- in pursuit of creative insights that improve our world.

The Institute's scientific and educational missions are supported by philanthropic individuals and foundations, forward-thinking partner companies, and government science agencies.
About NCAR

The National Center for Atmospheric Research (NCAR) is a federally funded research and development center devoted to service, research and education in the atmospheric and related sciences. NCAR’s mission is to understand the behavior of the atmosphere and related physical, biological and social systems; to support, enhance and extend the capabilities of the university community and the broader scientific community – nationally and internationally; and to foster transfer of knowledge and technology for the betterment of life on Earth. The National Science Foundation is NCAR's primary sponsor, with significant additional support provided by other U.S. government agencies, other national governments and the private sector.

NCAR Locations
NCAR History
NCAR Mission Statement
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Welcome to NCGIA

The National Center for Geographic Information and Analysis is an independent research consortium dedicated to basic research and education in geographic information science and its related technologies, including geographic information systems (GIS).
Learn From Parallel Efforts
GRAPHICACY

noun /ˈɡræfɪkəsi/ [fr.] 1965

1. A literacy of pictorial encoding and decoding
2. The realization of information in a visual format
3. A roster of skills to comprehend optical inputs
"MIT is where science and society meet." – MIT President Susan Hockfield

Scholars in the Program in Science, Technology, and Society (STS) conduct research at that meeting point, from the history of science and technology to anthropology, sociology, and literature. Scholars in STS ask “How do changes in science and technology affect what it means to be human?” and, conversely, “How do science and technology express human values?”

**In the News**

**Spotlight**

**Fall 2012 Events**

Monday, October 22

Digital State: Industrial Districts and the Emergence of Minnesota’s High Tech Economy

Thomas Misa, Babbage Institute | University of Minnesota
Commenter: TBA
4:00 pm, 32-455
Welcome to STS

Please Note: The STS Program will be closing on July 1, 2012. Please contact the Director if you have any questions.

Science and technology continue to shape our society in profound ways. Entering the 21st century, our society is in need of well-educated individuals with a command of scientific and technical concepts. The sciences and engineering further require cultural, ethical, legal, and historical frameworks to critically assess the appropriate and far-sighted application of these new concepts and cutting-edge technologies.

The Science, Technology, and Society Program (STS) provides an interdisciplinary approach to the social, historical, ethical, philosophical, legal, and policy implications of scientific research, engineering, health, and medicine. Due to their engagement with multiple sides of current scientific and technical issues, STS scholars are uniquely positioned to take a leading role in shaping society. For the University, STS provides a means of bridging academic disciplines and forging new initiatives across disciplinary boundaries. For our students, STS provides an opportunity to bridge disciplinary interests, expand research possibilities, and learn the analytical skills needed to be competitive in an increasingly globalizing market for the sciences and technology.

Cross-cutting issues such as these are the important — even civilization challenging — topics that the field of Science, Technology and Society faces on a routine basis.
Give me a place to stand and I will move the Earth.

Archimedes

Entry Points
1. General Education

AAC&U has worked intensively on the issue of general education reform since the early 1980s. AAC&U general education initiatives aim to ensure that every undergraduate student experiences a relevant and challenging general education curriculum. In addition to working with campuses to strengthen their general education programs overall or to reform specific aspects of them (e.g. science requirements or diversity requirements), AAC&U initiatives address strengthening general education for transfer students, embedding high expectations and meaningful assessment of student learning, and general education as essential for enhancing curricula and pedagogy.
Eight Elements of General Education

The Task Force on General Education’s final proposal for that part of undergraduate studies specifies courses in eight subject areas, in addition to the College’s requirement for some foreign-language proficiency and Expository Writing, a first-year mandate (itself subject to revision, to incorporate instruction in writing and speaking throughout a student’s academic experience). The categories are:

- Aesthetic and interpretive understanding;
- Culture and belief
- Empirical reasoning;
- Ethical reasoning;
- Science of living systems;
- Science of the physical universe;
- Societies of the world; and
- The United States in the world.
WHAT IS GENERAL EDUCATION?

The inclusion of General Education in every degree program reflects Penn State's deep conviction that successful, satisfying lives require a wide range of skills and knowledge. These skills include the ability to reason logically and quantitatively and to communicate effectively; an understanding of the sciences that makes sense of the natural environment; a familiarity with the cultural movements that have shaped societies and their values; and an appreciation for the enduring arts that express, inspire, and continually change these values. General Education, in essence, augments and rounds out the specialized training students receive in their majors and aims to cultivate a knowledgeable, informed, literate human being.

Penn State’s General Education program is designed to enable students to:

- acquire knowledge through critical information gathering, including reading and listening, computer-assisted searching, and scientific experimentation and observation;
- analyze and evaluate, where appropriate in a quantitative manner, the acquired knowledge;
- integrate knowledge from a variety of sources and fields;
- make critical judgments in a logical and rational manner;
- develop the skills to maintain health and understand the factors that impinge upon it;
- communicate effectively, both in writing and orally, and using the accepted methods for presentation, organization, and debate particular to their disciplines;
- seek and share knowledge, independently and in collaboration with others;
- gain understanding of international interdependence and cultural diversity and develop consideration for values, lifestyles, and traditions that may differ from their own;
- comprehend the role of aesthetic and creative activities expressing both imagination and experience.
2. The Liberal Arts
FIGURE 1: The Seven Liberal Arts

THE TRIVIUM:
The three arts of language pertaining to the mind
Logic................art of thinking
Grammar.........art of inventing and combining symbols
Rhetoric...........art of communication

THE QUADRIVIUM:
The four arts of quantity pertaining to matter
Discrete quantity or number
Arithmetic.........theory of number
Music...............application of the theory of number
Continuous quantity
Geometry...........theory of space
Astronomy ......application of the theory of space
THE QUADRIVIUM:
The four arts of quantity pertaining to matter

Discrete quantity or number
  Arithmetic........theory of number
  Music...............application of the theory of number

Continuous quantity
  Geometry........theory of space
  Astronomy .......application of the theory of space
What To Do
Next?
Generate a Case Statement

--goal(s)
--rationale & justification
--needs & *supporting evidence*
--benefits of acting & costs of not doing so
Challenges

--deceptive obviousness of spatial thinking
Challenges

--deceptive obviousness of spatial thinking
--must be cross-disciplinary; move beyond discipline-based structure of potential Federal funding agencies
Challenges

--deceptive obviousness of spatial thinking
--must be cross-disciplinary; move beyond discipline-based structure of potential Federal funding agencies
--lack immediate connection to businesses, except for GIS
Challenges

--deceptive obviousness of spatial thinking
--effort must be cross-disciplinary; need to move beyond discipline-based structure of potential Federal funding agencies
--lack immediate connection to businesses, except for GIS
--need to cultivate supportive businesses & foundations
Resolving Ambiguities & Questions

--is it spatial thinking or thinking spatially?
Resolving Ambiguities & Questions

--is it spatial thinking or thinking spatially?

--is it different from: Spatial skills?  Spatial intelligence?
Resolving Ambiguities & Questions

--is it spatial thinking or thinking spatially?

--is it different from: Spatial skills? Spatial intelligence?

--if it is so important, why have we not paid attention to it before now?
Resolving Ambiguities & Questions

--is it spatial thinking or thinking spatially?

--is it different from: Spatial skills? Spatial intelligence?

--if it is so important, why have we not paid attention to it before now?

--where does it live on campus?
“There's all the difference in the world between having something to say, and having to say something.”

John Dewey
"The only reason for time is so that everything doesn't happen at once."

Albert Einstein
“Space and time are modes by which we think, not conditions under which we live.”

Albert Einstein
Are You Preaching to the Choir?