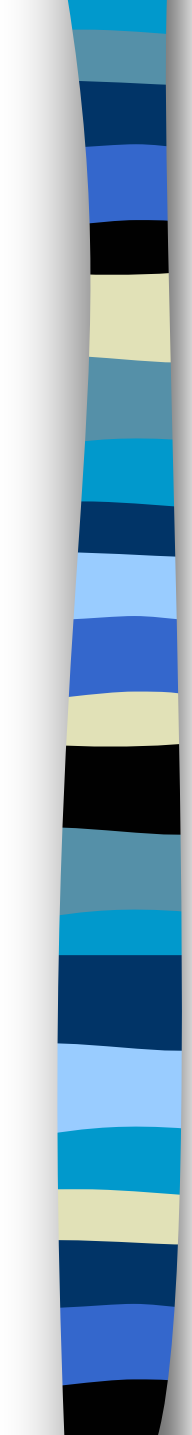


Gap Analysis: Bridging the Space Between What We Know and What We Want to Know

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In information technology, gap analysis is the study of the differences between two different information systems or applications, often for the purpose of determining how to get from one state to a new state. A gap is sometimes spoken of as "the space between where we are and where we want to be."

- 1. What do we know?**
- 2. What don't we know?**
- 3. What should we do to fill in the gaps in our knowledge?**



The Algorithmic Approach to Gap Analysis

(were it only this simple)

State of Complete Knowledge

-- What We Know

= What We Don't Know



Design Principle 1 (from Executive Summary of NRC Report, 2002)

Staff the Agency with People Skilled in Science, Leadership, and Management

“Research staff should hold similar qualifications [leadership capabilities; be respected researchers in education], as well as be adept at writing grant announcements, engaging with the field to identify research gaps and priorities, and assembling panels of peers to perform various tasks” (NRC Report, 2002, p. 7).

National Research Council. (2002). Scientific research in education. R. J. Shavelson & L. Towne (Eds.), Committee on Scientific Principles for Educational Research. Washington, DC: National Academy Press.



Scientist-Administrators at the NICHD

“The identification or recognition of underinvestigated but potentially fruitful areas of investigation is important for the success of the Institute and for the advancement of science. Scientist-administrators are in a unique position that allows them to identify areas in need of special support” (Friedman & Baldwin, 1990, p. 56).

Friedman, S.J., & Baldwin, W. (1990). Scientist-administrators at the National Institute of Child Health and Human Development as contributors to the scientific enterprise. *American Psychologist*, 45, 54-57.



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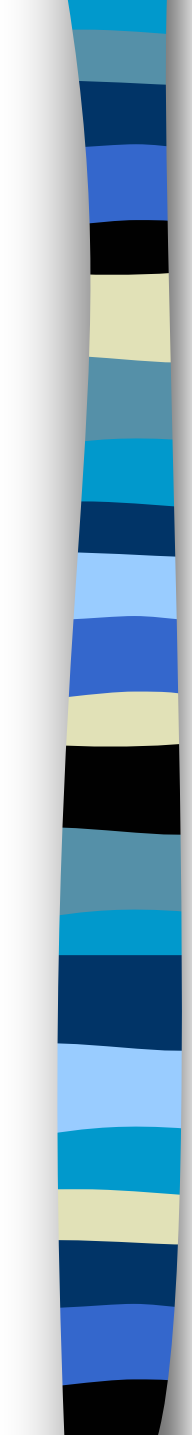
“Their [scientific-administrators] responsibilities as monitors of the progress of grants and as observers of the review of new applications gives them a bird’s-eye view of their own scientific field. Through their contact with advisors who are well aware of leading scientific issues, they learn about potential areas for breakthrough and important problem areas”

(Friedman & Baldwin, 1990, p. 56).



Sources of Ideas for Developing Funding Initiatives at the NICHD

- Reports issued by the National Academy of Sciences
- Recommendations emerging from scientific workshops sponsored by the NICHD, sometimes in partnership with other federal agencies (e.g., U.S. DoED)
- Suggestions from members of the National Advisory Child Health and Human Development Council
- Directives from the United States Congress
- Advice and counsel proffered by scientific societies as well as professional associations, including those comprised of practitioners
- Assessment of the current research literature by NICHD program directors
- Suggestions generated from informal meetings, exchanges, and discussions between program staff and individual researchers



During the process of developing a funding initiative, an NICHD program director may combine some of the ideas emanating from these various sources, modify others, and/or provide some of his/her own perspectives, as for example when attempting to:

- Stimulate a new area of research
- Seed innovative opportunities for collaborative efforts that require combinations of expertise from somewhat disparate domains
- Rejuvenate a field by supporting the application of state-of-the-art of approaches that could yield novel directions for future research



Scientific Roadmaps

“A roadmap is an extended look at the future of a chosen field of inquiry composed from the collective knowledge and imagination of the brightest drivers of change in that field. Roadmaps can comprise statements of theories and trends, the formulation of models, identification of linkages among and within sciences, identification of discontinuities and knowledge voids, and interpretation of investigations and experiments” (Galvin, Science, 1998, p. 803).



Continued:

“The optimal process for gathering and selecting the content of roadmaps is to include as many practicing professionals as possible in workshops periodically in order to allow all suggestions to be considered and to objectively evaluate the consensuses that will more often than not emerge. Roadmaps communicate visions, attract resources from business and government, stimulate investigations, and monitor progress. They become the inventory of possibilities for a particular field, thus stimulating earlier, more targeted investigations. They facilitate more interdisciplinary networking and teamed pursuit” (Galvin, 1998, p. 803).



Mathematical Cognition: From Numerical Thinking to Mathematics Education

NICHD Conference

The NICHD meeting constituted a productive first step toward drafting a roadmap for the area of mathematical learning and cognition. It achieved this by laying out the boundaries of the terrain that should be covered in future research expeditions, and by sketching in some of the principal interdisciplinary highways that must be constructed over the next several years to establish a more cohesive vision for the field. A viable scientific roadmap need not limit Galvin's "drivers of change" to only one or two routes, but it can at the very least ensure that they will be heading in a similar direction. To assist some of these drivers in staying on the road, the Child Development and Behavior Branch of the NICHD will use the recommendations that emerged from the conference as the basis for generating a Request for Applications that will target some of the key priorities for future funding.

Berch, D. B. (1999). Toward a roadmap for the study of mathematical cognition and development. NICHD Technical Report.



Mathematics Cognition and Specific Learning Disabilities (RFA HD-02-031)

NICHD and OSERS invite innovative research grant applications designed to contribute to new knowledge in the area of mathematical cognition and learning, with a focus on:

- The discovery of cognitive, perceptual, behavioral, genetic, hormonal, and neurobiological mechanisms that are influential in the expression of mathematical learning abilities.
- The role of individual differences in the development of mathematical proficiency (e.g., gender, sociocultural factors, SES).
- Specific learning disabilities in mathematics, including definition, classification, epidemiology, diagnosis, preventive strategies, and early intervention.



Adult and Family Literacy Workshop

A panel of experts from various disciplines was convened to assess the current state of knowledge about effective approaches to improving the literacy skills of low-literate adults and about the role of family literacy services in providing parents with the knowledge and skills they need to support their children's literacy development as well as their own.



Questions posed to the participants:

1. What do we know about instructional effectiveness? What do we need to know, and how might this be approached? (research design, methods, etc.)
2. What do we know about the timing and mode of delivery of reading instruction for programs in these two areas (intensity, duration, organizational structure)?
3. What special measurement and assessment issues must be addressed?
4. What are the professional development needs in the field and how might they be approached from a research vantage point?
5. What are the specific needs that must be met in order for rigorous, high quality research to be done in these fields? For example, establishment of research collaborations across fields and disciplines, coordination across multiple sites to increase number of research participants, development of common protocols across projects. What else do we need to consider to move these fields forward?



Emergent And Early Literacy Workshop: Current Status And Research Directions

This workshop sought to bring together researchers, practitioners, policy makers, and university educators to consider the current state of knowledge about emergent and early literacy learning in all young children, including those with disabilities and other literacy learning risks. The goal of the workshop was to discuss the gaps in current knowledge and to inform the national direction of literacy research and practice.



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In addition to specific topics, each speaker was asked to address the following common themes:

- Converging findings and research gaps in emergent and early literacy
- Practical concerns that influence research design and implementation in investigations of emergent and early literacy
- Implications for individuals working in different professional roles and disciplines



Question for the Workshop

Participants:

What additional knowledge is needed about early literacy learning? That is, what literacy instructional practices work for different professionals and families at specific developmental stages, times, conditions, settings, and at particular levels of intensity and duration?



Definitive Study of Metacognition: Knowing about Knowing

On knowing how to know when you know
enough about what you know that you should
have known that it wasn't even worth knowing
about. Know what I mean?

(Berch, 1975, personal communication – with myself)