

DECEMBER 2015 EHR ADVISORY COMMITTEE

HIGHLIGHTS

For full notes see <https://drive.google.com/open?id=0B9EmfBgyof1PeTB4ZVNIR0NSeUk>

I. Introductory Remarks:

- AC asked to not just advise but to participate in efforts to draw attention to science.
- Many ongoing efforts out of EHR to raise the profile of the science and participate in collaborative within NSF and in interagency activities.
- Joan is interested in:
 - Impact of our investments
 - Coherence of the portfolio
 - Capitalizing on EHR's unique role as an education agency within a science agency
 - Growing the STEM education research portfolio
- These aims are guided by the re-envisioning report
- New efforts are underway to better understand the impact and coherence of our investments.

II. Revisiting the Re-envisioning Document...:

- Jolene introduced many ways that the 3 pillars are supporting EHR strategy and introduced new areas of opportunity.
- Several concepts came out of the AC discussion:
 - EHR could identify the goals/purposes of and key players in the STEM Education Enterprise to make a broad contribution to the organization and direction of STEM education reform.
 - EHR could make Equity, Inclusion, and Broadening Participation in STEM central to all of its work.
 - EHR could reconsider its research agenda and funding/impact timelines for its investments in order to take advantage of longer term opportunities and continue to align its investments with the 3 pillars.
- How to collaborate within the STEM education enterprise was also discussed – leading to suggestion about how NSF should influence and support the research to practice pipeline.

III. HBCU Report:

- Tuajuanda Jordan introduced the audience to the 3 categories of HBCUs identified and the suggestions made for them in the report.
 - Research active receiving R&RA funding and EHR funding
 - Transition – primarily funded from EHR (HBCU-UP)
 - Never Applied for NSF funding
- The Assistant Directors of the NSF Directorates joined the AC in a discussion of the recent HBCU report.
- AC members expressed concern about the following issues:
 - \$ value of partnerships with research universities to the HBCUs.

- Complexity of awards administration for small schools, infrastructure building grants could mediate this.
- Community-wide engagement is needed to make real impact. Relationship building and mentoring is essential.
- Teaching loads can be an impediment and reliance on summer visitations to research institutions are not sufficient nor manageable. Funding for support staff or postdocs could solve this?

IV. Vision and Plan for Grand Challenges:

- Dr. Deborah Loewenberg Ball illustrated the importance of grand challenges to stimulate thinking about education in a specific field as well as creating big breakthroughs with the example of the NSF Oceanic Science Institute. She also addressed the size of NSF commitment to education and the NSB interest in the development of a grand challenge for education research and challenged the AC to propose grand challenge topics for EHR leadership to consider and develop further.
- The AC perspective was that thinking of grand challenges in STEM is a valuable pursuit for EHR and acknowledged that the current “laissez-faire” system where each researcher decides what is important to them will not produce answers to grand challenges.
- The following big problems in education research were broached:
 - Understanding the interactions involved in student learning.
 - Understanding the learning challenges among diverse culture backgrounds.
 - Developing teaching practice.
 - Learning how to determine what the most appropriate metrics are and how to collect, measure, and analyze them.
- Advances that could make grand challenges accessible were also discussed:
 - Larger more collaborative communities of researchers are sharing data.
 - Technology makes it possible to collect, store, access, and interpret (machine learning, etc.) larger sets, more diverse sets, and new kinds of data on educational phenomena (e.g., video, dynamic).
 - New ideas about measurement and analysis are being developed and used.
- Discussion of the nature of a grand challenge for education generated the following description:
 - 20-40 year challenge
 - Big problem
 - Problem for which data could be brought to bear
 - Leverages progress in theory and understanding
 - Utilizes new tools and methods of measurement
 - Involves communities of researchers with diverse interests and backgrounds.
 - Could involve one or more approaches to infrastructure.
 - Could build on a body of micro-literature (infrastructure from aggregate data)
 - Applies broadly across the directorates of NSF
- A number of questions were developed to consider in the context of grand challenges:
 - Would it be useful to develop a project to explore this idea of grand challenges in education?
 - Is this a good time?

- Who would/could do it and why? What role should NSF play?
- How could the experience from other fields be capitalized to develop the idea in education research?
- What might be the pitfalls of trying to do this that could be addressed through new approaches to research in education?
- Thematic areas for grand challenges that were broached by the AC were:
 - Standards
 - Active Learning
 - Tests
 - Teacher prep and support
 - Education Systems
 - Critical/Scientific thinking populace as a national priority

V. Update from the NSF Director

- Comments from the Director
 - Improvement is needed in Interdisciplinary research
 - Should there be a menu of grand challenges similar to how astrophysics does it.
- AC Questions
 - How are Directorates evaluated and held accountable?
 - OMB identified Areas, no consistent plan, OISE programs are undergoing eval – could be a model
 - What is vision for diversity in US science?
 - Science is for everyone, INCLUDES scales up NSF broadening participation, more effort in thinking about these programs in a systems engineering sense and putting emphasis on citizen science -> open/public science at the NSF
 - How do we better include Veterans?
 - Lots of vets do receive opportunities, should better target GI bill participants at community colleges, REU for community colleges is a good idea. REU programs needs an alumni element.
 - How can we better educate the populace about STEM as a route to social mobility?
 - FY16 budget addresses this some, this is more relevant nationally than inside the beltway.
 - Can NSF leverage ideas about STEM education to the entrepreneurial community? – Extend the vision without federal funding?
 - MACOS almost brought down the agency but meeting with Silicon Valley entrepreneurs soon. I-Corps program does this some.
 - How do we better leverage resources that NSF has already funded for education?
 - We are diligent about research data management but less so about educational materials...

VI. Challenges and Opportunities Surrounding Partnerships: Open Educational Resources and I-Corps L

Panelists: Eamon Kelly, Lee Zia, Karen Crosby, John Krupczak

- There has been a call to require open access, promoting equity/access to federally-funded education materials, and increase transparency. Discuss.
- NSF has had a long interest in open education resources
 - Cyberinfrastructure for Education and Learning for the Future (CELLF; 2005)
 1. series of workshops
 2. discussing how to more effectively use and adapt successful materials
 - “NSF is not a *sustaining* institution”
 - Policy and technology environment is now much different than in 2008
 1. We may be better equipped to deliver on earlier charges for open access to NSF-funded education materials
 - NIH, DoEd, DoLabor have open government programs ongoing
 - USAID, State have nascent programs
- If we are talking about “open”, we must also talk about “sustainability”
 - open is not necessarily free or without costs
 - we need to talk about business models
- Other important implications/Influences:
 - data <-> privacy
 - standards
 - digital divide 2.0 (broadband access issues in US)
- NSF’s roles:
 - convener, enabling community developed/driven standards
 - support research agendas
 - scaling of models
- NSF I-Corps L Program (I-Corps for learning)
 - accelerate the process of bringing effective educational innovations to scale
 - May be a good idea to have an I-Corps L short course or workshop available to all PIs or proposers, so that they are aware of increasing the impact of their work.
 - What do we do with the good ideas that have unclear resources for scaling & sustaining?
- Questions:
 - Who are the best partners for improving I-Corps L pathways, and how would we carry it out?
 - Given NSF’s limited mandate and funding, how can the NSF partner to facilitate moving this type of research to market?
 - Education is seen by many as a bigger market than healthcare, but how to best commercialize it seems less obvious.
- Questions/comments from AC:
 - Love the idea, but a for-profit business has to be a pathway. Almost nothing we do through NSF EHR is patentable. Educational materials are not traditional products.
 - R-word: “revenue”. Is NSF’s mission to promote sustainability, or to disseminate knowledge? Probably the latter. What are the benefits/risks of stepping into open licensing?
 - Encouraging entrepreneurship while encouraging open-sourcing? Economically this makes no sense. If you require open sourcing of findings/materials, entrepreneurs will not apply to EHR solicitations. Innovation is greater when money is at stake.

- Counterpoint: Innovation does not only happen when there is a big payoff. Without open-sourcing disparities might be created, however unintentionally. NSF-funded discoveries should be recycled within the community, so that the research “rich” don’t just get richer.
- Sustainability may not be the focus of the NSF, but it is particularly important for the mission of EHR.
- We still don’t understand learning well enough to commercialize it. Algorithms in privatized software for predictive analytics in learning need to be made more transparent, not less so.
- Some of NSF’s best ideas get shelved due to problems with scaling / dissemination.
- Is education data really less valuable to the public than weather data? It seems to be more important! -- an argument for open access to education data & research. Wunderground is one example of a great idea that got worse when it was commercialized.

VII. Synthesis of the Day

- Impact of Assessment
- Coherence of portfolio
- Capitalizing on our role
- Growing the research portfolio
- Suggests another document to consider- Workshop Achieving Systemic Change a Sourcebook for achieving...Undergraduate STEM education
- Coalition for Reform of Undergraduate Education
- Grand Challenges

VIII. Reflections on Day 1

Francisco Rodriguez recapped the topics covered yesterday. AC members volunteered their thoughts on the topics they found most important and worth discussing more in the future. The result of this was the identification of two workgroups for the next AC meeting: One to explore intellectual property and the public good, and one to explore what can be done as the “Grand Challenge”

IX. INCLUDES

Core concept: Impact at scale

- Multiple questions about how NSF will define things or if decisions will be left to the field (non-prescriptive solicitation), and if the latter, how will focus be maintained.
- Diversity is important at all levels: students, faculty, networks, etc.
- NSF INCLUDES working group just launched a week ago; very exciting initiative. Signal NSF’s seriousness about the need to achieve scale in inclusion and diversity. Not a critique of past efforts, but an effort to improve equity and diversity a matter of national focus. Needs science community to see diversity as an asset.
- Literature on collective impact as a guide, along with collaborative networks.
- First event: Director’s Workshop held this past summer. Kickoff discussion on what INCLUDES might look like and what NSF can bring. 5 points from this meeting

- Learn from and build on existing successes
- “Wide ranging partnerships” including organizations not typically funded by NSF e.g. community organizations, neighborhood groups
- Shared measurements, networked coordination; specific goals with clear indicators and metrics e.g. AP offerings
- National agenda with sensitivity of local differences
- Connect research and practice
- We’ve spoken to ACs for all the directorates; everyone is engaged and believes this is critical. Last CEOSE committee asked NSF to look at broadening participation as a core issue. The community needs to step up and tell us their big bold ideas, we can’t be too prescriptive.
- Key words: Impact at Scale
- Request for 2016 \$15 for BP program. Launched working group, solicitation under development, encourage community to come up with some pilots/prototypes of what we might be doing in the future. Also planning Ideas Labs and workshops.
- Looking forward to 2017: As we encourage networking we intend to build this out as a national effort.
- Dr. Cordova’s charge to working group: activity that will define NSF’s BP investment; will provide congruence to the investment that we have in existing programs that don’t necessarily communicate with each other. Bring these ideas to scale. Leverage our existing investments.
- Intelligence and innovation can be found everywhere and we need to support the low SES
- Launch pilots - planning grants. Get those interested to define what they would do if they had more resources. Looking at systems problems. Groups that submit will commit to finding a common goal, common measures, and demonstrate that the things they intend to plan for will be mutually reinforcing activities; synergistic projects.
- Workshops and Ideas Labs - What are the key elements of the backbone?
- Will fund 10-15 pilots; grantees will be made up of a mix of “the usual suspects” and new players who may bring different ways to thinking to address these challenges
- Working group had a number of stakeholder meetings, including PAEMST and several other groups. Group composed of 13 members with representation across NSF.
- STPI will do preliminary group to inform the working group’s efforts. Currently conducting an inventory of the NSF BP portfolio. Looking for exemplars, strong networks, analysis of target audience, potential outcomes, literature review for best practices
- Preliminary timeline (see slide). Throughout process will be a campaign to increase awareness of INCLUDES across NSF and outside the agency.

X. COV Reports and Updates

Each of the presentations described the COV focus, highlighted recommendations, and two discussed changes that have resulted in response to COV recommendations.

The following were suggestions, questions that emerged:

ATE Program:

- Did/does the COV process look at what was funded in the portfolio and what is thought about the health of the program/sector?

- How do you accomplish programs with strong community and focus for workforce development (WF)?
 - ATE is a compelling example of a program community with a strong supportive, collaborative ethos vs. competitive ethos.
 - ATE should maintain a focus on WF and not shift to an R&D program as many EHR programs are.
 - Academic deans of community colleges on the project team could ensure WF focus/collaborative community.

ADVANCE Program:

- Investigators could benefit from a designation of “Highly Competitive but no funds available.” This kind of designation could help them secure bridge funds offered through universities.
- INCLUDES should build on/link to/connect with ADVANCE.
- Caution to ensure that “Technical Assistance” offered to field does not create conflict of interest for program.

DRL COV:

- Cross-division COV process was challenging and took time to get past a program-level focus. The reason for doing it is to look at cross-cutting trends and issues.
- NSF is poised--through its capacity for data collection, data management, and data evaluation--for data-driven decision making and continuous improvement in management. Another member also endorsed NSF sharing models and best practices in this space.
- The DRL strategic planning process is perhaps happening too slowly, encouraged a greater sense of urgency.
- Landscape survey is important to the strategic planning process and will hopefully capture powerful research coming from neuroscience research about what is possible in, e.g., the high school/secondary range; the higher standards, new and old challenges in teaching and learning motivation and engagement all transcend disciplines (DRL programs?)

General Comment:

How does what NSF is doing reverberate at other institutions?

XI. Graduate Education

Discussion about NSF Strategies for Graduate Education. Discussants:

Dr. Dean Evasius, Division Director, NSF Directorate for Education and Human Resources

Nimmi Kannankutty, Division of Science Resources Studies, Directorate for Social, Behavioral, and Economic Sciences

Alexandra Isern, Section Head, NSF Directorate for Geosciences

Main points:

- NSF is taking a leadership role in development of the agency's priority goal of strategic framework of graduate education/graduate student preparedness.
- There is unanimous endorsement of research training, but less certain of how we are accomplishing the broader aims of graduate education and how we are preparing students for the workforce.
- Common recommendations should be made across disciplines. Best practices can be discussed with NIH (BEST Award recipients). This is especially true for NRT/IGE track.
- Continue or establish partnerships with Council of Graduate Schools (CGS), Association of American Universities (AAU) and Graduate Career Consortium (GCC).
- Can we mine the data on graduate education that is already out there?
- Partnerships with foundations to help fund graduate students (50/50)
- Thinking critically about veterans and how we can help them complete their education given that they are non-traditional students and often facing different challenges caused by family obligations or medical conditions.
- Use power of the NSF to promote change. This worked very successfully for ethics training/RCR and IDP. How can we have PIs think more critically about the mentoring and professional development of their students?
- Possibility of designing a highly competitive postdoctoral fellowship for those interested in education research in the sciences.
- Continue to examine the longitudinal effectiveness of graduate education.

XII. Wrap Up and Adjournment