

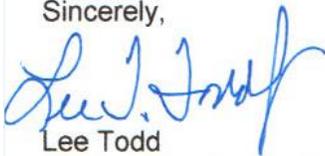
February 27, 2014

Dr. Joan Ferrini-Mundy  
Assistant Director  
Directorate for Education and Human Resources  
National Science Foundation  
4201 Wilson Boulevard  
Arlington, VA 22230

Dear Joan:

I have reviewed the final version of the minutes of the Directorate for Education and Human Resources Advisory Committee meeting that was held January 7, 2014 and am pleased to certify the accuracy of these minutes.

Sincerely,



Lee Todd  
Chair, Education and Human Resources Advisory Committee

## **National Science Foundation (NSF)**

### **Meeting of the Advisory Committee for Education and Human Resources (EHR)**

**January 7, 2014**

#### **Meeting Notes**

##### **Members Present**

Lee Todd

Michele Cahill

Evelynn Hammonds

Francisco Rodriguez

Greg Camilli

Karen Klomparens

Lilian Wu

Margaret Honey

Mary Ann Rankin

Muhammed Chaudhry

Robert Martin

Roy Pea

Dr. Jolene Jesse, Executive Liaison to the EHR Advisory Committee (AC), provided logistical guidance for virtual participants. The public was invited to submit questions or comments to [ehr\\_ac@nsf.gov](mailto:ehr_ac@nsf.gov) to be addressed as well.

##### **Welcoming Remarks from the Chair**

Dr. Todd, EHR AC Chair, opened the meeting by noting the dramatic transformation in the activities of the Advisory Committee based on his committee service of six to seven years. The goal of the meeting was to discuss the subcommittee white paper drafts. Dr. Todd charged the AC and EHR to think creatively about how to bring about major changes in STEM education, as innovation in STEM education is the key to maintaining the US standard of living and ensuring national security.

##### **Introductions, Meeting Overview and Updates, COV Report Discussion**

Dr. Ferrini-Mundy praised the AC members for giving the EHR Program Staff documents that will guide the use of the best knowledge, evidence, and thinking to frame the work of EHR going forward. A brief update on recent EHR-wide and NSF-wide business was provided. See slides for more information.

Each EHR Division Director (Drs. James Lightbourne, Richard Duschl, Susan Singer, and Sylvia James) shared division-wide updates.

Dr. Hammonds presented an overview of the COV report findings from the reviews of the TCUP, HBCU-UP, AGEP, CREST, and LSAMP programs.

Dr. Rodriguez added general observations regarding the need to develop mechanisms of training for less experienced reviewers and tools to communicate best practices and feedback.

## **Discussion of COV Findings**

Dr. Todd moved to have the AC receive the COV findings. A combination of electronic and physical hand-raising indicated that the committee received the findings.

### **Session 1: Presentation, Discussion and Endorsement of Subcommittee Reports**

Dr. Anthony Kelly cited the core themes for the sub-committee reports which have been in development since May 2013: broadening participation and institutional capacity, STEM learning and learning environments, and workforce development. He suggested these themes are highly interdependent and invited the AC to discuss how each of the white papers might lead to new directions for integration across the three themes.

#### **STEM Broadening Participation Subcommittee**

Dr. Rodriguez described the subcommittee's view that securing the nation's future prosperity and competitiveness requires engaging all members of the population at all levels. The subcommittee made recommendations around two central themes: 1. broadening participation as a solution, and 2. fostering a culture of science.

The subcommittee also discussed the need for developing:

- A common working definition of broadening participation, accounting for traditional definitions but also looking at building a widely disseminated definition among NSF directorates.
- A more robust and flexible data system using metadata to increase knowledge and transparency about funded research.
- Enhanced partnerships within EHR, across directorates, across agencies, and with the public and private sectors.

The subcommittee recommended that each EHR division take responsibility for the focus of one core R&D area. The subcommittee also suggested that the Division of Human Resources Development (HRD) take the lead in the area of broadening participation and institutional capacity in STEM. The subcommittee also encouraged HRD's continued investments in HBCUs, tribal colleges and universities, and other minority-serving institutions.

The group discussion that followed included the following points:

- External stakeholders oftentimes do not have knowledge of NSF programs. NSF should develop plans to better market to a broader audience what it is doing, what investments it is making and why these investments are being made.
- Comments reiterated the need for developing robust data systems and identified that NSF can play a role.
- EHR should make better use of technology to disseminate information and expand audiences.
- External stakeholders should be more diverse and include populations that are typically underrepresented and may have no knowledge of STEM. However, because EHR resources are limited, the subcommittee was asked how EHR should prioritize. The Committee referenced the importance of better partnerships and cross-agency support as a first step.

## **STEM Workforce Development Subcommittee**

Dr. Camilli described the subcommittee's discussions around the need to develop a cohesive framework to align NSF investments with national workforce needs. However, the subcommittee found there is a surprising lack of consensus about what it means to meet or predict current or future STEM workforce needs. A number of factors hamper the ability to accurately predict workforce needs including multinational labor markets, changing demographics, international and national business models and the limitations of data and understanding of future trends.

The subcommittee provided three recommendations:

- Align NSF investments in K-16 education with changing STEM workforce needs and demands.
- Align investments of EHR and other directorates' support of R&D to model and impact the dynamic and emerging STEM workforce.
- Build NSF-university-industry partnerships to leverage investments in research, development, and training for the STEM workforce with emphasis on personalized learning.

The Committee discussion included the following points:

- Industry and universities can better partner in innovative ways to ensure universities are meeting industry hiring needs. NSF can help create the ecosystem for building these partnerships and make lessons learned from such deep partnerships widely available to other institutions.
- NSF should do more work to illuminate the issues surrounding foundational competencies and learning sequences and addresses the questions of how narrow workforce education should be and whether or not it will lead to inequities or pathways. One approach would be to compare internationally what math educators deem important. Another approach would be to go to industry partnerships and try to understand what makes people successful, then backwards map the findings.
- STEM education can improve upon teaching soft skills; there is an important social aspect to workforce development in terms of interpersonal skills with people.
- Partnerships are best with universities when they involve industry experts working with students, postdocs, and faculty to develop curriculum and real life case studies that teach students through deep collaborations in research.
- The question of how to educate sectors within the community that are not so fundamentally tied to research and who are not at the cutting edge was raised. While the above-described model works well for Research 1 universities, how about other universities? The Advisory Committee discussed alternative models for engaging students across various institutions and in collaboration with industry.

## **STEM Learning and Learning Environments Subcommittee**

Dr. Cahill discussed the subcommittee's findings that NSF should consider orienting its investments by:

- Capitalizing and amplifying the most promising trends in STEM learning to focus on high leverage topics.

- Coordinating programs of research and developing coherent knowledge base of STEM learning and STEM learning environments.
- Developing a knowledge base of NSF-funded research.

The Committee discussion included the following points:

- A combination of professional development and learning tools will be needed. We have the opportunity now to use technology-based instructional tools for learning across context and time and to use different kinds of people in different roles.
- An important goal is to develop a cumulative knowledge base of actionable knowledge, whether or not the knowledge comes from NSF-funded research. There are crowdsourcing platforms for soliciting and coordinating this information. Actionable knowledge is a more approachable problem than it has been for many years.
- This as an interesting opportunity to look at effective practice kinds of models and determining how one goes about identifying examples. There is a lot we do know and a lot we do not need to reinvent; therefore, it will be important to select, examine, aggregate, and communicate the right models effectively.

#### **Dialogue with Dr. Cora Marrett, Acting Director, NSF**

Dr. Marrett stated that the draft report was highly productive and provided useful recommendations for EHR and NSF. She emphasized the Committee's recommendation that EHR should amplify promising trends in the field and build a cumulative knowledge base. Identifying the trends and discussing future directions will be a challenge, but it will be imperative to move the discussions beyond the intellectual ideas to the actions that need to be taken. All three of the subcommittee drafts have mentioned in some way the importance of partnerships, which are critical to advancements.

#### **Next Steps and Adjournment**

Dr. Ferrini-Mundy explained that EHR leadership will likely develop follow-up questions for the EHR Advisory Committee. Once draft papers are finalized, EHR can begin implementation of some of the recommendations. EHR leadership is particularly interested in what ideas are cross-cutting across themes.

Dr. Kelly provided the group with a summary of themes that emerged from today's discussion:

EHR's role: What does it know, and how can it be made available to a more wide and diverse audience. EHR cannot do this alone, and partnerships can be leveraged for creating a new learning community.

New perspectives: The movement away from a pipeline metaphor; recognizing that social networks are changing the way we think about the formation of knowledge; and thinking about broadening participation as a solution and not a problem.

New opportunities: Personalized learning; opportunities for learning around transitions; employing the new evidence guidelines; scaling in of itself, and how it can re-conceptualize and drive new research questions and methods.

New challenges: Issues of anonymizing data, intellectual ownership in instances of crowd-sourced data, informed consent and the role of the Institutional Review Board.

**Meeting Adjourned**

\* The PowerPoint slides provide additional detail and context for the above EHR Advisory Committee Meeting Minutes. The slides can be found at [http://www.nsf.gov/events/event\\_summ.jsp?cntn\\_id=130035&org=null](http://www.nsf.gov/events/event_summ.jsp?cntn_id=130035&org=null).