

Minutes Education, Outreach and Training Subcommittee Meeting

Location: Washington University, St. Louis, MI

Dates: January 11th and 12th, 2006

Purpose: To prioritize EOT activities for the development of an implementation/execution plan.

Members Present: Mark Benthien; Helen Boussalis; Stephanie Couch; Jim Dorward; Shirley Dyke; John Van de Lindt.

Members Connected Temporarily: Judy Liu, Thalia Anagnos

NEESinc Staff Present: Parshaw Vaziri; Melanie Brown; Ayde Perez

Facilitator: Shirley Dyke

The meeting was hosted by Shirley Dyke at Washington University and was available live via videoconferencing on January 11, 2006.

January 11, 2006

I. EOT Activities Spreadsheet.

The meeting began with a discussion by NEESinc staff of EOT activities information gathered to date for each sub-group including K-12, Undergraduate/Graduate, and Faculty/Professional Persons. The information was gathered from Annual Activity Reports and Annual Working Plans from each Equipment Site (ES), as well as from information submitted from some NEESR projects. The format of the spreadsheet will be revised to include PI names when applicable and name of the project. The spreadsheet will be finalized in a form that will allow the information to be transferred to a database. It was suggested that PI's be given a form to fill out that will ask for specific information, and ultimately that form will be available on the web so that they can enter data and update it as necessary.

II. Plans for Subcommittee Discussions

A three page document entitled "Plans for Subcommittee Discussions, attached hereto, was distributed and discussed. An idea was discussed to have a cooperative internship with professionals by partnering with them. Professional development of future science teachers, risk managers and earth science teachers was discussed, such as having earthquake science and engineering modules presented at the NSTA workshop. It was noted that the content must meet the needs and required state standards for curriculum. Teachers attending could provide input. Teachers could also be invited to a workshop held at the NEES Annual Meeting. For funding, it is important to first have an activity group formed, then to get input and develop modules and organize workshops. This could be a 2-3 year project. ISE is a

proposal out now with NSF that calls for workshops. We can look for key partners in states. See the list that Thalia Anagnos started in the EOT Strategic Plan.

It was noted that the NEESR projects should be all on the website. Also, real time data access to ongoing research would be a good addition – modules based on ongoing research.

A comment was made to look at the existing NEESR projects and reformat to divide into K-12 or 16 activities. Shirley suggested this is not the role of drafting the EOT Execution Plan but we can have this as an action item for the future.

REU programs at NSF were discussed: ITEST, ITEAM? and ICS. ITEST is Information Technology Experience for Students and Teachers.

It was noted that researchers need affiliations/partnerships with practitioners.

The Triangle of Life is a current subject of interest in the media. It was suggested that there be a research/outreach project to get hard data to prove why this theory is not valid. This theory has been debunked by FEMA, the Red Cross and others but there is an email that keeps recirculating that advises people to get next to large objects so that they are not crushed in an earthquake, and to put reams of paper nearby since it does not compress. This might be a good Payload Project, which can get funded even if NEESinc. rejects such a proposal. (Any NSF proposal can use NEES as a partner to submit the proposal.) This idea might be a good one for a Public Policy Working Group. Mark Benthien and Leigh Abts would like to be in this group.

III. Integration of Activities and Prioritization

The next item of discussion was that there needs to be a paragraph include for each topic/target audience explaining why it is important. Include existing conditions, also the absence of the type of outreach, why they are needed and appropriate.

Where are we going, and how is it to be measured? A calendar with deadlines as to completion of the EOT Execution Plan should be used.

Shake Tables

One idea for integration of EOT activities is to eventually expand the use shake tables for all types of groups, i.e. K-12, Undergraduate and Graduate, Faculty and Professional Person. Another thought was that Discovery Science Centers for young children can be used, either with a traveling exhibit or on the website.

Video Game/Tools

A video game format such as the West Point Bridge Project with a virtual design package which allow you to look at architectural drawings and to compare and look at research that was done to see how the building or bridge performs. These types of tools are particularly attractive for today's students. Integrate java scripts to make tools for a toolkit like a Lab-U program. Two-three NEESR projects could partner and NEESit could join to design common

tools in a drop-down menu and build projects. This would be similar to the Education Payload Project.

Three projects could be used as a pilot program to work out the bugs, before release. Get an assessment expert, feed input back to make it user-friendly.

There are several engineering education research centers in the country with assessment experts at each, for instance, the University of Washington. Shirley has a list of about eight that we might consider. NSF has an instructional materials development proposal, the IMD. The tools proposal would fit under the criteria for the proposal.

Tools can be used for a gaming application. The tools themselves could be an end product for users and also used in a design application for an online game.

In sum, integration could include 1) up to 60 shake tables available across the U.S. for live experiments to be performed at the site or via the web for informal and formal exercises at all levels, and 2) toolkits which include commonly used tools and components that could be utilized by other education projects and other cyberenvironments.

Customized Web Pages

CHEF/Sakai allows one to create customized web pages and is currently used at NEES.

Advanced Placement Engineering Class

Boussallis has an Advanced Placement Engineering class. She said it is important to use art teachers in addition to scientists so that the modules presented are attractive and user friendly. Seven-eight institutions are involved. There should be one more meeting of this group, sponsored in Davis, and perhaps another in Minnesota to help get students lined up for the class. Stephanie Couch will help to recruit people to attend the Davis meeting. Funding is pending. It would be nice to include cyberinfrastructure and real data.

Earthquake Science Modules

Math teachers like to have something with context to teach statistics courses, or applied modeling activities. Physics teachers do also. Both can use modules with earthquake science content. A module can present a problem, such as asking a student to pick an equipment site (ES) to help them solve the problem. For instance, the problem could be how to find out what a centrifuge does, shake tables, etc. You would match the appropriate ES with the problem. The ES's should have descriptions for K-12 or the general public that explain what they do in simple terms.

(Ayde will contact each EOT contact person at the ES for a 1-2 paragraph description.)

It was suggested that we do a virtual tour of NEESinc, perhaps showing Cliff as guide. It was suggested that there be a master list of partners on the website.

(Melanie will follow-up with NEESinc staff.)

A suggestion was made to partner with the GATE coordinator at each K-12 school and also to partner with the Science Centers. See madscience.com for examples of for-profit

programs that can be offered to K-12. During middle school it is important to learn motion and force concepts.

Deliverables

Shirley will list some possible deliverables including: modules, tool box. (Another possible deliverable is forms on how to do demonstrations, and other EOT activities. Include steps for each, including how to do a press release.)

Training and Practitioner Priorities

Design guidelines for training on the ES's. This means that guidelines would be posted on the website so that people can either take a tutorial or review what training encompasses before going to the site for actual hands-on training. NSF can review and send guidelines and/or expectations to the ES. That issue of including guidelines can be on the ES meeting agenda. A draft of the suggestion should go to the Site Operations Subcommittee to discuss at their February meeting, then it would go to NSF.

A question of how we hit code developers what discussed. Cliff Roblee, Exec. Director of NEESinc wrote a proposal about how NEES can get research results implemented, i.e. to the people who write building codes, to the architects who use research data in the field, etc.

Community technology centers for K-12 can be contacted for outreach, they might affect more diverse, bigger groups.

NEES currently has a proposal – NEES Research Experiences for Undergraduates - submitted for cross disciplinary research at the ES's, Neesit, and NEESinc. The REU Diversity Working Group will work to choose a non-host student as one of the goals of the proposal is to increase diversity. This is a four year proposal for 34 students a year after Year One, that would allow undergraduates to spend 10 weeks in collaborative earthquake engineering research.

The State of CA budget has \$40M earmarked for career technology - see the framework for the budget document. Grants are available for multi-media, and NEES would fall under that category. The Science Talent Engineering Math Program (STEP) funds are available for community college or 4 year college level. Aug. 15, 2006 is the due date for intent to file, full proposals are due Sept. 26, 2006.

We need to do more to forecast/advertise EOT opportunities. A discussion followed about the ES's being required to do only Training as a required or fixed scope, whereas Outreach and Training are flexible scope. We have to encourage them to do more on O and T. If there are budgetary constraints, the outreach and training are reduced.

January 12, 2006

The second day of the meeting began with a discussion by Mark Benthien about a Southern California Earthquake Center (SCEC) joint proposal for one year, to begin this summer with Earthscope funding for middle schools.

Software Review

The Working Portfolio – an E-portfolio developed at Leigh Abts' university was reviewed and a demonstration and tutorial examined to see if it or similar software would work to track diversity for the Annual Activity Reports and Annual Working Plans – the reporting documents used by NEESinc to report to NSF. We need to look at more than just NSF needs for tracking the data. We need to include stakeholders' needs, Board of Directors, public, institutional, in order to assess the effectiveness of outreach. Make sure to judge the information needed in design of the software by ALL stakeholders. A discussion of designing software so that PI's or EOT coordinators can enter data directly on to the website, which could be tracked and tied to a database ensued. Charles Liu is the person who created the ELC "The Working Portfolio" software. Can Sakai allow numbers to be added in each field? It was decided that the ELC would not work for our EOT tracking purposes since it does not allow tracking of numerical data. Shirley is going to follow up with Leigh and Kate at Johns Hopkins.

Assessment

In order for there to be program improvement there should be a formal information mechanism. Another assessment tool would be to get impressions of people trained on equipment. There is an unsolicited education program in the Engineering Directorate at NSF, or a specific assessment program at NSF for approximately \$10K with NEESit as a partner to figure out assessment needs.

A Co-PI such as a person from EERC should be contacted to join in assessment to develop a reporting system.

Joy Pauschke of NSF sent some links to some nanotechnology sites for the Committee's review: nanohub.org has tool kits similar to those we would propose. Edutools.info had report comparing and portfolios.

Next Steps

Shirley will do an outline of the Execution Plan and the next meeting will be via teleconference in approximately six weeks.

Outcomes of Subcommittee Discussions – Ranked

K12&Public

Existing Projects or Planned Projects:

K through 12:

- Ongoing: K-12 outreach events (tours, hands-on experiments, competitions), either at the equipment sites, NEESR project universities
- Proposed: AP Engineering Feasibility Study: NEESinc will continue its work as a funded partner of this NSF project lead by Leigh Abts at Johns Hopkins University, learn from this activity and expand to the below activities
- Considered: Potential RET program – next September
- Interdisciplinary educational module development using a TOOLKIT (for EE, or to enhance math and physics courses with real world examples and aligned with core curriculum content and standards and expectations), and gaming tools, or enhancement of existing modules from, for instance, GK12 programs – use the cyberinfrastructure and real-world data “hooks”, and design for a multilingual audience --- develop using focus groups at the national science teachers association meetings and informal educational organizations, and then later present module to this group
- Considered: education media (Newspapers-In-Education) Collaboration after module development is complete
- Considered: Summer workshops for K-12 teachers and students for staff at informal education sites as well as formal (schools) – be sure to reach the parents also (SECME has programs for parents)
- Some program to attract parents to getting their children interested in EE
- Two plus two – community college recruits diverse students into a comm. College (maybe a engineering technology program) and then closely watches students and then they go on to a 4 year college – lessons learned may be valuable to us – best practices, and maybe link to the high school programs or modules to engage students
- Career technical education (vocational) schools in California? Funding is available soon to apply for – framework is available now.
- High school researchers – tie this to their science fair projects, possibly multiple tracks like the REU program, work with undergraduate supervisors, a few years after the modules are developed and incorporated into curriculum, and the goal may be to compete among themselves for the best summer project – the winner gets to go to Annual Meeting and presenting, or going to a test – each develops a website or portfolio that they can continue to update and we can use for tracking

Public:

- Considered: News media Collaboration
- Articulation of the K-G pathways to engineering and science careers – NSDL already has some funding – suggest that we partner with them in this effort, but it is not a time consuming activity requires some thought though
- Public policy working group – anticipating establishment of one at NEESinc
- Museum/science center displays and programs, funding needed and partnerships

Undergraduate and Graduate

Existing Projects or Planned Projects:

Undergraduate:

- Proposed: REU Site Program: If funded, NEESinc would establish and REU Site Program with 17 NEES nodes (15 ES's, NEESit, and NEESinc)
- Proposed: Getting benchtop shake tables onto the NEES network for undergraduate courses
- Considered: Spearheading a national undergraduate design competition culminating at the 2007? NEES Annual Meeting
- Educational course module development or enhancement of existing modules developed for courses. These might include modules that are integrated into courses. A likely source for these is NEESR projects. How do we hit non-engineers – science teachers of the future, risk managers, earth science
- Multi-site experiment capabilities for students in courses
- International research/technical trips for undergraduate students
- Internships with partnering state agencies and companies participating in NEESR experiments – should not require funding, but something we should encourage the NEESR projects to think about with partner companies that are part of NEESR projects, companies would pay students to work

Graduate:

- Considered: Establish a student organization and a leadership council for that organization – graduate level
- Educational course module development or enhancement of existing modules developed for courses. These might include modules that are integrated into courses. A likely source for these is NEESR projects. Multi-site experiment capabilities for students in courses
- Fellowship opportunities through standard programs, IGERT primary source
- International research/technical trips for graduate students – joint activity
- Cross-institutional courses to develop community of scholars - dissemination

Training and Practitioner and Faculty

Existing Projects or Planned Projects.

Training:

- Tracking and announcement of training activities at sites, and inclusion on NEESinc website and calendar – feeds into the tracking framework and database, queries after event as to how many people, linked to the equipment specs database – rationale for doing this now is that a NEES-wide coordination framework is being developed now
- Develop an appropriate way to maintain consistency in training materials, in cooperation with the NEES equipment sites (get feedback from the equipment sites at their annual meeting) and SOC – they want people to come and use the equipment and we want sufficient detail to use it. NEESinc should have certain requirements and expectations from the materials and if the sites do not comply, funding may be delayed
- Training in the use of Chef/Sakai – in cooperation with NEESit – in parallel with above?
- Mechanism for facilitating and funding extended visits for students and faculty to participate in NEESR projects at the NEES site – use the collaboration rooms -
- Incorporate some training into NEESreu program

Practitioner-oriented:

- Proposed: How do we hit the code developers or state agencies and others that are in a position to implement the research outcomes? Through ASCE? Through committees. This is the topic of the proposal that Cliff, etc submitted recently
- Should be now, building up: Articles in professional society newsletters (local, regional, national), in EERI we could have a column, NEES-EOT newsletter
- Web-based modules for practitioners including videos and data from experiments through potential partnerships with EERI Short-courses developed by the NEESR projects or other sources
- Landmark tests (1-2 per year) coupled with a symposium for practitioners – key speakers and watch experimental tests (NEESinc would monitor projects for such opportunities)
- Practitioner-in-residence (long-term goal)

Faculty (university)

- International exchange visits using existing programs

General (may apply to multiple categories above)

- Assessment of all of NEES EOT activities – funding needed for this
- Best practices/projects site?
- Award for best EOT activity
- E-portfolio Project Deployment (originally through NEESreu Program if both are funded)
- Web-based matrix of earthquake engineering educational resources categorized by targeted age groups and topic areas, as in Jim Dorward's Project, generated through the database/e-portfolio system developed for tracking and assessment

Subcommittee Discussion Starters:

What types of activities are we missing in this list? Who is/are the target audience(s)?

Are there links between some of the projects within this list? possible resources or information that can be recycled?

Are there links between some of the projects in this list and in other lists? possible resources or information that can be recycled?

How might these various activities be funded? Are there multiple sources of funding for any? Are partnerships needed for any, and with whom?

What projects in this list need to take first priority, because they are more important or because they facilitate the development of resources for other activities?

Are there any recommendations to NEESinc on how to make these projects a success?

K-12 WEBSITES OF INTEREST

www.engineeringk12.org

<http://tbp-highschool.mit.edu/highschool/>

<http://nsdl.org/>

<http://Needs.org/>

<http://www.ecs.org/clearinghouse/57/75/5775.htm>

www.edexcellence.net