Moving From CCLI to TUES – Meeting NSF Expectations

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Caution

Most of the information presented in this workshop represents the presenter's opinion and not an official NSF position

Outlines

1. Goal and Format of This Special Session
2. Overview of the TUES Program
3. Project Idea
4. Project Rationale
5. Project Goals and Expected Measurable Outcomes
6. Project Dissemination
7. Practical Aspects of the Review Process

1. Goal and Format of This Special Session

To help you:

- Better understand the expectations the TUES program
- Develop competitive proposals that effectively meet the expectations of the TUES program

Format: Active & Collaborative Learning

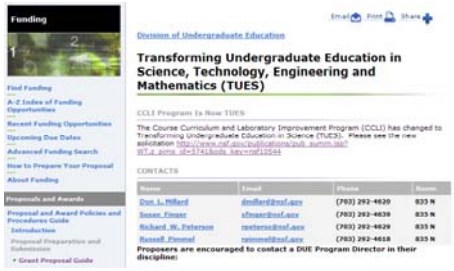
Think individually (1-2 minutes)

Share with partners (1-2 minutes)

Report to the entire audience (1-2 minutes)

Learn from program directors' responses

2. Overview of the TUES Program



Program Solicitation: NSF 10-544

TUES vs. CCLI

- TUES: Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics
- CCLI: Course, Curriculum, and Laboratory Improvement

Title changed to emphasize the special interest in projects that have the potential to transform undergraduate STEM education

TUES vs. CCLI – Review Criteria

Review criteria modified to emphasize the desire for projects that

- Propose materials, processes, or models that have the potential to
  - Enhance student learning and
  - Be adapted easily by other sites
- Institutionalize the approach at the investigator's college or university as appropriate for the Type
- Involve a significant effort to facilitate adaptation at other sites
- Have the potential to contribute to a paradigm shift in undergraduate STEM education?

TUES Program

VISION: Excellent STEM education for all undergraduate students

Activity: What kinds of proposals are appropriate for the TUES Program? What could a proposal address?

Think - Share - Report - Learn

TUES Project Components

- Creating Learning Materials and Strategies:
  - Guided by research on teaching and learning
  - Incorporate and be inspired by advances within the discipline
- Implementing New Instructional Strategies:
  - Contribute to understanding on how existing strategies
    - ✓ Can be widely adopted
    - ✓ Are transferred to diverse settings
    - ✓ Impact student learning in diverse settings
- Developing Faculty Expertise:
  - Enable faculty to acquire new knowledge and skills in order to revise their curricula and teaching practices
  - Involve a diverse group of faculty

TUES Project Components (cont)

- Assessing and Evaluating Student Achievement:
  - Develop and disseminate valid and reliable tests of STEM knowledge
  - Collect, synthesize, and interpret information about student understanding, reasoning, practical skills, interests, attitudes or other valued outcomes
- Conducting Research on Undergraduate STEM Education:
  - Explore how
    - ✓ Effective teaching strategies and curricula enhance learning and attitudes,
    - ✓ Widespread practices have diffused through the community
    - ✓ Faculty and programs implement changes in their curriculum

Type 1 Projects

- 70 to 75 awards expected
- Total budget up to $200K for 2 to 3 years
  - $250K when 4-year and 2-year schools collaborate
- Deadline
  - May 26, 2011 (A-M states)
  - May 27, 2011(N-Z states)
- Typically involve a single institution & one program component – but exceptions
- Contribute to the understanding of undergraduate STEM education
- Informative evaluation effort based on the project's specific expected outcomes
- Institutionalized at the participating colleges and universities

Type 2 Projects

- 20 to 25 awards expected
- Total budget up to $600K for 2 to 4 years.
- Deadline January 14, 2011
- Typically involve multiple institutions & several program components – but exceptions
- Typically based on prior work with results explicitly described – but exceptions
- Produce evidence on the effectiveness
- Institutionalize at the participating schools

Type 3 Projects

- 3 to 5 awards expected
- Budget negotiable, but not to exceed $5 M or 5 years
- Deadline January 14, 2011
- Large scale efforts
- Typically based on prior work with results explicitly described – but exceptions
- Produce evidence of student learning in a broad population
- Describe impact of the work on the prevailing models
- Describe strategies for implementation in new contexts

Tues Central Resource Projects

- 1 to 3 awards expected
- Budget negotiable, depending on the scope and scale of the activity
  - Small focused workshop projects -- 1 to 2 years & up to $100,000
  - Large scale projects -- 3 to 5 years & $300K to $3M
- Deadline January 14, 2011 for large-scale projects
- Implement activities to sustain the STEM community
- Increase the capabilities of and communications in the STEM community
- Increase and document the impact of CCLI and TUES projects

Activity

What criteria do we use in reviewing NSF proposals?

Think - Share - Report - Learn

NSF Suggested Questions for Intellectual Merit

Will the project

- Include activities important in advancing knowledge?
- Involve qualified proposer(s)?
- Contain creative and original concepts?
- Have a well conceived and organized plan?
- Include sufficient access to resources?

NSF Suggested Questions for Broader Impacts

Will the project

- Advance discovery - promote teaching & learning?
- Broaden participation of underrepresented groups?
- Enhance the infrastructure?
- Include broad dissemination?
- Benefit society?

TUES Suggested Questions for Intellectual Merit

Will the project

- Produce one or more of the following:
  - Exemplary materials, processes, or models that enhance student learning and can be adopted by other sites
  - Important findings related to student learning?
- Build on existing knowledge about STEM education?
- Have explicit and appropriate expected measurable outcomes integrated into an evaluation plan?
- Include an evaluation effort that is likely to produce useful information?
- Institutionalize the approach at the investigator's college or university as appropriate for the Type

NOTE: Oversized type indicates changes from CCLI solicitation

Tues Suggested Questions for Broader Impacts

Will the project

- Involve a significant effort to facilitate adaptation at other sites?
- Contribute to the understanding of STEM education?
- Help build and diversify the STEM education community?
- Have a broad impact on STEM education in an area of recognized need or opportunity?
- Have the potential to contribute to a paradigm shift in undergraduate STEM education?

NOTE: Oversized type indicates changes from CCLI solicitation

Activity: Strengths & Weaknesses

- Pretend you analyzed a stack of panel summaries to identify the most commonly cited strengths and weaknesses
- List what you think will be
  - Most common strengths (*Proposal was innovative*)
  - Most common weaknesses (*Proposal was not innovative*)

Think - Share - Report - Learn

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Top Ten Strengths

- Topic is important and timely, introduces new material; or is responsive to industry or a community need
- PIs were experienced, strong, and technically sound
- Proposed collaboration with other organizations (diverse 4-year schools, community colleges, K-12, etc.) is detailed and believable
- Proposal has good potential for involving minorities or women
- Dissemination plan is excellent and will contribute to STEM education knowledge base.
- Proposed ideas are likely to have a large impact (Number of students, broadness of idea, etc.)
- Proposed ideas build on prior work or existing products
- Evaluation plan is excellent, outstanding, or good
- Proposed ideas are novel or innovative
- Proposed activities include non-traditional pedagogy

Top Ten Weaknesses

- Proposed activities are not described in sufficient detail with clear plans
- Evaluation plan is missing or incomplete
- Proposed activities are not doable or they will not result in expected outcomes
- Dissemination plan is inadequate and will not contribute to STEM education knowledge base
- Proposal does not have good potential for involving minorities or women
- Proposed ideas do not build on prior work or existing products
- Proposed ideas are not novel or innovative
- Proposed ideas are not likely to have a large impact (Number of students, broadness of idea, etc.)
- Proposed collaboration with other organizations (diverse 4-year schools, community colleges, K-12, etc.) is not detailed or believable
- Topic is not important and timely, does not introduce new material; or is not responsive to industry or a community need

3. Project Idea

Activity: What can you do in your proposal to convince the reader that your project results (such as exemplary materials, processes, or models) are transportable and can be adopted by other sites?

Think - Share - Report - Learn

PD's Responses

- Context of the problem
- Other curricular model
- Involving faculty from other school
- "Product" focus vs. implementation focus

Activity

What can you do in your proposal to convince the reader that your proposal addresses a general -- not just a local -- issue, opportunity, or a problem?

Think - Share - Report - Learn

4. Project Rationale

Rationale provides the context for the project, that is, background and justification

Activity: An Effective Rationale

Write a list of questions that the rationale for a TUES proposal should answer

pay particular attention to questions the reviewer will expect answered

Think - Share - Report - Learn

PD's Response: An Effective Rationale

- What does the knowledge base say about the approach?
  - What have others done that is related?
  - What has worked previously?
  - What have been the problems/challenges?
- Why is this problem important?
  - Is it a global or local problem?
  - What are the potential broader impacts?
  - How will it improve the quality of learning?

Continued

- What is the theoretical basis for the approach?
- What is the evidence that the approach will solve the problem?
- Does it address the defined outcomes?
  - Will it achieve the defined outcomes?
- Will it improve student learning?
- What are alternate approaches?

Continued

- What are the potential problems & limitations?
  - What can be done about them?
- Has the applicant done prior work?
  - Has funded work lead to interesting results?
  - Are there any preliminary data and what do they show?

5. Project Goals and Expected Measurable Outcomes

Project Goals

- Goals: define your ambition or intention
  - What is your overall ambition?
  - What do you hope to achieve?
- Two types of goals
  - "Project management" goals
    - ✓Start or complete some activity or product
  - Student behavior goals
    - ✓Change the students' or instructors' knowledge, skills or attitudes
    - ✓Change the students' success rates or increase the diversity of the students

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Project Expected Measurable Outcomes

- Learning goals identify the intended change in knowledge, skills or attitudes
- Expected measureable outcomes
  - Identify the observable changes in behavior if goal is obtained
  - One or more specific observable results for each goal
    - ✓How will achieving your "intention" reflect changes in student or faculty behavior?
    - ✓How will it change student learning? Students' attitudes? Students' successes? The diversity of the students?

6. Project Dissemination

Activity: Your have developed a transferable "product,"

- How to inform others your "product"?
- How to encourage and facilitate use by others?

Think - Share - Report - Learn

PD's Response: Dissemination Strategy

- Standard approaches
  - Post material on website
  - Present papers at conferences
  - Publish journal articles
- Consider other approaches
  - NSDL
  - Specialty websites and list servers
  - Targeting and involving a specific sub-population
  - Workshops and webinars
  - Commercialization of products
  - Beta test sites

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7. Practical Aspects of the Review Process

Reviewers have:

- Many proposals
  - Ten or more from several areas
- Limited time for your proposal
  - 20 minutes for the first read
- Different experiences in review process
  - Novices to veterans
- Different levels of knowledge in proposal area
  - Experts to outsiders
- Discussions of proposals' merits at panel meeting
  - Share expertise and experience

Activity

Write a list of suggestions (guidelines) that a colleague should follow to deal with these practical aspects

Think - Share - Report - Learn

PD's Response: Review Process

- Use good style (clarity, organization, etc.)
  - Be concise, but complete
  - Write simply, but professionally
  - Avoid jargon and acronyms
  - Check grammar and spelling
  - Use sections, heading, short paragraphs and bullets (avoid dense, compact text)
- Reinforce your ideas
  - Summarize and highlight them (bolding, italics)
- Give examples

Continued

- Provide appropriate level of detail
- Pay special attention to the Project Summary
  - Summarize goals, rationale, methods and evaluation and dissemination plans
  - Address intellectual merit and broader impacts
    - ❖ Explicitly and independently
    - ❖ Three paragraphs with headings:
      - "Summary"
      - "Intellectual Merit"
      - "Broader Impacts"

Continued

- Follow the solicitation and GPG
  - Adhere to page, font size, and margin limitations
    - ✓ Use allotted space but don't pad the proposal
  - Follow suggested (or implied) organization
  - Use appendices sparingly (check solicitation to see if allowed)
  - Include letters showing commitments from others
    - ✓ Avoid form letters

Continued

- Prepare a credible budget
  - Consistent with the scope of project
  - Clearly explain and justify each item
- Address prior funding when appropriate
  - Emphasize results
- Sell your ideas, but don't over promote
- Proofread the proposal
- "Tell a story" and turn a good idea into a competitive proposal

Reflection

What have you learned from this session?

Thanks for your participation!

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