# Proposal Enhancement Strategies

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**AASCU Workshop**

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## Workshop Agenda

- **Enhancement strategies**
  - General aspects
  - Goals, objectives, and outcomes
  - Rationale (Introduction, Background, Justification)
  - Evaluation plan
  - Dissemination plan
  - Realities of the review process
- **Interactive exercise on each strategy**

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## Workshop Outcomes

*After the workshop, you should be able to:*

- **Identify areas where proposals can be enhanced**
  - Made more competitive
- **Generate a list of suggestions for each area**

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## Framework for the Workshop

- **Learning situations involve prior knowledge**
  - Some knowledge correct
  - Some knowledge incorrect (i. e., misconceptions)
- **Learning is**
  - Connecting new knowledge to prior knowledge
  - Correcting misconception
- **Learning requires**
  - Recalling prior knowledge – actively
  - Altering prior knowledge

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## Active-Cooperative Learning

- **Learning activities must encourage learners to:**
  - Recall prior knowledge -- actively, explicitly
  - Connect new concepts to existing ones
  - Challenge and alter misconception
- **The think-share-report-learn (*TSRL*) process addresses these steps**

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## Workshop Format

- **"Working" Workshop**
  - Short presentations (mini-lectures)
  - Group exercise
- **Exercise Format**
  - *Think → Share → Report → Learn*
    - *(TSRL)*
- **Limited Time -- Feel rushed**
  - Intend to identify issues & suggest ideas
    - Get you started
    - No closure -- No "answers" – No "formulas"

## Reflective Exercise

Identify the single most important piece of advice you would give to a colleague writing a proposal

- Write your answer as one simple sentence
- This is a continuing exercise
  - Leave space for more answers

# General Proposal Structure

## Scenario: Origin of a CCLI Proposal

- Prof X has taught Statics for several semesters
- She has an idea for greatly improving the course by adding *"new stuff"*
  - *"New stuff"* could be anything
    - Material (e. g., modules, web-based instruction, new text)
    - Activities (e. g., laboratories, projects, simulation, games)
    - Pedagogy (e. g., problem based learning, team learning)
- She decides to prepare a CCLI proposal

## Professor X's Initial Proposal Outline

- Problem Statement:
  - Items describing the problem as she sees it
- Proposed Approach:
  - Items describing how the the "new stuff" will look
- Proposed Activities:
  - Items describing how she will develop "new stuff"
- Schedule:
  - Items describing the timing of the development

## Better Initial Proposal Outline

*Goals:* Develop "*new stuff*" to enhance student learning at U of Y

*Rationale:* Observed shortcomings in educational experience of the students at U of Y and felt that *new stuff* would improve the situation

*Project Description:* (Approach, planned activities, etc.)

*Evaluation:* Use U of Y's course evaluation forms to show difference

*Dissemination:* Describe "*new stuff*" using conference papers, journal articles, and web site

## *Exercise #1*
## Initial Advice

As a colleague, p*rovide* a few suggestions to guide Prof X as she develops her proposal for the CCLI program

## PD's Response
# Initial Advice (1)

- Read the program solicitation
  - Determine how your ideas match the solicitation
  - Determine how you can improve the match
- Articulate goals, objectives, & outcomes
  - Outcomes should include improved student learning

## PD's Response
# Initial Advice (2)

- Build on existing knowledge base
  - Review the literature
  - Present evidence (or arguments) that the "new stuff"
    - Is doable
    - Will enhance learning
    - Is the best approach
  - Emphasize what's new and what's being adapted

## PD's Response
# Initial Advice (3)

- Use literature and data to document existing shortcomings in student learning

- Provide clear examples of how approach will be used

- Describe management plan
  - Provide a timeline

## PD's Response
# Initial Advice (4)

- Integrate the evaluation effort early
  - Connect with evaluation and assessment experts from beginning
  - Build evaluation around defined expected outcomes
  - Tie assessment tools to learning outcomes

## PD's Response
# Initial Advice (5)

- Identify strategies for contributing to the knowledge base
  - Define a dissemination plan
  - Think about broader impacts
  - Collaborate

# Strategies for the Four Section of the Proposal

- Consider strategies for:
  - Goals, objectives, and outcomes
  - Rationale (Introduction, Background, Justification)
  - Dissemination Plan
  - Evaluation Plan

# Goals → Objectives → Outcomes

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## Developing Goals & Outcomes

- Start with one or more overarching statements of project intention
  - Each statement is a *goal*

- Convert each goal into one or more expected measurable results
  - Each result is an *outcome*

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## Goals, Objectives and Outcomes

- Converting goals to outcomes may involve intermediate steps
  - Intermediate steps frequently called *objectives*
    - More specific, more measurable than goals
    - Less specific, less measurable than outcomes

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## Definition of Goals, Objectives, and Outcomes

*Goal* – Broad, overarching statement of intention or ambition
  - A goal typically leads to several objectives

*Objective* – Specific statement of intention
  - More focused and specific than goal
  - A objective may lead to one or more outcomes

*Outcome* – Statement of expected result
  - Measurable with criteria for success

*NOTE: No consistent definition of these terms*

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*Exercise #2*
## Identification of Goals

- Read the abstract
  - Note - Goal statement removed
    - Also Evaluation and dissemination
  - Suggest two plausible goals
    - One focused on a change in learning
    - One focused on a change in some other aspect of student behavior

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## Abstract

The goals of the project are …… The project is developing computer-based instructional modules for statics and mechanics of materials. The project uses 3D rendering and animation software, in which the user manipulates virtual 3D objects in much the same manner as they would physical objects. Tools being developed enable instructors to realistically include external forces and internal reactions on 3D objects as topics are being explained during lectures. Exercises are being developed for students to be able to communicate with peers and instructors through real-time voice and text interactions.. The project is being evaluated by … The project is being disseminated through …

## Goals - Overview

- **Goals may focus on**
  - **Cognitive changes**
  - **Achievement change**
  - **Affective changes**
  - **Cognitive, achievement, or affective changes in targeted subgroups**

## Goals - Cognitive Changes

- **Goals on cognitive changes**
  - **Increase understanding of concepts**
    - **Ability to solve statics problems**
    - **Ability to draw free-body diagrams**
    - **Ability to describe verbally the effect of external forces on a solid object**
  - **Increase processing skills**
    - **Ability to solve out-of-context problems**
    - **Ability to visualize 3-D problems**
    - **Ability to communicate technical problems**

## Goals - Achievement Rate

- **Goals on achievement rate changes**
  - **Improve**
    - **Recruitment rates**
    - **Retention or persistence rates**
    - **Graduation rates**

## Goals -Affective Changes

- **Goals on affective changes**
  - **Improve students' attitude about**
    - **Profession**
    - **Curriculum**
    - **Department**
  - **Improve students' confidence**
  - **Improve students' intellectual development**

## Goals - Specific Subgroup Focus

**Goals focused on target subgroups**
- **Increasing a target group's**
  - **Understanding of concepts**
  - **Processing skills**
  - **Achievement rate**
  - **Attitude about profession**
  - **Confidence**
  - **Intellectual development**

- *"Broaden the participation of underrepresented groups"*

## Transforming Goals into Outcomes

**Write one expected measurable outcome for each of the following goals:**

1. **Improve the students' understanding of the concepts in statics**

2. **Improve the students' attitude about engineering as a career**

## Outcomes

*Conceptual understanding*
- Improve students conceptual understanding as measured by a standard tool (e. g., a statics concept inventory)
- Improve students conceptual understanding as measured by their ability to perform various steps in the solution process (e.g., drawing free body diagrams) when solving out-of-context problems

*Attitude*
- Improve the students' attitude about engineering as a career as measured by a standard tool (e. g., the Pittsburgh Freshman Engineering Survey )
- Improve the students' attitude about engineering as a career as measured in a structured interview

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# Project Rationale

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## Project Rationale

- **Rationale**
  - Introduction, Background, Justification
  - The narrative that provides the context for the project
  - The section that connects the "*Goals and Outcomes*" to the "*Project Plan*"

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## An Effective Rationale

Write a list of of questions that the *Rationale* for a CCLI proposal should answer

- What questions will a reviewer expect answered as he/she reads the *Rationale*?

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## An Effective Rationale (1)

- **What does the knowledge base (i. e., the literature) say about the approach?**
  - What have others done that is related?
  - What has worked previously?
  - What have been the problems/challenges?

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## An Effective Rationale (2)

- **What is the evidence that the approach will solve the problem?**
  - What is the evidence that it will:
    - Address the defined outcomes?
    - Achieve the defined outcomes?
    - Improve student learning?
  - What are the potential problems & limitations?
    - What can be done about them?

## An Effective Rationale (3)

- Why is this problem important?
  - Is it a global or local problem?
  - What are the potential broader impacts?
  - How will it improve quality of learning?

## An Effective Rationale (4)

- Has the applicant done prior work?
  - Has funded work lead to interesting results?
  - Are there preliminary data and what do they show?

## Reflective Exercise (2)

Identify the single most important piece of advice you would give to a colleague writing a proposal

- Write it down with your original answer
- Write your answer as one simple sentence
- This is a continuing exercise
  - Leave space for more answers

# Evaluation

## Project Evaluation Plan

- All projects require evaluation
  - All proposal require an evaluation plan
- During the project, evaluation:
  - Monitors progress toward goals
  - Identifies problems
- At the end of the project, evaluation:
  - Tells you what you accomplished
  - Provides data for you to use in telling others

*Exercise #5*
## Evaluation Plan

Read the sample *Evaluation Plan* and list suggestions for improving it

## Sample Evaluation Plan

Assessment of the Student Response Technology (SRT) will be both quantitative and qualitative. First, students will be surveyed at the end of the semester on the content, level of difficulty, and their perceived level of mastery of the concepts of Statics. Second, faculty members teaching the course using SRT will be asked to judge its effectiveness in monitoring student achievement throughout the semester. In addition, faculty members who have been teaching Statics course for several years will be asked to compare students' abilities after using SRT with those in previous years who have not used SRT. Finally, the final grades of students using SRT will be compared with those from previous years who have not used the technology in the classroom.

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*PD's Response*
## Evaluation Plan (1)

- **Include formative assessment**
  - **Provides feedback during the design and implementation phases**
  - **Helps monitor progress toward outcomes**

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*PD's Response*
## Evaluation Plan (2)

- **Get help at the beginning – in the proposal writing phase**
  - **Involve an expert evaluator**
  - **Consider an outside (independent) evaluator**
    - **Size of budget**
    - **Importance of objectivity**

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*PD's Response*
## Evaluation Plan (3)

**Consult other sources**
- *NSF's User Friendly Handbook for Project Evaluation*
  - **http://www.nsf.gov/pubs/2002/nsf02057/start.htm**
- **Existing tools**
  - **Online Evaluation Resource Library (OERL)**
    - **http://oerl.sri.com/**
  - **Field-Tested Learning Assessment Guide (FLAG)**
    - **http://www.wcer.wisc.edu/archive/cl1/flag/default.asp**
- **Science education literature**
  - *J. of Engineering Education*, **Jan, 2005**

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*PD's Response*
## Evaluation Plan (4)

- **Provide details on tools & experimental design**
  - **Describe how**
    - **Students will be "surveyed",**
    - **Faculty will be "asked",**
    - **Grades will be "compared"**
  - **Indicate who will do these tasks**
  - **Indicate who will analyze and interpret the data**
  - **Consider confounding factors**
  - **Try to measure deeper learning**
  - **Collect demographic data on student populations**

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*PD's Response*
## Evaluation Plan (5)

- **Consider broadening the approach**
  - **Examine effects on retention and diversity**
  - **Involve larger populations**
    - **More diverse populations**
  - **Collaborate**
  - **Beta test**

# Dissemination

## (Contributing to Knowledge Base & Building Community)

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# Effective Dissemination Plans

- *Education&D projects need dissemination plan*
- *CCLI projects need to contribute to:*
  - *The STEM education knowledge base*
  - *Building the STEM education community*

- *How does a proposal convince the reader (the reviewer or program officer) that the project will:*
  - *"Contribute to the STEM education knowledge base"?*
  - *"Help build the STEM education community"?*

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## *Exercise #6*
# Effective Dissemination Plan

**Read the sample *Dissemination Plan* and list suggestions for improving it**

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# Sample Dissemination Plan

**This project will serve as a pilot for other courses at the University of ____ and at other colleges and universities throughout the country. The results of our evaluation will be disseminated on the University's web site, which will contain a special page devoted to this NSF-sponsored project. Additional dissemination will occur through presentations at conferences, such as teacher education and science education conferences, regionally and nationally, and through articles published in peer-reviewed journals.**

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## *PD's Response*
# Dissemination Plan (1)

- **Be more proactive in promoting website & materials**
- **Integrate community building, dissemination, and evaluation**

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## *PD's Response*
# Dissemination Plan (2)

- **Target and involve a specific sub-population**
  - **Those who teach similar course at other locations**
  - **Ask them to review various products, data, and approaches**
  - **Work with them to organize**
    - **Email exchanges and listserves**
    - **Informal meeting at a conference or on-campus**
    - **Faculty development workshops (on-campus and at conferences)**
- **Explore beta test sites**

## PD's Response
### Dissemination Plan (3)

- Be specific about how the project will serve as a "pilot"
  - Strategy for evaluating and disseminating
  - Strategy for getting "buy-in" by others

## PD's Response
### Dissemination Plan (4)

- Be more specific in publication efforts
  - Indicate the specific conferences and journals
    - Include conference travel and journal page charges in budget
    - Include a tentative title & description of paper
  - Explore other venues
    - CUR (http://www.cur.org/), PKAL (http://www.pkal.org), State Academy of Science meetings
    - Science news publication and lay press
    - Professional society and specialty listserves

## PD's Response
### Dissemination Plan (5)

- Explore commercialization
  - Discuss contacts with software and textbook publishers
- Put material in a form suitable for the National Science Digital Library (NSDL)

## Reflective Exercise (3)

Identify the single most important piece of advice you would give to a colleague writing a proposal

- Write it down with your other answers
- Write your answer as one simple sentence
- This is a continuing exercise
  - Leave space for more answers

# Practical Aspects of Review Process

## Practical Aspects of Review Process

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

## Practical Aspects of Review

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

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## Practical Aspects of Review (1)

- **Use good style (clarity, organization, etc.)**
  - **Be concise, but complete**
  - **Write simply but professionally**
  - **Avoid jargon and acronyms**
  - **Check grammar and spelling**

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## Practical Aspects of Review (2)

- **Use a readable, "friendly" structure**
  - **Sections, heading, short paragraphs, bullets**
    - **Avoid dense, compact text**
  - **Reinforce ideas**
    - **Summarize**
    - **Highlight (bolding, italics)**
  - **Give examples**
  - **Provide appropriate level of detail**

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## Practical Aspects of Review (3)

**Follow the solicitation and the *GPG***
  - **Page, font size, and margin limitations**
  - **Use allotted space but don't pad the proposal**
  - **Follow suggested (or implied) organization**
  - **Use appendices only if allowed**
    - **Use sparingly**
  - **Include commitments letters**
    - **Avoid form letters & vague support letters**

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## Practical Aspects of Review (4)

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

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## Practical Aspects of Review (5)

- **Prepare credible budget**
  - **Consistent with the scope of project**
  - **Clearly explain and justify each item**

- **Address prior funding when**
  - **Emphasize results**

## PD's Responses
## Practical Aspects of Review (6)

- Sell your ideas
  - Don't over promote
- Address review criteria
- Don't make assumptions about audience
  - The reviewers
- Proofread it
  - Also have expert and non-expert proofread it

## Reflective Exercise (4)

Identify the single most important piece of advice you would give to a colleague writing a proposal

- Write it down with your other answers
- Write your answer as one simple sentence
- This is a continuing exercise
  - Leave space for more answers

## Reflective Exercise Wrap-up

Review your responses and identify how they have changed.

# Conclusion

## Questions and Concerns During Proposal Preparation

Questions and concerns will arise as you develop your proposal

- *Should I include ____?*
- *How should I deal with ____?*
- *Is the discussion of ____ clear?*
- *Should I do ____?*

*How do you deal with them?*

## Information Sources

- Read the solicitation and the *GPG*
- Get advice
  - NSF program directors
  - Experienced colleagues
- Use an "imaginary panel"
  - Variation on guidelines for effective writing
    - *Write for a specific reader*
- Use your judgment
  - Don't include a poorly developed section because someone told you that it is needed
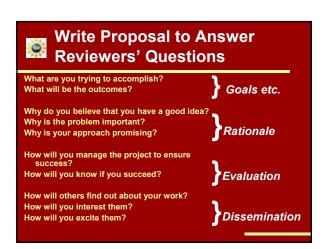
## "Imaginary Panel"

- Identify a few colleagues who you know well that you can predict what they will say
  - Some in field -- some out
  - Some experienced -- some novices
- Form an "imaginary panel" and "ask" them
  - How would they respond to a question?
  - How would they react to an idea?
  - How would they react to a written section?
  - What else would they like to see?
  - What questions will they have?

## Project Perspective

- Describe a "project" not just the "new stuff"
- A "project" includes other critical aspects
  - *Goals, objectives & outcomes*     *Rationale*
  - *Evaluation plan*     *Dissemination plan*
- Look beyond the project description
  - Let all aspects of proposal evolve together
- "Tell the story" and turn a good idea into a competitive proposal

## Write Proposal to Answer Reviewers' Questions

What are you trying to accomplish?
What will be the outcomes?  } *Goals etc.*

Why do you believe that you have a good idea?
Why is the problem important?
Why is your approach promising?  } *Rationale*

How will you manage the project to ensure success?
How will you know if you succeed?  } *Evaluation*

How will others find out about your work?
How will you interest them?
How will you excite them?  } *Dissemination*

## Final Advice

Read the solicitation!
Read the *GPG!*

**Read the solicitation!**
**Read the *GPG!***

## **Read the solicitation!**
## **Read the *GPG!***

# Questions