

Developing a Competitive Proposal

(An Interactive, Web-Based Workshop)

Russell Pimmel
Division of Undergraduate Education
National Science Foundation

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Please dial **1-866-727-8088** for the audio portion of the conference; use pass code **9501514**, and place your phone on **MUTE**

Caution

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

Preliminary Comments

Workshop Goal & Expected Outcomes

GOAL: Enable participants to prepare competitive proposals

OUTCOMES: Participants should be able to describe:

- Common proposal strengths and weaknesses
- Strategies for developing various aspects of the project/proposal
- Strategies for dealing with the practical aspects of the review process

Workshop Topics

- **Introduction**
- **Common Strengths and Weaknesses**
- **Developing a Proposal**
 - **Goals and Expected Outcomes**
 - **Rationale**
 - **Evaluation Plan**
 - **Broader Impacts**
- **Practical Aspects of Review Process**

Active & Collaborative Learning

- **Effective learning activities**
 - Recall prior knowledge -- actively, explicitly
 - Connect new concepts to existing ones
 - Challenge and alter misconceptions
 - Reflect on new knowledge

- **Active & collaborative processes**
 - **Think** individually
 - **Share** with partner
 - **Report** to local and virtual groups
 - **Learn** from program directors' responses

Participant Activities

- **Long Exercise** ---- 7 min
 - Think individually ----- ~2 min
 - Share with a partner ----- ~2 min
 - Report in local group ---- ~2 min
- **Short Exercise** ----- 5 min
 - Think individually ----- ~2 min
 - Report in local group ---- ~2 min
- **Reflection** ----- 1 min
- **Questions** ----- 3 min

Facilitator's Duties

- **Coordinate the local activities**
- **Watch the time**
 - **Allow for think, share, and report phases**
 - **Reconvene on time -- 1 min warning slide**
- **Ensure the individual think phase is devoted to thinking and not talking**
- **Coordinate the asking of questions by local participants**

CCLI Program -- Components

- **Vision of the program is excellent undergraduate education for all STEM students**
- **Project Components**
 - **Creating learning strategies and materials**
 - **Implementing new instructional strategies**
 - **Developing faculty expertise**
 - **Assessing/evaluating student achievement**
 - **Conducting research on undergraduate STEM education**

CCLI Program – Important Features

- **Important project features**
 - **Quality, relevance and impact**
 - **Student focus**
 - **Use of and contribution to STEM knowledge base**
 - **STEM education community-building**
 - **Sustainability**
 - **Expected measureable outcomes**
 - **Project evaluation**

CCLI Program – Project Types

- **Project Types (Scale, Scope, and State)**

Type 1- Exploratory

Type 2- Expansion

Type 3- Comprehensive

CCLI Program – Information Sites

- **Solicitation**

 - http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5741&org=DUE&from=home

- **Search awards**

 - <http://www.nsf.gov/awardsearch/tab.do?dispatch=2>

 - **Use “Search All Fields” tab**

 - Enter key words
 - Enter “Element Code” -- use “Lookup” link on right
 - Select “Any” vs “All”

- **Can request copy of proposal from PI or NSF through FOIA**

 - <http://www.nsf.gov/policies/foia.jsp>

 - **Use carefully – Not a “template” for your idea**

Activity


Reflection

- What is the most important advice that you would give to a colleague writing a CCLI proposal?

- ***Activity Guidelines:***
 - *Allotted time is 1 min*
 - *Write your ideas on a sheet of paper*
 - *You will add to this "Reflections" sheet several times*
 - *No discussion*

CCLI Review Processes

- **Program directors**
 - Sort by disciplines
 - Send to reviewers
- **Each reviewer**
 - Rates each proposal (E, V, G, F, and P)
 - Writes comments
 - Describes strengths and weaknesses in terms of the intellectual merit and broader impacts criteria
- **Review panel**
 - Discusses each proposal
 - Writes the Panel Summary
 - Highlights strengths and weaknesses



Common Proposal Strengths and Weaknesses

Study of Strengths and Weaknesses

- Analyzed strengths and weaknesses identified in Panel Summaries of CCLI Phase 1 engineering proposals from 2005 and 2006
- Developed codebook of statements (or items) describing strengths and weaknesses
 - Included 30 complementary strength and weakness statements, e. g., “Proposal was innovative” and “Proposal was not innovative”
 - Coded Panel Summaries for 471 proposals

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*)

Predict the results of our analysis

- Long Exercise ---- 7 min
 - Think individually ----- ~2 min
 - Share with a partner ----- ~2 min
 - Report in local group ---- ~2 min
- Watch time and reconvene after 7 min
- Use THINK time to think – no discussion
- Selected local facilitators report to virtual group

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*)

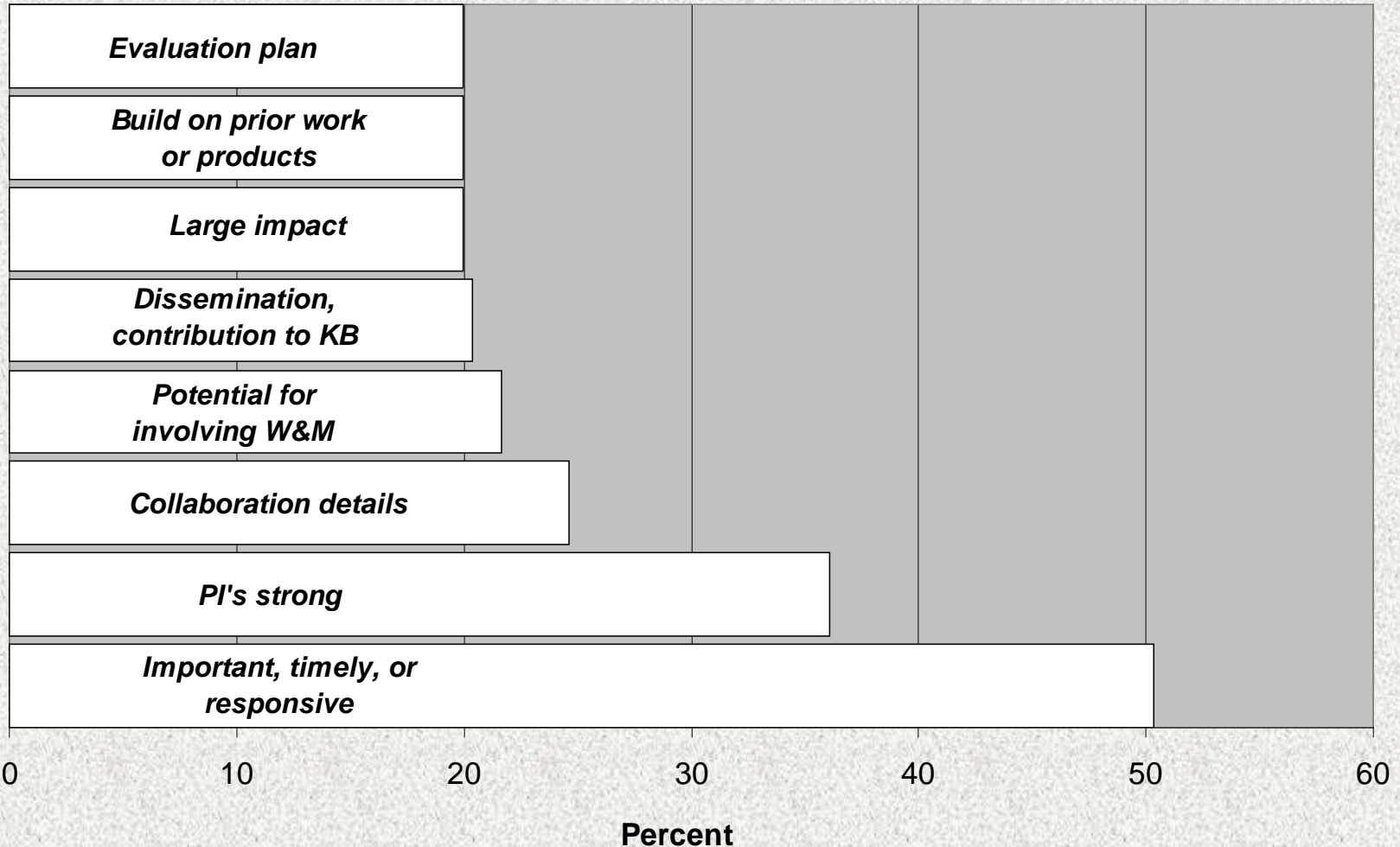
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ONE Minute

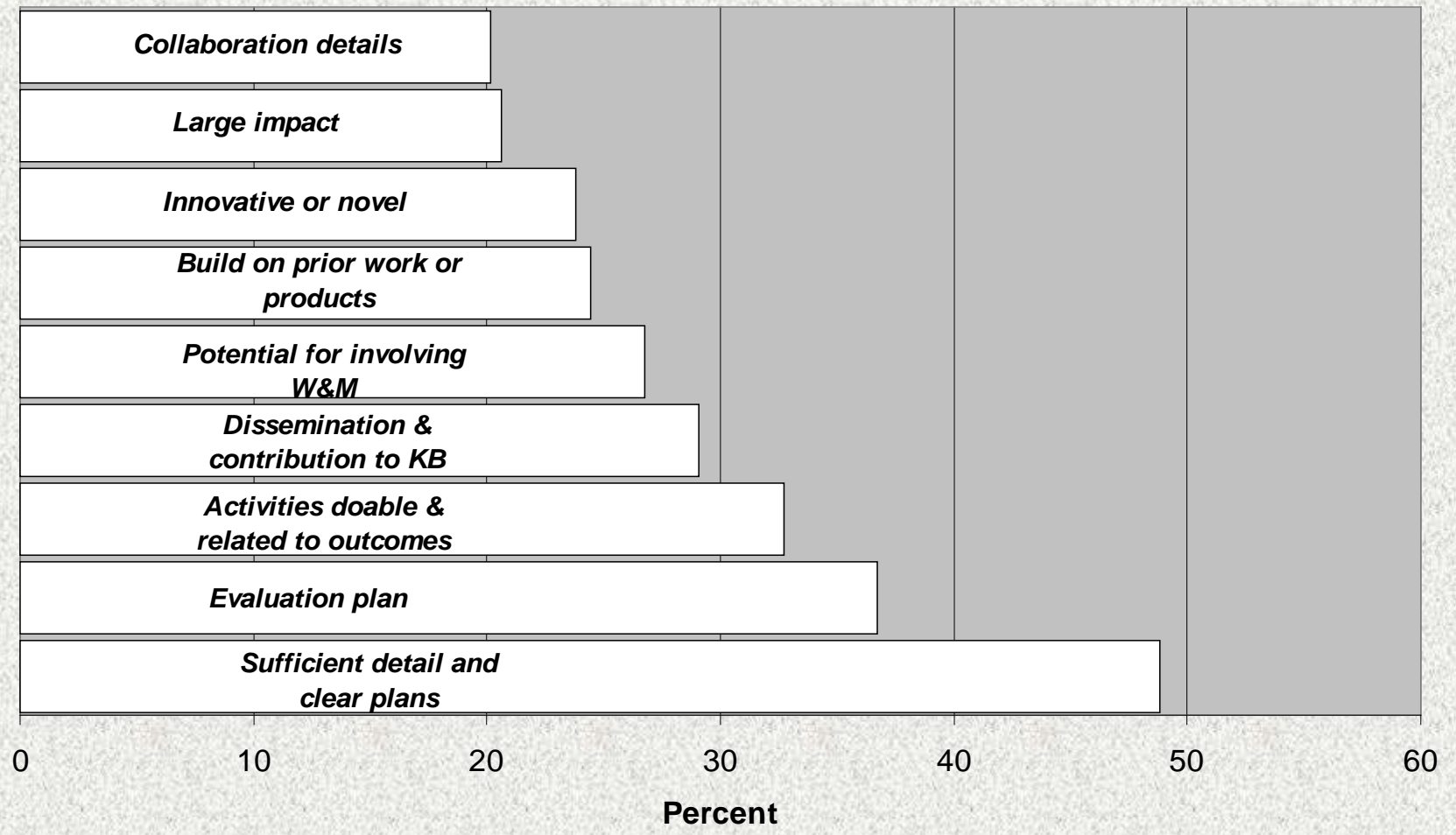
Most Common Strengths

Strengths Cited in More Than 20 % of the Panel Summaries



Most Common Weaknesses

Weaknesses Cited in More Than 20 % of the Panel Summaries



Top Ten Strengths and Weaknesses

Rank	Strengths	Weaknesses
1	Important, timely topics & responsive to needs	<i>Sufficient detail and clear plans</i>
2	<i>PI's strong</i>	<i>Evaluation plan good</i>
3	Collaboration details	<i>Activities doable & related to outcomes</i>
4	Potential for involving women and minorities	Dissemination good & contributes to knowledge base
5	Dissemination good & contributes to knowledge base	Potential for involving women and minorities
6	Large impact	Build on prior work or products
7	Build on prior work or products	Innovative or novel
8	Evaluation plan good	Large impact
9	Innovative or novel	Collaboration details
10	<i>Non-traditional pedagogy</i>	Important, timely topics & responsive to needs ²⁰

Most Commonly Cited Strengths and Weaknesses

Item	Percent
Important, timely topics & responsive to needs	68
Sufficient detail & clear plans	59
Evaluation plan good	57
Dissemination good & contributes to knowledge base	49
Potential for involving women & minorities	48
Collaboration details	45
Builds on prior work or products	44
Activities doable & related to outcomes	44
Innovative or novel	43
PI's strong	42
Large impact	41

Developing a Proposal

**(Converting a Good Idea
into a Fundable Project)**

Preliminary Comments

Elements of a Competitive Proposal

- **Competitive proposals contain**
 - A **great idea**
 - A **well designed project** developed around the idea
 - A **convincing description** of the project

- **Non-competitive proposals lack one or more of these elements**

- **Workshop focus: Converting a good idea into a well designed project**
 - The “**project development**” phase
 - Not the “**idea generating**” or “**writing phases**”

Preliminary Comments

Organization of a Project

- **Goals and expected outcomes**
- **Rationale**
 - **Introduction**
 - **Background (prior work, theoretical basis)**
 - **Justification (importance, impact, need)**
- **Project Plans**
 - **Implementation plan**
 - **Evaluation plan**
 - **Management plan**
 - **Dissemination plan**

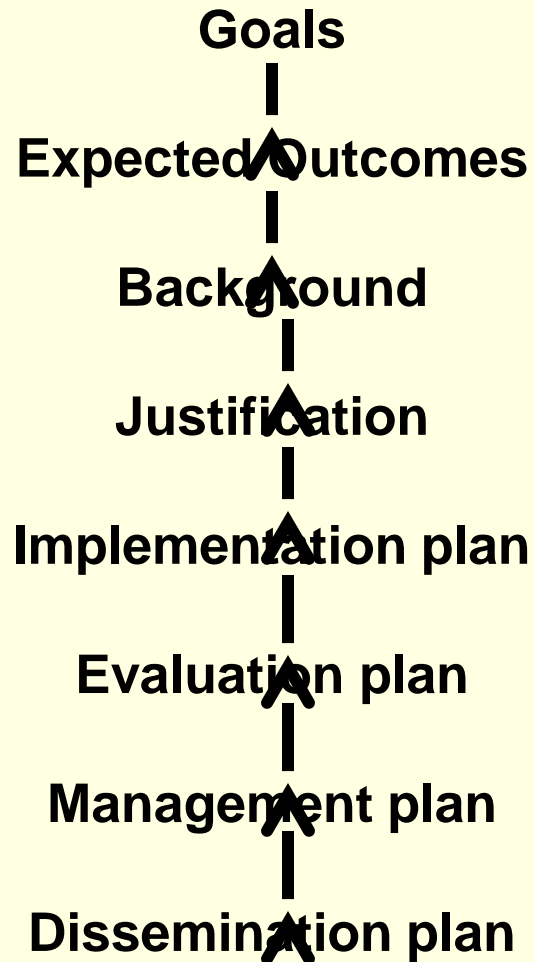
Note: There are other organizations

Project Development Model

- **Think of the project as a single entity, not a group of individual (independent) elements**
- **Design the project in an iterative process with “successive refinement”**

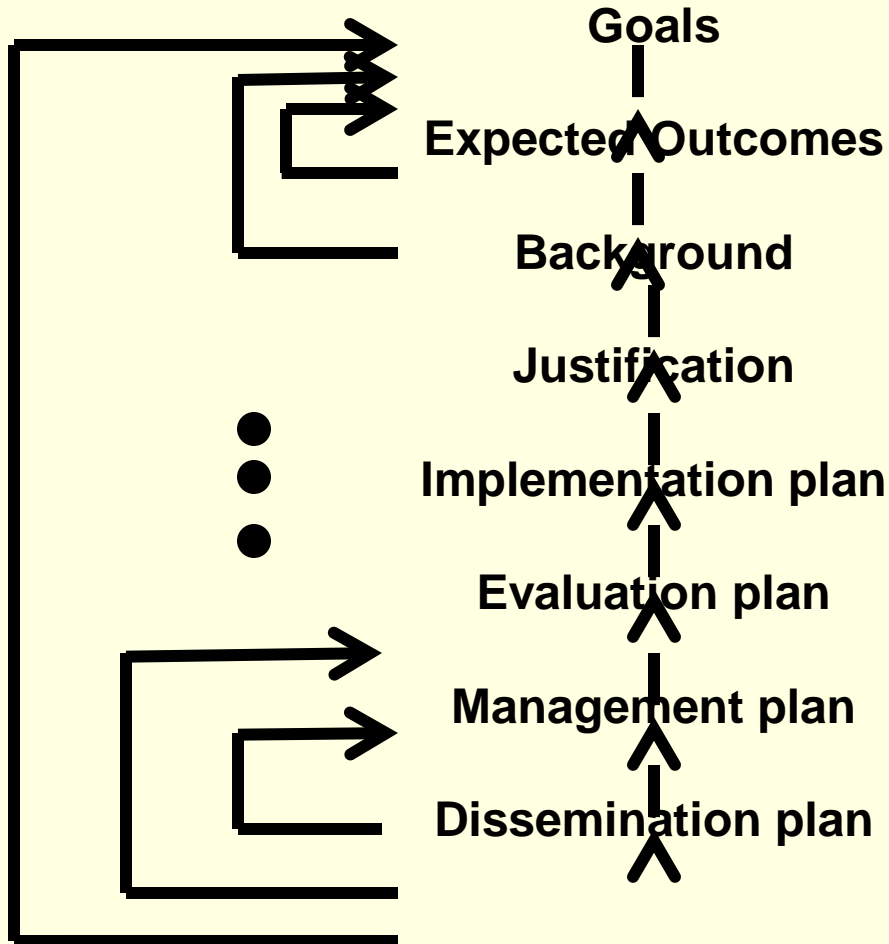
Preliminary Comments

Linear Model



Preliminary Comments

Iterative Model



Questions

Activity

Reflection

- **What is the most important advice that you would give to a colleague writing a CCLI proposal?**

- ***Activity Guidelines:***
 - ***Allotted time is 1 min***
 - ***Write your ideas on your "Reflections" sheet***
 - ***No discussion***



Project Goals & Expected Outcomes

Goals & Expected Outcomes

- **Goals** provide overarching statements of project intention

What is your overall ambition?

What do you hope to achieve?

- **Expected outcomes** identify specific observable results for each goal

How will achieving your “intention” reflect changes in student behavior?

How will it change their learning? Their attitudes? Their successes? Their diversity?

Activity

Developing Project Goals

Consider an idea aimed at integrating 3-D visualization software and small group discussions and presentations of homework problems into an engineering mechanics course

- List possible goals for this project
 - *Use student perspective not instructor or material perspective*
 - *Not “Develop material...” or “Incorporate material ...”*
- **Short Exercise**
 - *Think individually ----- ~2 min*
 - *Report in local group ----- ~2 min*
- *Watch time and reconvene after 4 min*
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Activity

Developing Project Goals

Consider an idea aimed at integrating 3-D visualization software and small group discussions and presentations of homework problems into an engineering mechanics course

- List possible goals for this project
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ONE Minute

Types of Project Goals

- **Goals may focus on**
 - **Cognitive behavior**
 - Conceptual understanding
 - Processing skills
 - **Affective behavior**
 - **Success rates**
 - **Diversity**
 - Cognitive, affective, or success goals in underrepresented groups

Goals on Cognitive Behavior

- ***Within the context of the course***
 - **Improve conceptual understanding**
 - **Improve ability to**
 - **Solve textbook problems**
 - **Use the visualization software tool**
 - **Describe specific course concepts**
- ***Beyond the context of the course***
 - **Improve ability to**
 - **Solve out-of-context problems**
 - **Visualize 3-D models**
 - **Discuss technical issues**
 - **Work effectively in teams**

Goals on Affective Behavior

Improve

- **Interest in the course**
- **Attitude about**
 - **Profession**
 - **Curriculum**
 - **Department**
- **Self-confidence**
- **Intellectual development**

Goals on Success Rates

- **Improve**
 - **Recruitment rates**
 - **Retention or persistence rates**
 - **Graduation rates**

Goals on Diversity

Increase a target group's

- **Understanding of concepts**
- **Achievement rate**
- **Attitude about profession**
- **Self-confidence**

“Broaden the participation of underrepresented groups”

Activity

Transforming Goals into Expected Outcomes

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

1. Increase the students' understanding of the concepts in statics
1. Improve the students' attitude about engineering as a career

- ***Short Exercise ----- 4 min***
 - ***Think individually ----- ~2 min***
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Activity

Transforming Goals into Expected Outcomes

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

1. **Increase the students' understanding of the concepts in statics**
1. **Improve the students' attitude about engineering as a career**

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ONE Minute

Expected Outcomes

Conceptual understanding

- ***Students will be better able to solve simple conceptual problems that do not require the use of formulas or calculations***
- ***Students will be better able to solve out-of-context problems.***

Attitude

- ***Students will be more likely to describe engineering as an exciting career***
- ***The percentage of students who transfer out of engineering after the statics course will decrease.***

Goals and Expected Outcomes

- **Ultimately the goals and expected outcomes should convince the reader that the applicant has**
 - **A clear understanding of what he or she is trying to achieve**
 - **A clear understanding what he or she expects to observe when this is achieved**



Broader Impacts

Activity

Developing Broader Impacts

List the facets that should be explored in developing the project's broader impacts

- ***Short Exercise ----- 4 min***
 - ***Think individually ----- ~2 min***
 - ***Report in local group ----- ~2 min***
- ***Watch time and reconvene after 4 min***
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Activity

Developing Broader Impacts

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ONE Minute

Broader Impacts

- **Goals and expected outcomes**
 - **Consistent with rest of project**
- **Rationale for expected outcomes**
 - **Prior work by you and others**
- **Strategy and specific activities**
 - **Existing relationships (e.g., a K-12 connection)**
- **Plan to evaluate outcomes**

Broader Impacts

- Ultimately the broader impacts discussion should convince the reader that the applicant has
 - **Goals and expected outcomes** for project's broader impacts
 - A **strategy** for achieving them
 - A **rationale** supporting the strategy
 - A detailed approach for **evaluating** progress
 - A **connection** to other aspects of project

Questions

BREAK

15 min

BREAK

1 min



Project Rationale

Project Rationale

- Rationale provides the context for the project
- It provides
 - Background
 - Justification
- Connects the “*Statement of Goals and Expected Outcomes*” to the “*Project Plan*”

Activity

Developing the Project's Rationale

List facets that should be explored in developing the rationale for a project (*Describe prior work*)

- ***Long Exercise ---- 7 min***
 - *Think individually ----- ~2 min*
 - *Share with a partner ----- ~2 min*
 - *Report in local group ---- ~2 min*
- ***Watch time and reconvene after 7 min***
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Activity

Developing the Project's Rationale

List facets that should be explored in developing the rationale for a project (*Describe prior work*)

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ONE Minute

Developing the Rationale

- **Collect and analyze information, data, evidence**
 - **The importance of the problem**
 - **Incorporates new disciplinary knowledge**
 - **Addresses an emerging area or known problem**
 - **Meets an industry need**
 - **The potential impact of the work**
 - **Number of students**
 - **Transportable to a large number of institutions**
 - **Serves as model for other areas**

Developing the Rationale (cont.)

- **Collect information, data, evidence**
 - **Prior work by others**
 - **Referenced to the literature**
 - **Prior work by applicant**
 - **Preliminary data**
 - **Relevant theory**
 - **Referenced to the literature**
- **Potential contributions to teaching & learning knowledge base**
- **Potential problems, limitations, alternate approaches**

Developing the Rationale (cont.)

- **Consider both intellectual aspects and broader impacts as rationale is developed**
- **Make sure project is consistent with solicitation**

Overview

Project Rationale

- **Ultimately the rationale should convince the reader that the applicant**
 - **Has identified an important, big-impact problem**
 - **Understands the problem and the prior work**
 - **Has thought seriously about broader impacts**



Questions

Project Plans

- **Project plans include**
 - **Implementation plan**
 - **Evaluation plan**
 - **Management plan**
 - **Dissemination plan**



Implementation Plan

Implementation Plan

- **Implementation plan describes activities that will be undertaken in order to achieve the project's goals and expected outcomes**
- **Sometime called the “methods”**

Activity

Implementation Plan

- **List facets that should be considered when developing an implementation plan**
 - ***Long Exercise ---- 7 min***
 - ***Think individually ----- ~2 min***
 - ***Share with a partner ----- ~2 min***
 - ***Report in local group ---- ~2 min***
 - ***Watch time and reconvene after 7 min***
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Activity

Implementation Plan

- List facets that should be considered when developing an implementation plan
 - *Long Exercise ---- 7 min*
 - *Think individually ----- ~2 min*
 - *Share with a partner ----- ~2 min*
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■ **ONE Minute**

Implementation Strategy

- **Type of activities**
- **Relationship of activities to expected outcomes**
- **Interdependence of activities**
- **Schedule**
- **Resources**
- **Expertise**
- **Details of each activity**
- **Examples**
- **Both intellectual aspects and broader impacts**

Implementation Plan

Ultimately the implementation plans should convince the reader that the applicant

- **Understands the activities needed to achieve the expected outcomes**
 - **Technical details for each activity**
 - **Interrelationships between the activities**
 - **Scheduling of the activities**
 - **Resources and effort required**
- **Has a doable plan**
- **Will complete the activities and achieve the expected outcomes**
- **Has considered the intellectual aspects and the broader impacts**



Evaluation Strategy

Activity

Developing an Evaluation Plan

List facets that should be considered when developing an evaluation plan (*Identify evaluator*)

- ***Short Exercise ----- 4 min***
 - ***Think individually ----- ~2 min***
 - ***Report in local group ----- ~2 min***
- ***Watch time and reconvene after 4 min***
- ***Use THINK time to think – no discussion***
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Activity

Developing an Evaluation Plan

List facets that should be considered when developing an evaluation plan (*Identify evaluator*)

- ***Short Exercise ----- 4 min***
 - ***Think individually ----- ~2 min***
 - ***Report in local group ----- ~2 min***
- ***Watch time and reconvene after 4 min***
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ONE Minute

Evaluation Plans

- **Evaluation expertise**
- **Evaluation questions**
 - **Derived from the expected outcomes**
- **Evaluation methods**
 - **Tools and protocols**
 - **Data analysis and interpretation**
- **Confounding factors**
 - **Approaches for minimizing their impact**

Evaluation Plan (cont.)

- **Formative evaluation**
 - **Monitoring and improving the project as it evolves**

- **Summative evaluation**
 - **Characterizing the accomplishments of the completed project**

Evaluation of both intellectual aspects and broader impacts

Evaluation Plan

- **Ultimately the evaluation plan should convince the reader that the applicant will**
 - **Collect, analyze, and interpret appropriate data**
 - **Complete an informative evaluation**
 - **For monitoring (formative)**
 - **For validating (summative)**
 - **Evaluate both the intellectual aspects and the broader impacts**



Dissemination Plan

Activity

Dissemination Plan

- List facets that should be considered in developing a dissemination plan
- ***Short Exercise ----- 4 min***
 - *Think individually ----- ~2 min*
 - *Report in local group ----- ~2 min*
- ***Watch time and reconvene after 4 min***
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ONE Minute

Dissemination Strategy

- **Standard approaches**
 - **Post material on website**
 - **Present papers at conferences**
 - **Publish journal articles**

- **Consider other approaches**
 - **NSDL**
 - **Specialty websites and list servers (e. g. Connexions)**
 - **Targeting and involving a specific sub-population**
 - **Commercialization of products**
 - **Beta test sites**

Dissemination Plan

- **Ultimately the dissemination plan should convince the reader that the applicant has plans to**
 - **Develop a transferable “product”**
 - **Inform others**
 - **Encourage and facilitate use by others**

Proposal Development

- **Competitive proposals present a clear, convincing, complete description of a project designed to explore great idea**
- **Converting a great idea into a competitive proposal requires a systematic exploration of all aspects of the project in an iterative fashion**

Questions

Activity

Reflection

- **What is the most important advice that you would give to a colleague writing a CCLI proposal?**

- ***Activity Guidelines:***
 - ***Allotted time is 1 min***
 - ***Write your ideas on your "Reflections" sheet***
 - ***No discussion***



Review Process -- Practical Aspects

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

Activity

Practical Aspects of Review Process

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

- ***Long Exercise ---- 7 min***
 - ***Think individually ----- ~2 min***
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Practical Aspects of Review Process

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

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ONE Minute

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, headings, short paragraphs & bullets (Avoid dense, compact text)**

- **Reinforce your ideas**
 - **Summarize; Highlight (bolding, italics)**

- **Give examples**

Review Process

- Provide appropriate level of **detail**

- Pay special attention to **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”

Review Process

- 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
 - “Support letters” are not allowed
 - Avoid form letters

Review Process

- Prepare **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



Questions

Activity

Reflection

- **What is the most important advice that you would give to a colleague writing a CCLI proposal?**

- ***Activity Guidelines:***
 - ***Allotted time is 1 min***
 - ***Write your ideas on your "Reflections" sheet***
 - ***No discussion***

Activity

Final Reflection

Review your reflective statements

- How have they changed?
- What have you learned?

- ***Short Exercise ----- 4 min***
 - *Think individually ----- ~2 min*
 - *Report in local group ----- ~2 min*
- ***Watch time and reconvene after 4 min***
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Final Reflection

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ONE Minute



Questions

Final Comments

- Thank you for your cooperation
- Please complete the evaluation survey
 - www.eng.lsu.edu/nsfwebinar/