Elsa: GOOD AFTERNOON, EVERYONE. I'M ELSA VILLA, AND BEFORE WE GET INTO TODAY'S WEBINAR, LET ME THANK MICHELLE AND JULIA FOR ALL THEIR HARD WORK IN COORDINATING WHAT WE HOPE TO BE AN INFORMATIVE WEBINAR, AND ALSO A SPECIAL SHOUT-OUT TO DONNA AND HER COLLEAGUES AT NSF WHO CONCEPTUALIZED THE REVOLUTIONIZING ENGINEERING DEPARTMENTS PROGRAM.

THIS FIRST WEBINAR IN ITS SERIES OF THREE HAS AN EXPECTED OUTCOME OF BEING ABLE TO CONCEPTUALIZE REVOLUTIONARY CHANGE IN YOUR DEPARTMENT.

OUR EXPECTED OUTCOME IS FOR YOU TO CONCEPTUALIZE REVOLUTIONARY CHANGE AS YOU BEGIN DEVELOPING YOUR PROPOSAL PLAN.

PLEASE NOTE THAT WE USE THE TERM "ENGINEERING" THROUGHOUT OUR WEBINAR TO DENOTE BOTH ENGINEERING AND COMPUTER SCIENCE.

CLICK

OUR **OUTLINE** FOR TODAY'S WEBINAR WILL BE TO DEFINE WHAT WE INTERPRET AS A REVOLUTION; SEVERAL EXAMPLES OF FUNDED RED PROJECTS; DESCRIPTION OF OUR INTERPRETATION OF PARADIGM SHIFTS; TWO HYPOTHETICAL CASE

STUDIES TO DEMONSTRATE THE DIFFERENCE BETWEEN A REVOLUTION AND A REFORM; AND, FINALLY, OUR TIPS FOR DEVELOPING A REVOLUTIONARY PROPOSAL.

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OUR VIEW OF **REVOLUTIONARY**, IN THE CONTEXT OF DEPARTMENTAL CHANGE, IS ADDRESSING THE EXISTING INTERCONNECTIVITY OF VARIOUS ELEMENTS THAT DEFINE PROGRAMS IN ENGINEERING, SUCH AS CURRICULUM, AND THE SHIFT IN THINKING ABOUT THESE ELEMENTS, WHICH IS REVOLUTIONARY WHEN THIS NEW WAY OF THINKING IS ENACTED.

IN PARTICULAR, A REVOLUTION IN CURRICULUM COULD BE A SHIFT IN THE MORE TRADITIONAL WAYS OF THINKING ABOUT WHAT LEARNING MEANS TO INCLUDE CONTENT, PRACTICES, AND STRUCTURES OF EDUCATION. WE SEE THEN THAT THIS INTERCONNECTIVITY CAN BE VIEWED AS A SYSTEMS APPROACH TO EDUCATION ADDRESSING SOCIAL, CONTEXTUAL AND ORGANIZATIONAL PROCESSES.

THE SOCIAL COULD BE FACULTY INTERACTION WITH STUDENTS, AND VICE VERSA. INTERACTIONS IN A CLASSROOM OR IN A LABORATORY COULD BE CONSIDERED CONTEXTUAL FACTORS.

IT COULD ALSO INCLUDE STUDENT INTERACTIONS WITH EACH OTHER; AND OF

COURSE TEACHING ASSISTANTS AND OTHER STUDENT LEADERS. THE

ORGANIZATIONAL PROCESSES COULD INCLUDE HOW CURRICULUM IS

STRUCTURED. IS IT ENTRENCHED IN PARTICULAR HISTORICAL OR CULTURAL

NORMS THAT NEED TO BE CHANGED OR MODIFIED? DO CORE BELIEFS OF

FACULTY, STUDENTS AND OTHERS IN THE COMMUNITY NEED TO BE ADDRESSED?

I WILL NOW HAND IT OFF TO MILO, WHO WILL ADDRESS THESE NOTIONS IN

MORE DETAIL.

CLICK

Milo:

Good afternoon, I am Milo Koretsky, a Professor of Chemical Engineering at Oregon State University.

I would like to now consider what might be some revolutionary ways to think about student learning in more detail – which we call ways to "re-situate" student learning. I will first present a traditional view that is rooted in the historical and cultural norms of undergraduate engineering school. Then I will contrast it with an alternative revolutionary take. The revolutionary views presented here are rooted in principles from the learning sciences and science and technology studies literature.

In going through this list, I want to be clear, the revolutionary perspective presented here is not meant to be THE only way to think about revolution or re-situating learning. There are many other valid syntheses, and in the end, the ways you conceptualize a change in learning should fit within the institutional context

of your revolution including the other elements in your RED project. Rather this is meant to be an example of how any revolution in engineering education sits squarely in the work we ask students to do and the meaning and value that is assigned to that work.

CLICK

A traditional curricular view tends to emphasize the technical aspect of engineering work – for example, SOME might be enamored with rigorous mathematical analyses. THEY might also include social work – the soft skills or professional skills – since ABET says THEY need to. But that aspect is backgrounded and largely separated from the technical work.

CLICK

In the revolution, we say engineering is fundamentally a social profession, as the engineer designs processes and products to meet social needs. And that the work contains both significant social and technical components. Moreover, these two are "interlocked" – meaning that social practices influence the way we go about technical work – and vice versa.

CLICK

A traditional view might be that you need to have a solid understanding of the fundamentals before you can do real engineering work. This perspective leads to curricular designs where math, science, and engineering science are front loaded, leaving students little opportunity to experience engineering work in a realistic context. In the revolution, we may take the approach that you learn principles better by applying them to real concrete engineering demands.

CLICK

A traditional view gives students deterministic problems with single answers; a revolutionary view is that engineering problems can have multiple solution paths where the engineer is asked to be more creative and to work within competing constraints.

CLICK

Traditional classes convey that engineering is done with certainty and good students are able to find the correct answer; a revolutionary curriculum prompts students to make the best decisions they can based on what they know – and thereby understand that engineers need to work with incomplete knowledge.

CLICK

The traditional class reinforces the norm that there is one way to be smart and privileges a certain type of knowledge. The revolutionary curriculum lets students see there are multiple ways that they can meaningfully and productively contribute to a team – and therefore places value on diverse ways of thinking.

CLICK

Finally many players in the traditional classroom are oriented by grades while after the revolution, the learning re-situates to the valued knowledge and skills needed for professional practice.

Poll

The conceptual framing of traditional and revolutionary we just explored was presented since

1. It is important to understand each and every one of these details to properly think about curricular revolutions.

2. As a conceptual model to illustrate it is important to think about the assumptions embedded in our learning systems if we want fundamental change to those systems.

It is heartening to see that many of you chose number 2. In fact, embedded in number 1 are many of the elements of traditional instruction – there is one correct answer and the role of the webinar is to provide it. Alternatively, response number 2 encourages you to frame your revolution as a creative and open-ended problem in design – curriculum design.

Thank you, Milo. I'm Noah Salzman, an Assistant Professor of Electrical and Computer Engineering at Boise State University.

We've just heard from Milo about ways of re-situating student learning, what I am going to spend the next few minutes talking about is renovating the structures of the system where student learning takes place. Revolutionizing engineering and computer science education requires more than just transforming the curriculum and the classroom experience. It also requires revolutionizing the practices that impact faculty and departmental culture, such as how we value and evaluate teaching, how we conceptualize diversity and recruitment, and how we promote lasting revolutionary change that benefits our students, colleagues, universities, and communities.

Like Milo did with re-situating learning, I am going to present some traditional perspectives on aspects of the undergraduate education system, paired with more revolutionary approaches to the same topic. And I offer you a similar disclaimer. These are examples of ways that we think that departmental and institutional structures can be transformed, not prescriptions. And "Traditional" is not necessarily synonymous with bad, nor "Revolutionary" with good. Rather, I hope that these examples will prompt you to think about ways that you can revolutionize the structures of your own departments within your unique institutional contexts.

CLICK

Let's start by thinking about how we value and assess teaching. Traditionally, faculty members' teaching ability has been assessed primarily using end-of-course evaluations completed by students. With a substantial body of research questioning the validity of these assessments, a more revolutionary approach to assessing teaching effectiveness is needed that truly measures student learning and their ability to practice what they have learned as opposed to merely their perceptions of learning.

CLICK

We also need to transform how we value teaching, from something that faculty members "buy out of" to something that they "buy into". Education is a foundational mission of universities; successful RED proposals will clearly

demonstrate how departmental culture will shift to elevate the status of teaching and fully value the opportunity to work with students.

CLICK.

Research, Teaching, and Service. These are the criteria used to assess most faculty as part of promotion and tenure decisions, with the relative importance varying by department and institution. This one-size-fits-all approach to faculty evaluation and rewards presents another aspect of departmental culture that is ripe for revolutionary change. A more revolutionary approach might involve context-based individualized evaluation, tailored to an individual's personal interests, motivations, and goals combined with the ability to work effectively with students and departmental colleagues.

CLICK

Lets switch gears, and talk about how structural changes can influence the makeup of our student bodies and pathways for students through our programs.

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Traditionally, many institutions assess their commitment to supporting underrepresented minority students by counting the number of students from underrepresented groups enrolled at their institution. While this provides a coarse measurement of an institution's success at recruiting and retaining underrepresented students, a more revolutionary approach involves critically examining departmental and institutional culture to create a more inclusive, equitable, and welcoming community.

CLICK

Diversifying pathways into and through engineering represents another challenge faced by many programs. Traditionally, the pathway through engineering has been conceptualized as a pipeline, with a single entry and exit point. A more revolutionary approach conceptualizes engineering pathways as a tributary, creating multiple entry points into the undergraduate curriculum, a multitude of pathways through the curriculum, and diverse opportunities for students upon completion of their degrees.

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Traditionally, most engineering and computer science programs utilize an industrial advisory board to incorporate guidance from industry partners. Many programs go beyond this with co-op programs or internships allowing students to actively interact with and learn from local industry. As you think about what revolutionary change looks like for you, I encourage you to think about opportunities for innovative partnerships with industry that can serve as a model for other institutions interested in developing closer relationships with industry. This can also go the other way, thinking about how your students can become agents for revolutionary change as future employees to create more innovative, welcoming, and just engineering and computer science workplaces.

CLICK

Revolutions need financial backing: In contrast to traditional approaches to reforming departmental culture and teaching practices through unfunded mandates for change, the RED program provides a significant level of funding to support change. You can certainly include traditional financial incentives such as course buyouts and summer salary for involved faculty members; many of our RED projects include either or both of these. However, as you are thinking about the budget for your project, think about both revolutionary ways that you can use the funding associated with this call to achieve your goals, and ensure that your budget allocates resources in alignment with your project goals and narrative.

CLICK

Last but not least I'd like to talk about traditional change that is directed, versus revolutionary change that is emergent. One traditional approach to change is simply telling people what to do; not surprisingly this approach does not seem to work very well in academia. With the Department Chair or Academic Unit Head as the required PI on a RED proposal, it can be tempting to see this as a means of promoting a personal agenda for change. Instead, lasting change results when a majority of stakeholders create and buy-in to the change. Encourage and seek out contributions from all members of the PI team, other faculty in your department, administrators, students, local industry partners and anyone else who you feel

has a stake in the development of your students and ability to contribute meaningful ideas to promote revolutionary change.

Emergent change also means looking at your department and recognizing how you are uniquely situated to achieve revolutionary change while also serving as a model or inspiration for other undergraduate programs. What are the unique resources, successes with cultural or curricular transformation, or partnerships that you can leverage to show that you are both excited about and capable of achieving revolutionary change?

CLICK

As an example, at Boise State University, our RED team identified several factors that we were able to leverage in our proposal to revolutionizing our computer science. This included recent rapid growth of the department resulting in having a significant number of new faculty members, moving into a new physical location located in the heart of Boise's software development community, and successful transformation of our introductory course sequence resulting in much higher retention rates for our incoming students. We were able to explain in our proposal how these factors made us ripe for revolutionary change, and how we would leverage these factors in the activities that we proposed in our RED grant application.

Clearly, not all of these factors, or possibly none of these factors, will apply to your team as you develop your proposal. However, I hope that this gives you a sense of what change to institutional structures might look like, and help you begin to think about how you and your institution are primed for revolutionary change.

Next, we'll hear from Milo again as he describes how Oregon State and Colorado State University applied some of the concepts and principles you've just heard about to revolutionizing their departments.

We next show two examples of projects from the first RED cohort. These representations are intended to illustrate THE EXISTING INTERCONNECTIVITY OF VARIOUS ELEMENTS THAT DEFINE these PROGRAMS

The first representation is form Oregon State University. It uses a pillars analogy to holistically show four different program elements. The first element shows **Curricular Change in the Core** where learning activities in 9 core sophomore- and junior-level studio classes are being changed to make work more meaningful and consequential for students. The second shows Student PODs. PODs are longitudinally mixed student teams where students can help one another to understand the university experience and how it relates to professional practice. The third pillar addresses formal changes to the structures, policies and practices within the unit. Finally, there is work to **Create a Culture of Inclusion** by Re-situating faculty and students' capacity to engage issues of inclusivity by shifting their cognitive and affective knowledge of power and privilege. these four pillars work together to support an inclusive community fostering the professional development of engineers.

CLICK

The second representation comes From Colorado State University where a diverse team of educators are redefining what it means to teach and learn in the Department of Electrical and Computer Engineering. This representation uses a web of interlocking strands. In this RED project they are, in effect, throwing away courses to overcome the challenges of the current engineering educational system. Approaching the degree from a holistic perspective, they no longer approach the program as a set of disparate courses taught by autonomous (and isolated) faculty, but as an integrated system that fosters collaboration among faculty and students. the new pedagogical and organizational model emphasizes knowledge integration and interweaves thematic threads throughout the curriculum. These threads include: "foundations", for example, math and science, "creativity", which includes design and research experiences, and "professionalism", i.e., what is frequently referred to as the "soft" skills.

Nadia:

Thank you Milo. Good afternoon. I'm Nadia Kellam, an Associate Professor at Arizona State University. So far we have focused our discussion at a theoretical level, and then with three concrete examples from current RED projects--now we are going to share hypothetical cases to help provide more concrete examples of what we mean by revolutionary versus non-revolutionary.

(advance slide) In the first case we have Dr. Taylor, a department head, who just attended a department heads meeting and learned about flipping classrooms--something he has never heard of before. He decides that he will put together a RED proposal around flipping classrooms in his department. He's personally excited to get a big grant like this one as he hopes it will help make him more competitive to become a Dean in the next year or two. His goal in the proposal is to flip all classrooms in his department within the first two years of the project. He begins working hard on writing the project description and getting the proposal documents together. He puts off finding an engineering education researcher and social science expert until he has already written a complete draft of the proposal. He manages to find two experts who agree to be on the proposal and leaves a half of a page in the project description for the engineering education research plan.

The engineering education researcher is an expert in creating high quality videos and aligns the research portion of this project with his personal research agenda. He comes up with an agenda quickly and aligns it somewhat with the broader proposal. He decides the purpose of the research is to understand how to best create high quality videos to be used when flipping classrooms. His research questions are "Do students learn more effectively if headings in videos are static or animated?" and "Do students learn more effectively when there are multiple videos that are less than 10 minutes or when there is a longer video that is 50 minutes in length?"

Honestly Dr. Taylor doesn't really understand why he even needs the social scientist so he has her write up her bio and current and pending support so that he can show the reviewers that he has met that requirement.

In the proposal he submits, Dr. Taylor explains that all faculty will be required to flip one class in year one of the project and then to flip all of their classes during year two. The funding is going to be used to help support the faculty in creating high quality videos of their existing lectures. To address broader impacts, he also decides to expand the existing tutoring center so that more students can be served and hopefully so that the high attrition rate that they typically see in their department will go down.

(advance slide)

(launch poll)

How revolutionary is this project on a scale from 1 (not revolutionary) to 5 (very revolutionary)?

(poll question)

(share results) It looks like you all think that this project is not very revolutionary. (describe more)

(advance slide)

Let's take a closer look at Dr. Taylor's case.

- (click to bring up next bullet) Dr. Taylor's vision is centered on taking the lecture out of the classroom and doing homework in the classroom. This still is the process of having students learning the principles (now out of class) before doing them. Flipping classrooms alone is not a very revolutionary idea.

- (click to bring up next bullet) Dr. Taylor's approach only focuses on curriculum--flipping the classroom. It is not a systems level approach that addresses social, contextual, and organizational processes in addition to curriculum. The approach is activity-driven, not process-driven.

- (click to bring up next bullet) The innovation is flipping the classroom, but is focused on the technology involved in flipping the classroom—the videos that are produced. It is not focused on the social system of teaching and learning.

- (click to bring up next bullet) The research plan is also focused narrowly--it is focused on how to best create high quality videos. It is not focused on faculty or student learning, motivations, self-efficacy, beliefs, values, or culture. It is focused solely on the video.

- (click to bring up next bullet) The idea does not consider that there are core entrenched historical and cultural norms. Many faculty and students will be resistant to changing the classroom. There is no thought put into how these existing cultural norms will be challenged and overturned. Meaningfully integrating a change theory (with help of the social scientist) would be helpful in considering these entrenched norms and how to change the current system. Friday's webinar will focus on theories of change if you'd like to learn more about that.

- (click to bring up next bullet) Dr. Taylor's approach does not address core beliefs and values of faculty. It actually takes away some of the autonomy of the faculty which could result in faculty becoming unhappy with his leadership and eventually lead to no revolution.

- (click to bring up next bullet) The team is not cohesive. The engineering education researcher and social scientist are add-ons and this will be clear when the reviewers read the final proposal. A cohesive team is really critical to these RED projects and tomorrow's webinar will focus more deeply on this aspect of preparing your proposals.

- (click to bring up next bullet) In this case, the department head alone is driving the change--the change is directed from the top down. There is no local buy-in from the faculty or students. There is also no buy-in from higher up--at the college or university level.

- What will happen if Dr. Taylor leaves for a dean position at another university in a year two? Will this revolution have lasting change? It is very dependent on one person and if that person is not there to champion it, it is not likely to be sustained.

Now lets move to the second case. In the second case we have two pre-tenure engineering faculty members who attended a summer teaching workshop that their chair, Dr. Samara, nominated them for and provided funds for them to attend. They learn about flipped classrooms and mention the idea at their next faculty meeting. Dr. Samara hears the idea at the faculty meeting and discusses it with another tenured professor and they decide that this may be a low bar entry point to changing practice in their engineering department. They think it may help increase student learning and motivation and could indirectly help students who work full time take care of dependents while taking classes. Dr. Samara then decides to put together a RED proposal as there seems to be some excitement about flipping classrooms. As soon as she decides to prepare a proposal she finds an engineering education research expert and social scientist and begins long, deep conversations about what it would take to truly make a revolutionary change to their engineering program. The social scientist is a change expert and proposes a change model that seems to align with the project. He begins to adapt that change model for this specific project. He also develops a research plan to understand cultural change of the engineering program through faculty and administrator interviews that he will conduct throughout the five year project. The engineering education researcher puts out the idea of having a participatory action research project where her and the faculty do collaborative research where they develop an understanding of how engineering educators spend their time in the classroom when they flip the class. In this research design they are trying out different ways of teaching in class, collecting data during the classes, analyzing this data, and then iteratively improving those ways of teaching. Through the participatory action research project, the engineering education researcher feels that faculty will begin to become more empowered

to make additional changes to their teaching. Many of the faculty will likely publish from this project and Dr. Samara has committed to counting these publications towards their research productivity. As the RED team continues to make progress on the project description, they continuously discuss their ideas with faculty and advisory board members and get a strong buy-in from both of these groups.

In the proposal that she submits, Dr. Samara proposes that four faculty will flip at least one classroom in year one of the project. In years two and three, other faculty will either flip classrooms or develop a more student-centered pedagogy that may be different from flipping the classroom. With these early adopters, she will incentivize them and will encourage them to work with the engineering education researcher to do a participatory action research project as this will simultaneously improve their classes, help the transition to student-centered teaching, and result in research publications in the area of engineering education.

(advance slide)

(launch poll)

So, what do you think, How revolutionary is this hypothetical case? 1 is not revolutionary at all and 5 is very revolutionary. Go ahead and answer the poll (poll question)

It looks like ##% think that this is revolutionary. I agree.

(advance slide)

Now, let's discuss how these cases align with revolutionary or not-so-revolutionary constructs.

- (click to bring up next bullet) Dr. Samara is taking a systems level approach that addresses social, contextual, and organizational processes in addition to curriculum. The project is process-driven instead of activity-driven.

- (click to bring up next bullet) The RED team was formed early and the team collaboratively developed the proposal. It really is focused on revolutionizing the program and does not narrowly serve just one team member's interests.

- <mark>(click to bring up next bullet)</mark> Dr. Samara is collaborating with the faculty in the program and the advisory board to encourage more intrinsic motivation surrounding this project and to get buy-in from across the board.

- <mark>(click to bring up next bullet)</mark> The innovation is flipping the classroom, but is focused on the social system of teaching and learning. Flipping is simply a means to get faculty excited about improving their teaching and to build on interest that is already present in the program. It is also an idea that originated with some of the faculty in her program— not from herself.

- <mark>(click to bring up next bullet)</mark> The research plan is focused broadly on faculty beliefs, how student-centered faculty ideas are, and emergent communities of practice.

- <mark>(click to bring up next bullet)</mark> The research plan is also unique in that it involves participatory action research, which will allow the faculty to be part of the research team, with the engineering education research expert, and will help with data collection, data analysis, and dissemination. This will simultaneously encourage a deeper level of reflection on their teaching practices while also helping move the research agenda forward on the project.

- <mark>(click to bring up next bullet)</mark> Dr. Samara's approach allows for faculty autonomy and aligns with their values and motivators. Her approach focuses on the core beliefs and values of faculty.

- <mark>(click to bring up next bullet)</mark> The project identifies and adapts a change theory to align with their specific project. By focusing on theory they will have a higher likelihood of realizing revolutionary changes and they will be better positioned to help other programs interested in starting their own revolutions.

- <mark>(click to bring up next bullet)</mark> Dr. Samara's vision is to revolutionize the engineering program and she has articulated her vision clearly to faculty and advisory board

members. This broad buy-in will increase the likelihood of sustaining this revolution even if she leaves the university or steps down as chair.

We intentionally developed two hypothetical cases that were centered on flipping the classroom to show that the pedagogical tool alone is not what makes a proposal idea revolutionary or not revolutionary. In order for a project to be revolutionary, the leadership team really needs to focus on the social system. Without a focus on the social, cultural, and institutional norms it will be difficult, if not impossible, to get any widespread and sustainable change. Also, these hypothetical cases show the importance of forming the RED team early and having them fully integrated into developing the project, getting buy-in from faculty and advisory board members, and developing a concise and cohesive vision.

Now we are going to wrap up our presentation with Elsa giving tips for starting a revolution. (advance slide)

Elsa: THANK YOU, NADIA, FOR A COMPREHENSIVE DEMONSTRATION OF OUR INTERPRETATION OF A REVOLUTIONARY IDEA VERSUS ONE THAT IS REFORMIST.

OUR PANEL HAS COMPILED TIPS FOR YOU, AS YOU CONCEPTUALIZE YOUR PLAN FOR DEPARTMENTAL REVOLUTION.

KEEP IN MIND THAT FLIPPED CLASSROOMS AND OTHER CURRICULAR APPROACHES, INCLUDING EVIDENCE-BASED PRACTICES, ARE TOOLS RATHER THAN THE FOUNDATION OF A REVOLUTION. INTEGRATING SUCH APPROACHES INTO CLASSROOMS IS CONSIDERED REFORMIST RATHER THAN REVOLUTIONARY.

AND REMEMBER, STUDENTS RESPOND TO SYSTEMS—SO, IT IS TRANSFORMING THE SYSTEM THAT IS NEEDED FOR A REVOLUTION. SO, LET'S NOT BLAME OTHERS, ESPECIALLY STUDENTS.

EVERY PROPOSAL NEEDS A CHE! WE ARE REFERRING TO CHE GUEVARA WHO WAS A MID-20TH CENTURY REVOLUTIONARY. IF YOU HAVE SOMEONE ON YOUR TEAM WHO CAN PLAY A CHE OR THE DEVIL'S ADVOCATE, THEY CAN QUESTION EMERGING IDEAS AGAINST THE CRITERIA WE HAVE PRESENTED. SO, AS YOU DEVELOP YOUR PROPOSAL, THIS MIGHT BE A GOOD WAY TO KEEP THOSE IDEAS YOU DEEM REVOLUTIONARY.

AND, KEEP IN MIND---REVOLUTIONS SHOULD CHANGE DEPARTMENTS FOR THE BETTER!

BE SURE YOUR TEAM'S RESPONSIBILITIES AND BUDGET ALIGN WITH THE PROPOSED WORK. YOU SAW IN ONE OF THE CASE STUDIES HOW MINIMIZING THE ROLES OF ENGINEERING EDUCATOR, SOCIAL SCIENTIST, AND/OR EVALUATOR CAN LEAD TO A MISALIGNMENT, WHICH COULD BE A RED FLAG TO REVIEWERS.

ALSO, THOSE CASE STUDIES DEMONSTRATED HOW THE NSF SOLICITATION IS FOR REVOLUTION, NOT REFORMATION.

CLICK

AND, FINALLY, WE SEE THE SOLICITATION'S DEFINITION OF REVOLUTION AND RE-ITERATE IT: **"REVOLUTION IS RADICALLY, SUDDENLY, OR COMPLETELY NEW; PRODUCING FUNDAMENTAL, STRUCTURAL CHANGE; GOING OUTSIDE OR BEYOND EXISTING NORMS AND PRINCIPLES."**—WE SEE HOW THE CASE STUDY ON FLIPPED CLASSROOMS THAT WAS REVOLUTIONARY IS RADICALLY DIFFERENT BECAUSE IT USES A THEORY OF CHANGE TO INFORM ITS RE-DESIGN OF STUDENT-CENTERED PROFESSIONAL DEVELOPMENT AND IS OUTSIDE OF EXISTING NORMS AND PRACTICES.

THUS, KEEP IN MIND THAT YOU NEED TO FOCUS ON SIGNIFICANT, SYSTEMIC DEPARTMENTAL CHANGE.

YOU MIGHT CONSIDER THE FOLLOWING QUESTIONS AS YOU DEVELOP YOUR IDEAS:

- WILL CHANGES REMAIN IF THE DEPARTMENT CHAIR LEAVES?
- HOW WILL THESE CHANGES AFFECT STUDENT LEARNING AND ENGAGEMENT IN PRE-PROFESSIONAL SKILL DEVELOPMENT?
- IS IT PROCESS-DRIVEN OR ACTIVITY-DRIVEN?

- IS CHANGE ANCHORED IN CULTURE?

ON BEHALF OF OUR PANEL, I WANT TO THANK YOU FOR JOINING US THIS

AFTERN0ON AND HOPE TODAY'S WEBINAR HAS BEEN INFORMATIVE.

MICHELLE, WHAT QUESTIONS DO YOU NOW HAVE FOR US TO ANSWER?