Introduction & Welcome: *Change model required*

10:30-12:00 am PST

Michelle M. Camacho, University of San Diego
Julia M. Williams, Rose-Hulman Institute of Technology
Charles Henderson, University of Western Michigan
Vanessa Svihla, University of New Mexico

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RED Webinar Facilitator

Professor Michelle M. Camacho

University of San Diego

Social Scientist

Co-PI NSF RED, 2015 cohort

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Overview—panelists today

- Julia M. Williams
  - Interim Dean, Cross-Cutting Programs & Emerging Opportunities and Professor of English, Rose-Hulman Institute of Technology
  - On the REDPAR team, Julia works with Ella Ingram to design and deploy support for RED teams

Overview – panelists today

- Vanessa Svihla
  - Assistant Professor, Organization, Information & Learning Sciences; Chemical & Biological Engineering, University of New Mexico
  - On RED team at UNM, Dr. Svihla is the Engineering Education Researcher

Logistics for the webinar and Q&A

- Enter questions in the Q&A panel
- We will prioritize questions that are broadly applicable
- Specific questions about the RFP should be addressed to the cognizant program officers

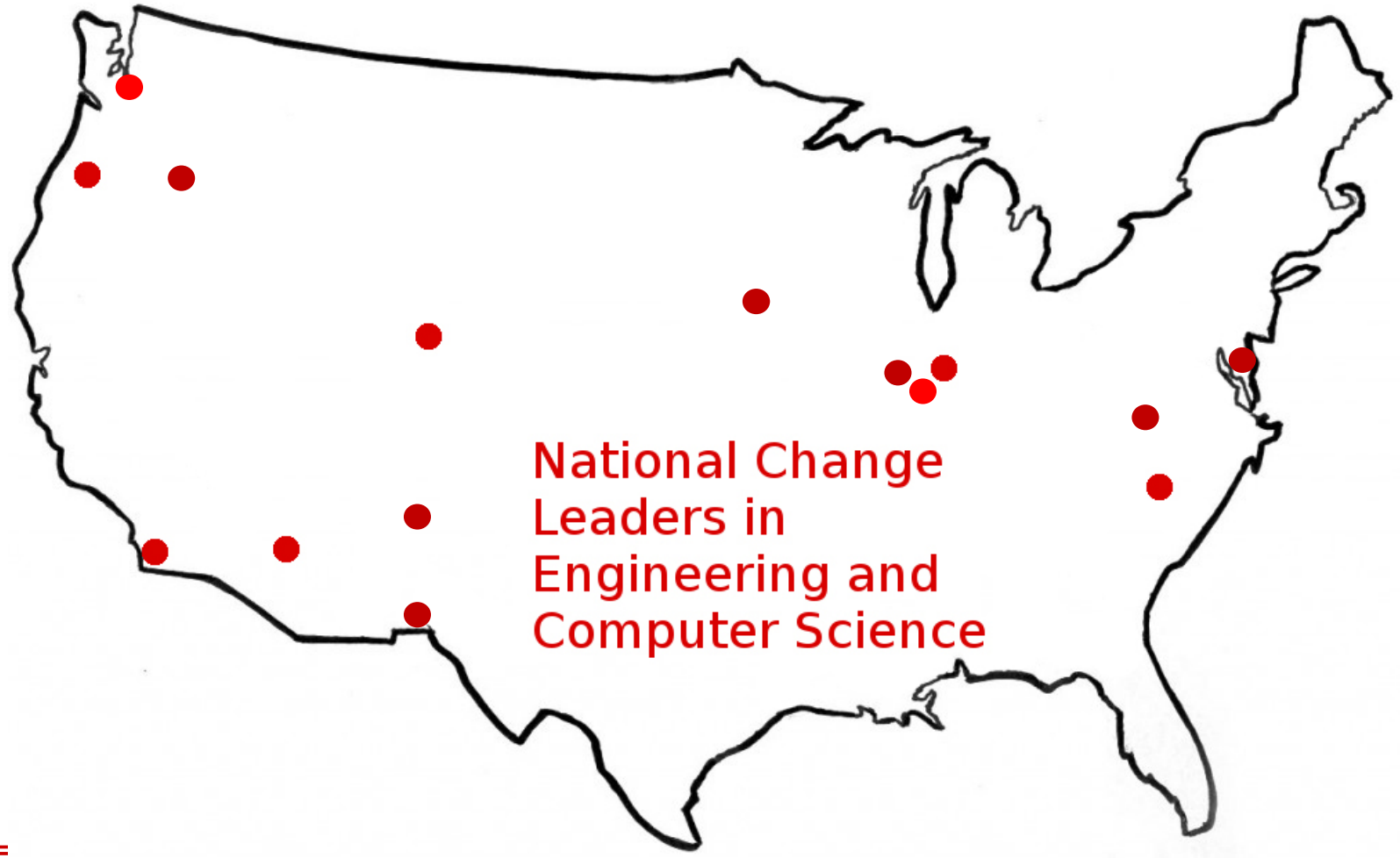
Name	Email	Phone
Kamau Bobb	kbobb@nsf.gov	(703) 292-4291
Elliot Douglas	edouglas@nsf.gov	(703) 292-7051
Olga Pierrakos	olpierra@nsf.gov	(703) 292-7936

Why does NSF require a change model?

Julia Williams

Revolutionizing Engineering Departments Consortium (REDCON)

September 15, 2016



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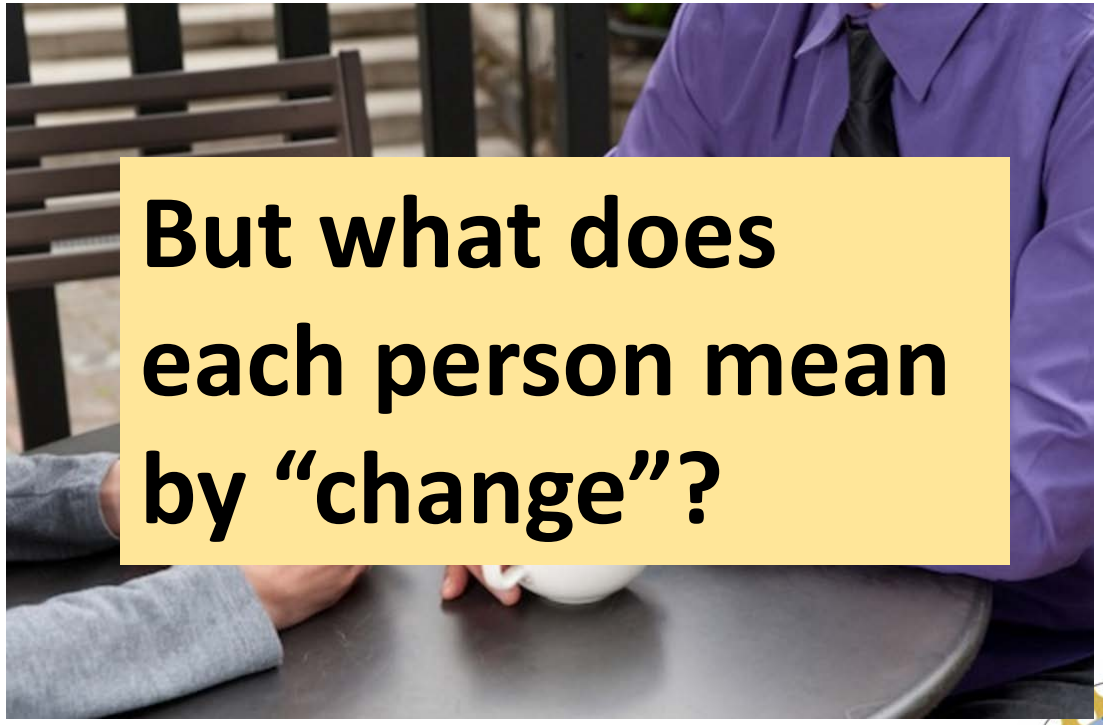
Consider the following scenario…

A small group of faculty meet periodically over coffee to talk about the need for a new curriculum that engages STEM students in their learning.

Each person refers to the new curriculum as a major “change” initiative for the college.



The definitions of “change” multiply…

- Faculty member—change refers to the new curriculum
- Department head—change refers to the need for new hires, shifting of resources and department priorities
- Dean—change refers to new policies that need to be developed
- Teaching and Learning Center Director—change refers to new workshops that must be deployed
- Lab technician—change refers to new equipment that must be purchased and configured
- President—change refers to new fundraising opportunities
- Students—change refers to the new textbook

What does the NSF RED Solicitation say about change?

In the Proposal Preparation Instructions/Full Proposal Contents:

Specific Actions: How will objectives be accomplished? . . .

What is the theory of change; that is, substantiate how and why should these activities effect lasting change? …

NSF requires a change model for your RED proposal, and you really need one!

They will often appear as graphics, but don't let the bright colors put you off.

The change model helps you bring together a diverse group of people.

Maura Borrego and Lynita K. Newswander, 2008

"Characteristics of Successful Cross-disciplinary Engineering Education Collaborations" *JEE*

"…the way an individual understands and appreciates the nature of knowledge affects the way he or she collaborates with colleagues in different academic disciplines, especially when the disciplines are fundamentally different."

So, you need a Change Model/Strategy

Charles Henderson

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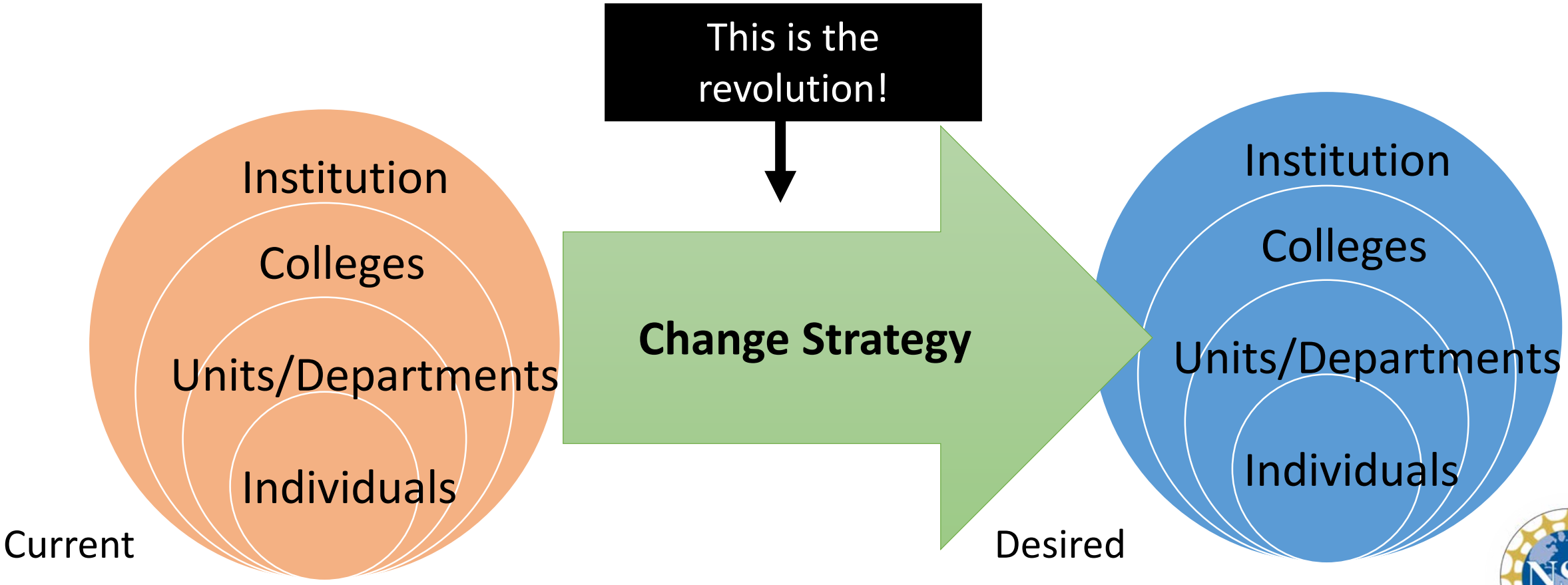
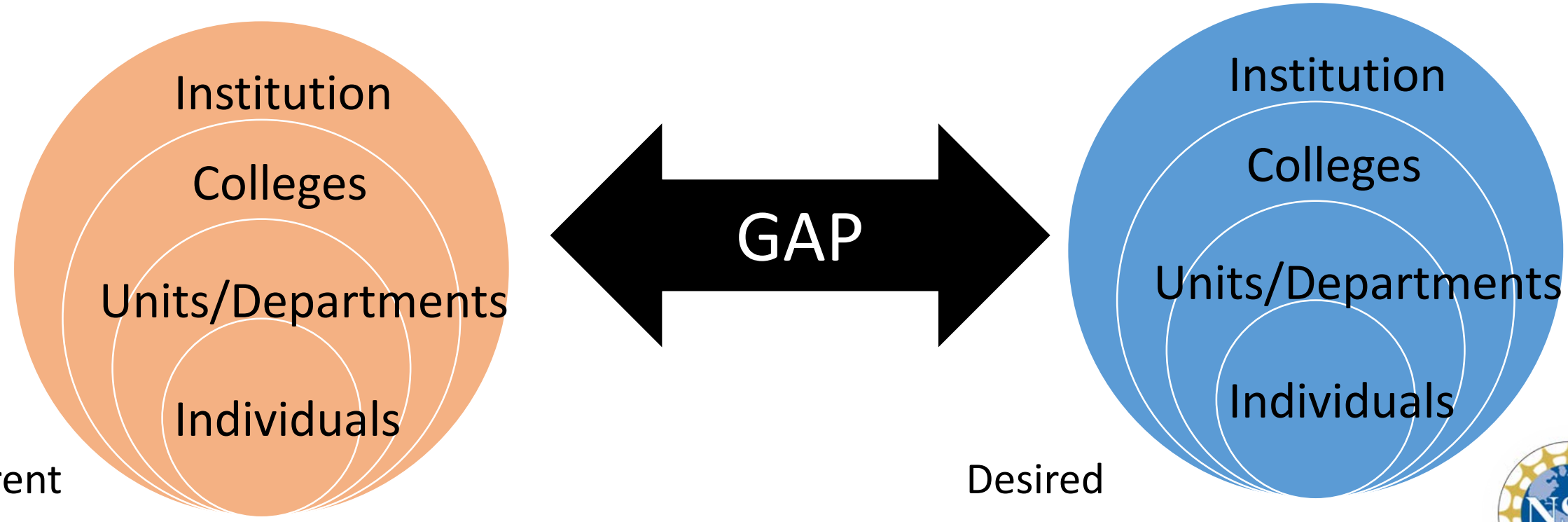
The purpose of a change model/strategy is to guide your development of change tactics (specific actions) that will take your department from the current situation to your desired situation

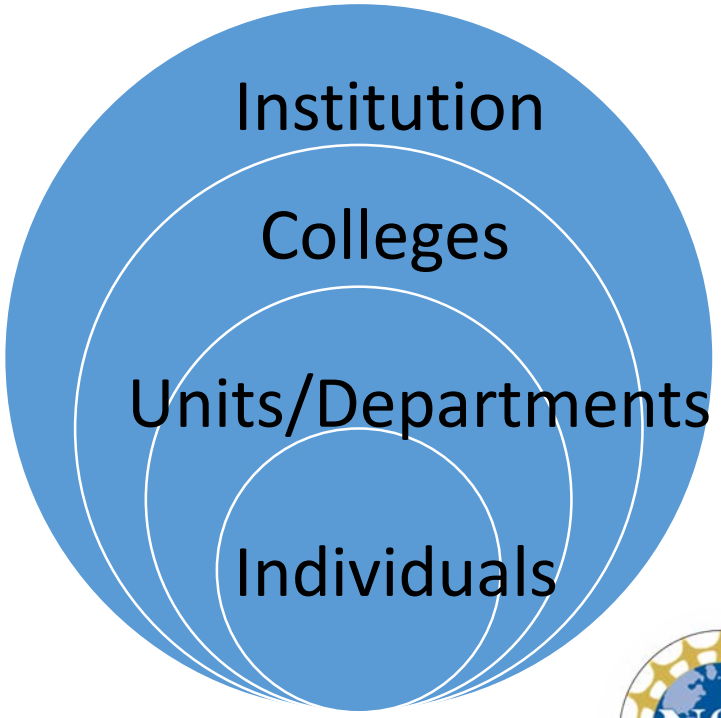


Step 1: Understand the Gap



What levels of the institution you want to change?

- What parts of your institution will be different after the revolution?



What do you want to change at each level?

Structures

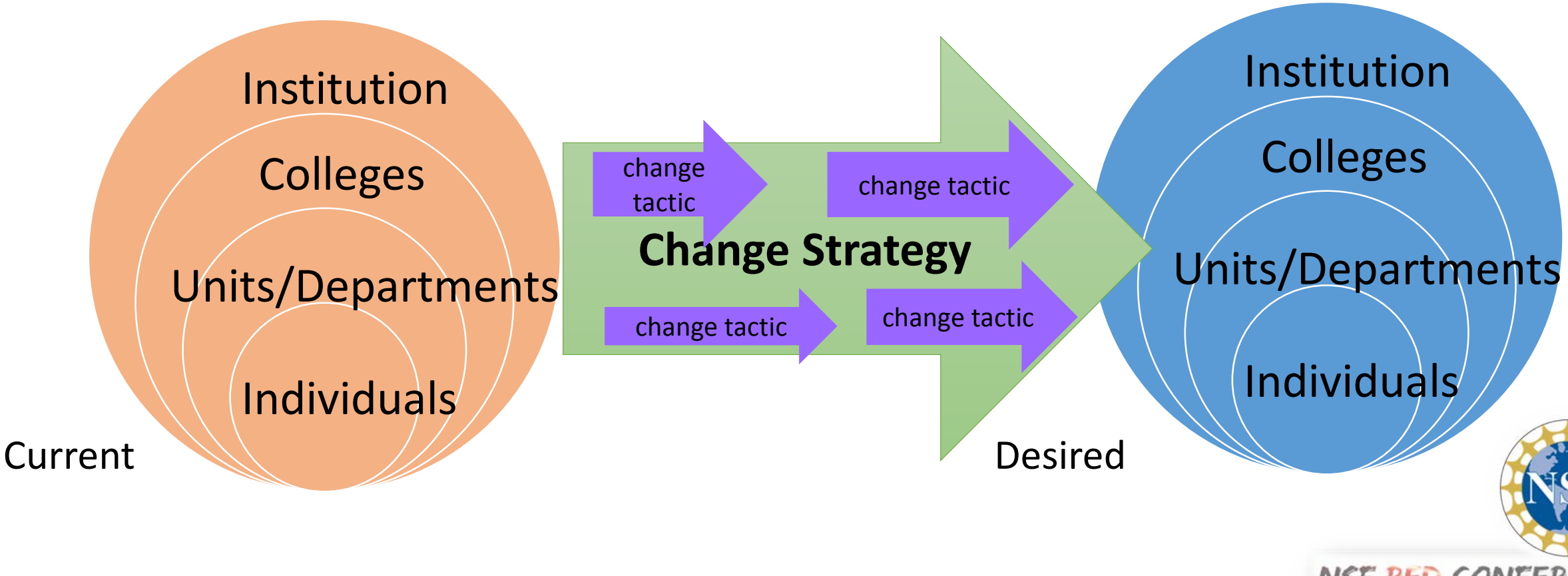
•curriculum (e.g., types of knowledge presented through the curriculum, organization of the curriculum)
•pedagogies (e.g., use of particular teaching methods or new technologies)
•student learning and assessment practices
•policies (key institutional policies such as those regarding scheduling)
•budgets
•non-financial resources (e.g., allocation of space or equipment towards particular projects)
•departments and institutional structures (e.g., organizational hierarchy, relevant centers)
•decision-making structures (e.g., formal governance processes, ad hoc structures such as task forces)

Cultures

•ways groups or individuals interact with one another
•the language the campus used to talk about itself
•the types of conversations (e.g., topics and priorities discussed at formal and informal conversations)
•relationships with stakeholders

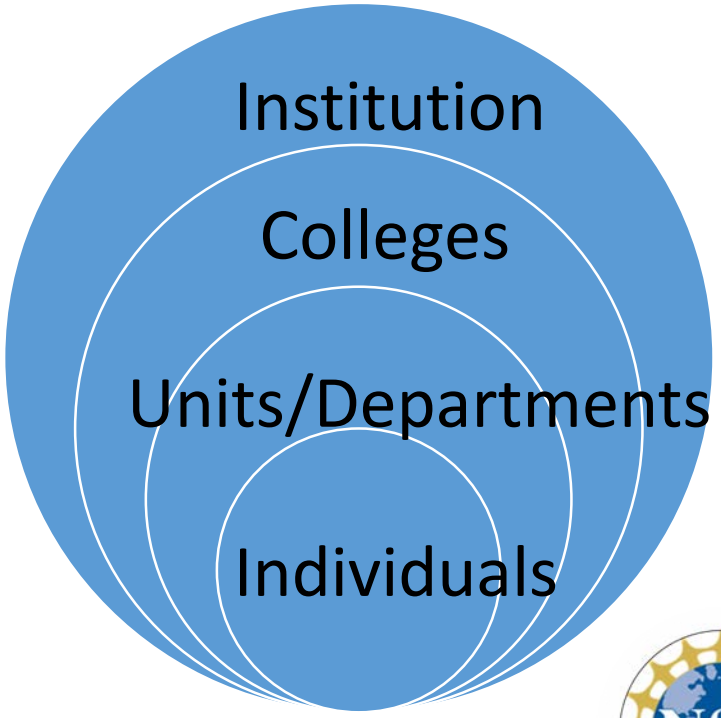
(Structural and cultural changes adapted from Eckel and Kezar (2003). *Taking the Reins: Institutional Transformation in Higher Education*. Westport, CT: Praeger Publishers.)

Step 2: Develop a strategy and tactics to bridge the Gap

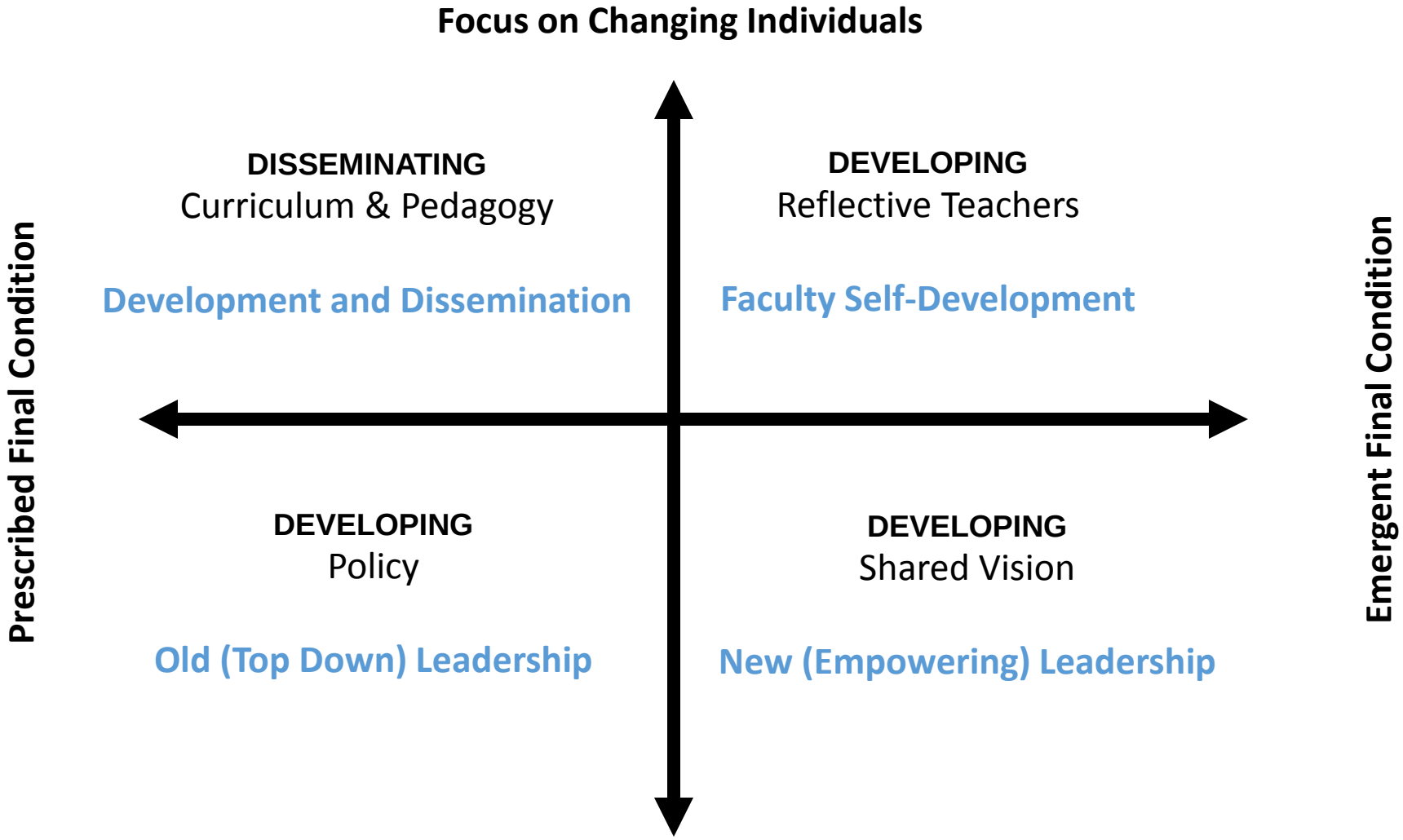


To select an appropriate change strategy and tactics you not only need to consider the gap, but also the resources and constraints that will help or hinder your success.

- What aspects (structures and cultures) of the institution will serve as barriers?
- What aspects (structures and cultures) of the institution will serve as facilitators?



Four Categories of Change Strategies



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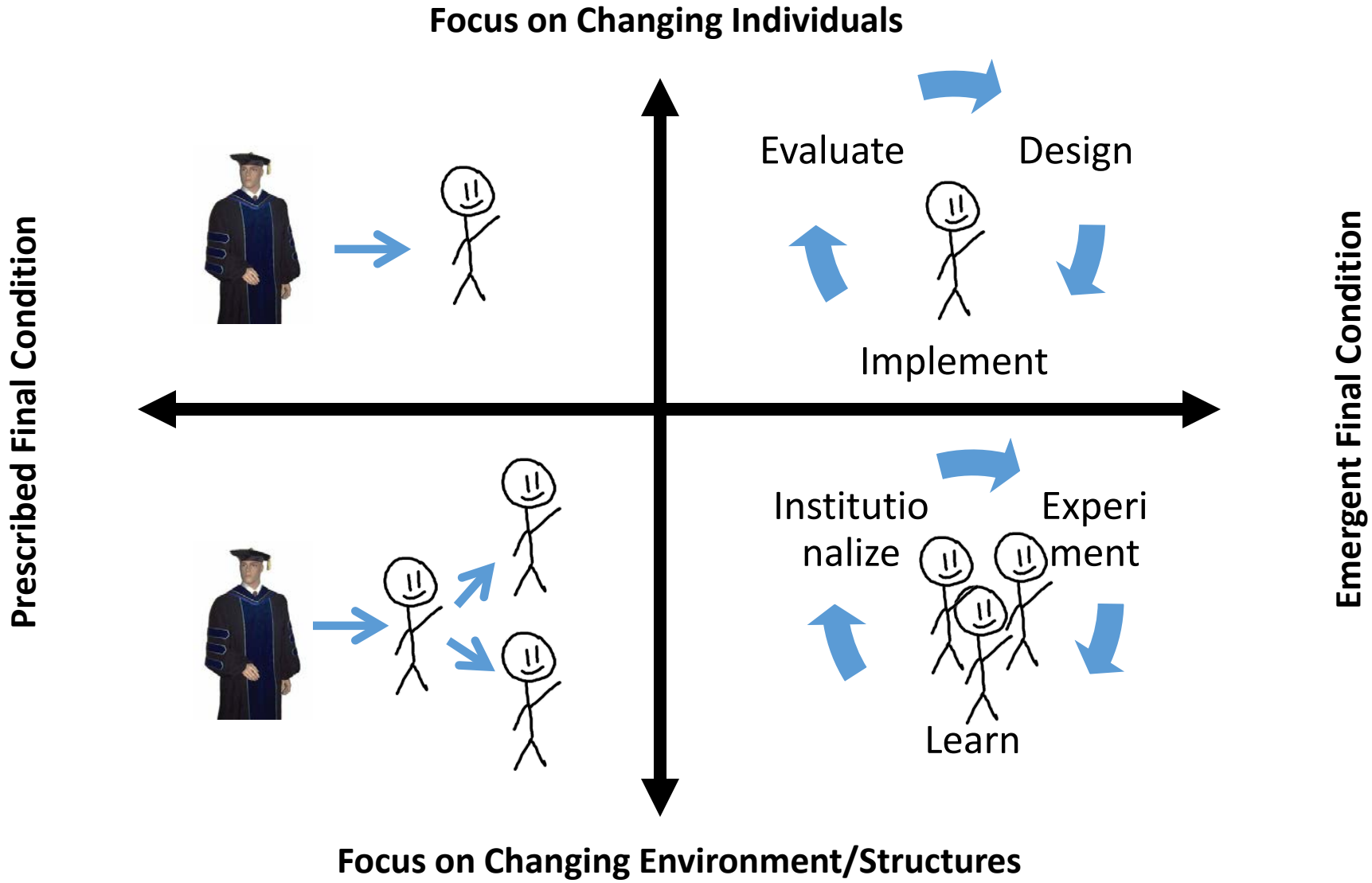
How they Work



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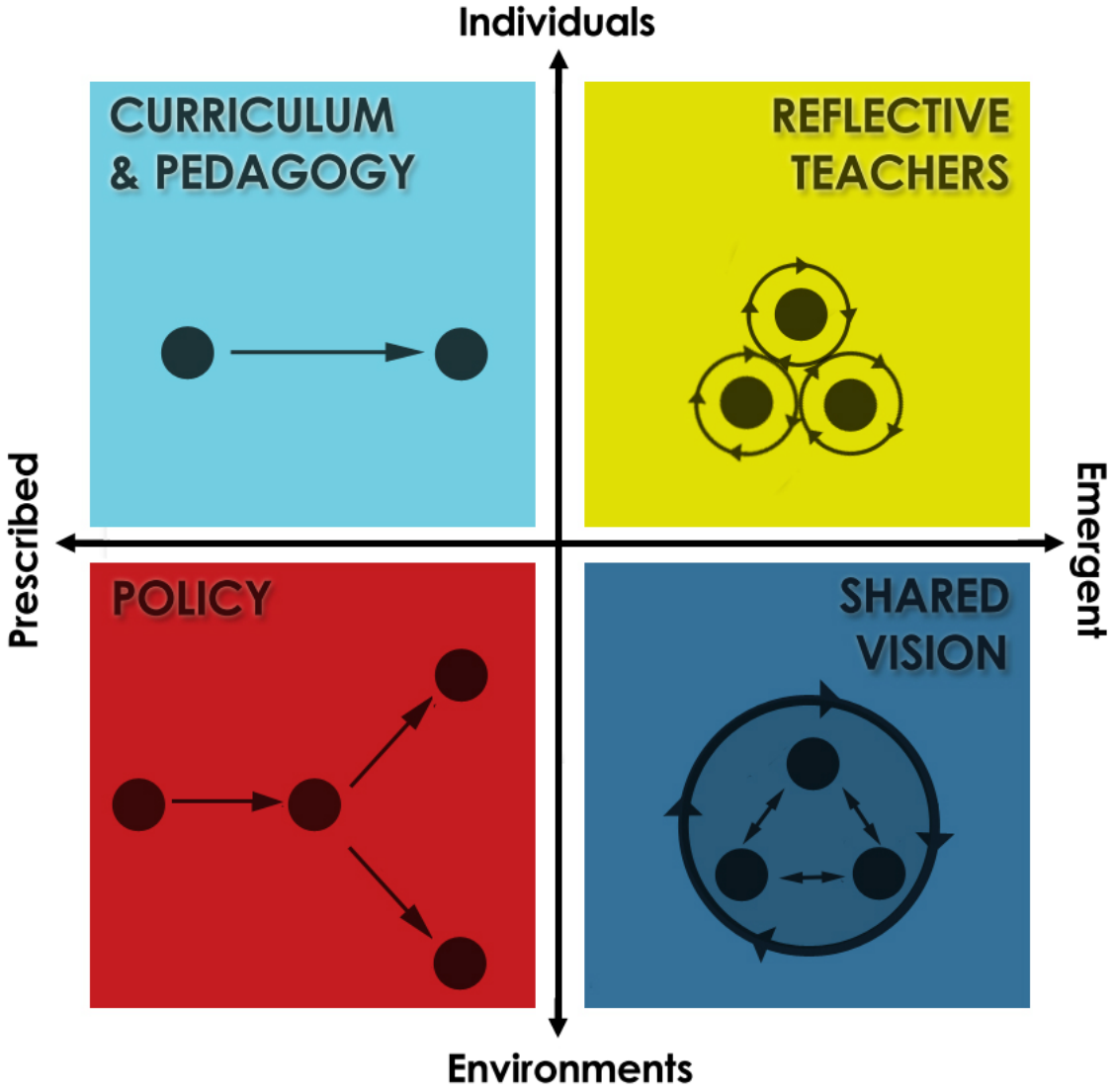

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Let's Categorize These Change Tactics

A. Provide opportunities within your institution for faculty to share good ideas and strategies related to the project goals

B. Form a team at your institution that has sufficient power to change degree requirements

C. Promote project ideas/products to departmental and institutional leadership

D. Create department or institutional teams to develop new practices related to project goals

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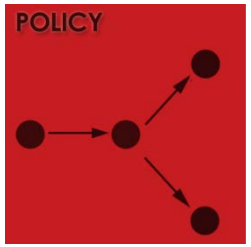

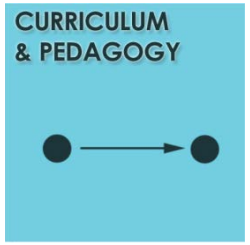

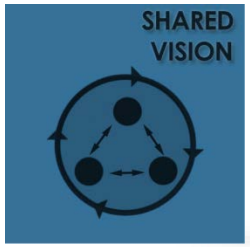

How Would You Categorize these Change Tactics?

A. Create cross-institutional teams to develop collective ideas related to project goals

B. Provide opportunities for targeted faculty to learn from one-another

C. Promote project ideas/products to instructors

D. Provide departments with rewards for making changes consistent with project goals

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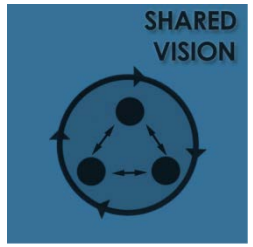
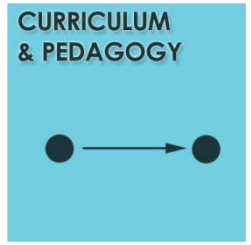
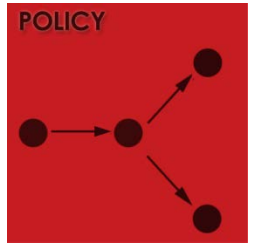
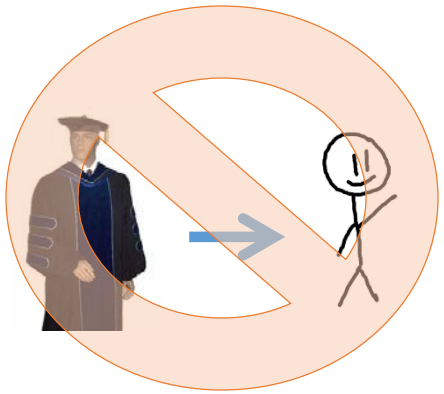


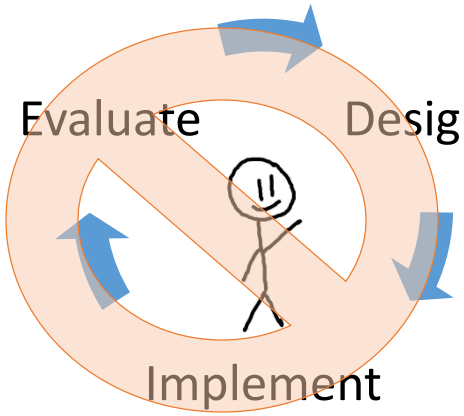




Department-Level Change Strategies – Two Examples

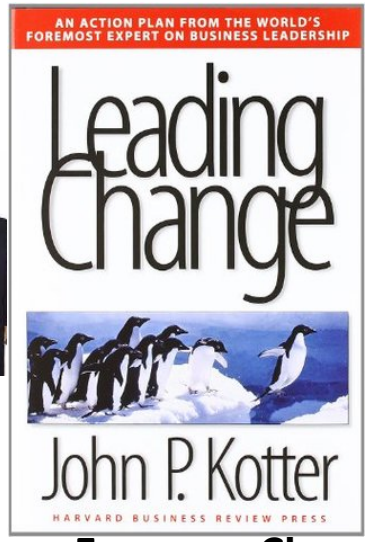
Focus on Changing Individuals

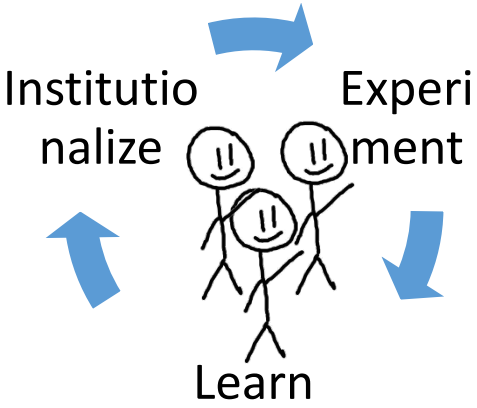




Prescribed Final Condition

Emergent Final Condition





Focus on Changing Environment/Structures

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Kotter's Eight Stage Change Model

Change is episodic, with a clear beginning and end

Implementing & sustaining for change

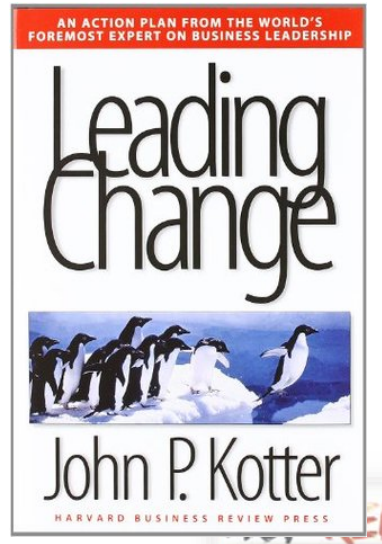
8. Make it stick
7. Build on the change

Engaging & enabling the organisation

6. Create quick wins
5. Empower action
4. Communicate the vision

Creating the climate for change

3. Create a vision for change
2. Form a powerful coalition
1. Create urgency



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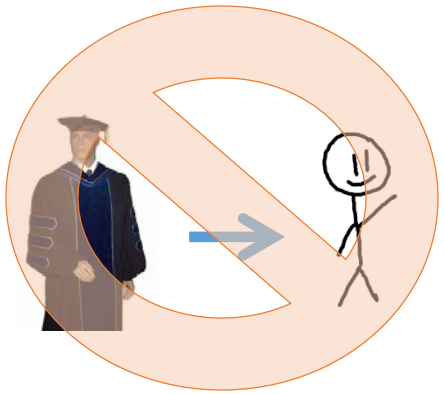

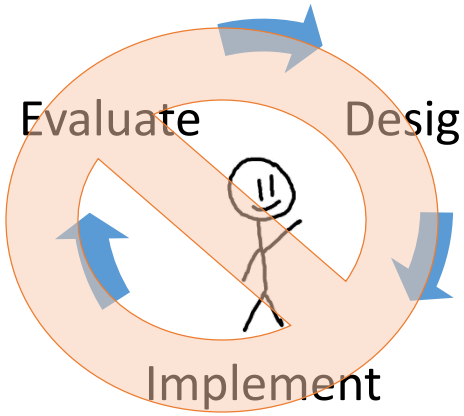

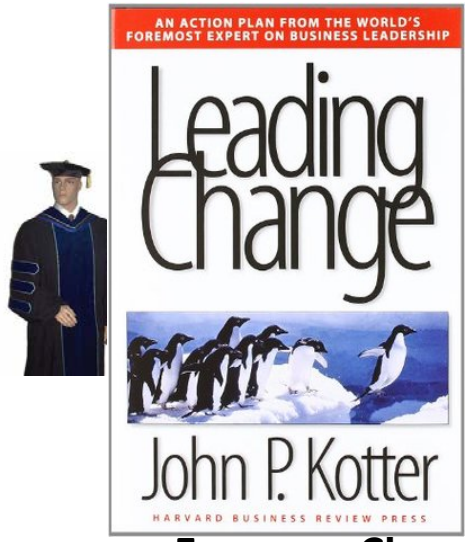

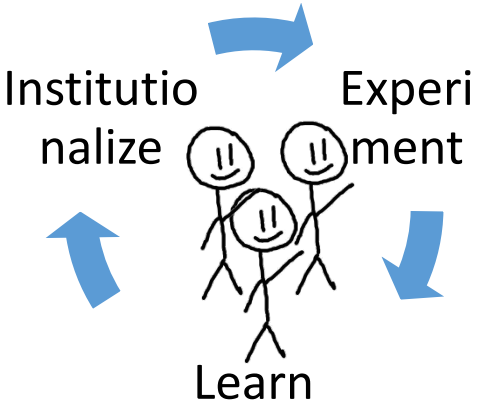

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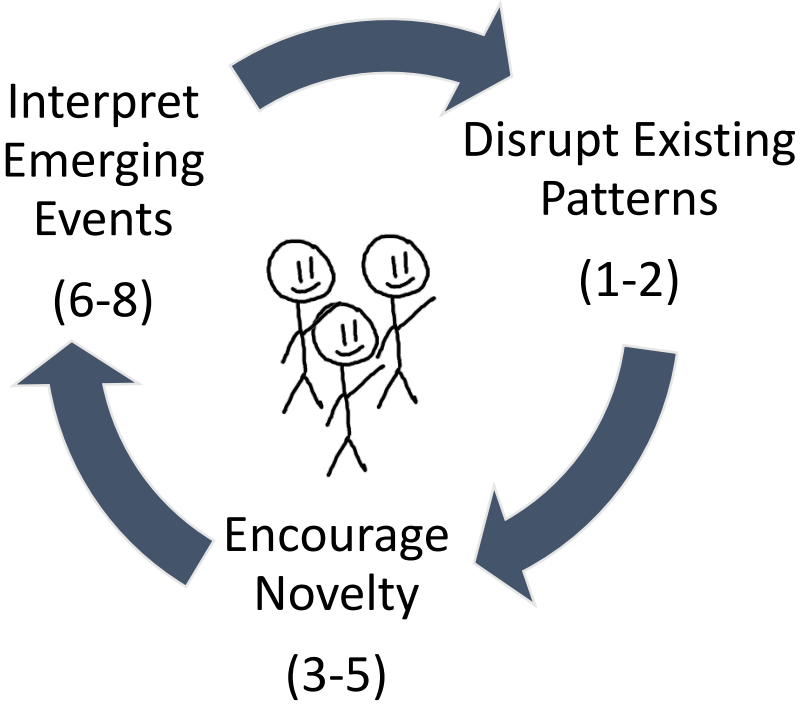
Complexity Leadership Theory

Change is cyclic and ongoing

Complexity Leadership Theory's Enabling Leadership (Uhl-Bien et al., 2007)
Change is cyclic and ongoing
1. Disrupting patterns to encourage interactions between individuals
2. Developing rules that create interdependency to encourage teamwork
3. Encouraging dissenting opinions to increase tension
4. Avoiding stifling regulations
5. Articulating the vision
6. Identifying emerging knowledge from interactions
7. Communicating emerging knowledge to formal leadership
8. Implementing knowledge

Quardokus, K. (2014). Unpublished Doctoral Dissertation.



Borrego, M., & Henderson, C. (2014). Increasing the Use of Evidence-Based Teaching in STEM Higher Education: A Comparison of Eight Change Strategies. *Journal of Engineering Education*, *103*(2), 220–252. doi:10.1002/jee.20040

Changing Teaching Practices from a Complexity Leadership Perspective

Key Features

- Disrupt existing patterns:
  - **Support**: Working groups need support (e.g., post doc or grad student)
  - **Interdependence**: Individuals have a reason to work together on the issue (e.g., new course assignment)
- Encourage Novelty
  - **Simple rule**: Work framed by compelling, simple rule or question (e.g., "students should do science in their first two years")
  - **Moderate Diversity**: Groups have some diversity of ideas/experiences, but not so much that it is a barrier
- Interpret Emerging Events
  - **Facilitation**: work within groups
    - post doc or grad student played an important role
    - Additional one-on-one interaction outside of group meetings
  - **Communication**: Spreading ideas outside of groups
    - Shared Language: extracting principles from details

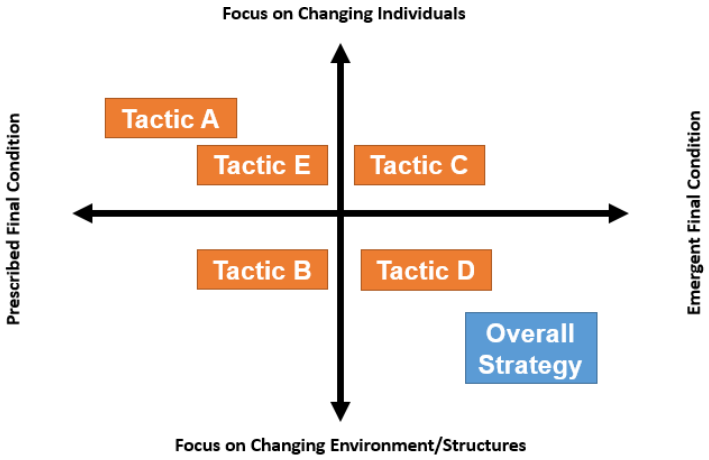
There are many other examples

Change Strategy	Summary
Diffusion (Quadrant I)	Innovations are created in one location, then adopted or adapted by others. Multi-stage adoption process.
Implementation (Quadrant I)	A set of purposeful activities are designed to put proven innovations into practice in a new setting.
Scholarly Teaching (Quadrant II)	Individual faculty reflect critically on their teaching in an effort to improve.
Faculty Learning Communities (Quadrant II)	A group of faculty supports each other in improving teaching.
Quality Assurance (Quadrant III)	Measurable target outcomes are identified and progress towards them is assessed and tracked.
Organizational Development (Quadrant III)	Leader develops new vision and plans a strategy for aligning employee attitudes and behaviors with this vision.
Learning Organizations (Quadrant IV)	Leader works to develop an organizational culture that supports knowledge creation.
Complexity Leadership (Quadrant IV)	In a complex system, results are not easily predicted. Change agents can create conditions that increase the likelihood of productive change.

From: Borrego, M., & Henderson, C. (2014). Increasing the Use of Evidence-Based Teaching in STEM Higher Education: A Comparison of Eight Change Strategies. *Journal of Engineering Education*, *103*(2), 220–252. doi:10.1002/jee.20040

What does it mean to have a well-aligned change plan?

Which of these change initiatives could be well aligned?



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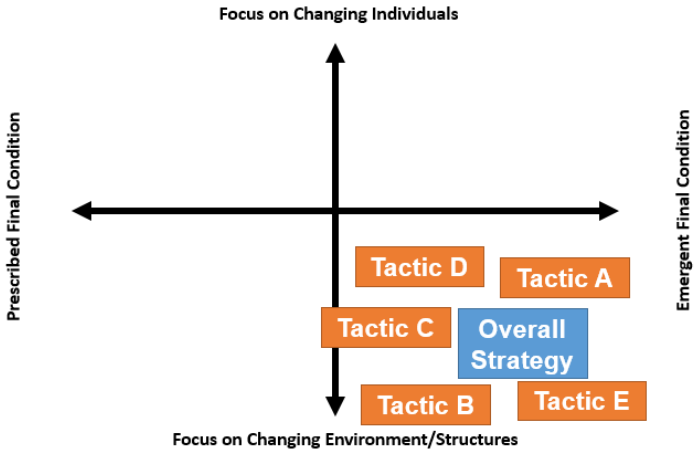

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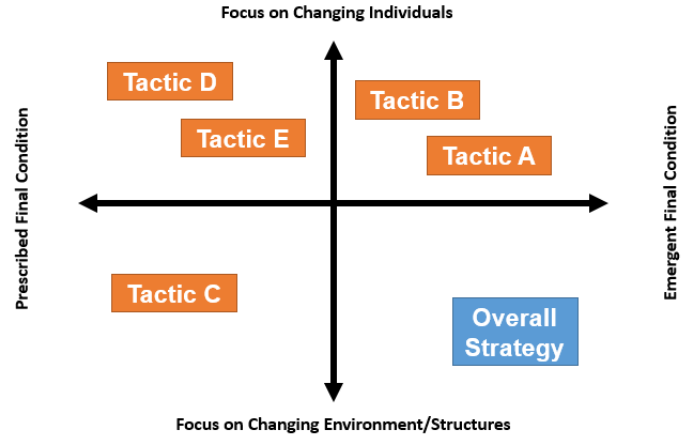

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What does it mean to have a well-aligned change plan?

- Alignment does not mean that all change tactics need to be in the same category as the overall strategy.
- Balance is important. All change initiatives (especially large ones) have emergent and prescribed aspects as well as individual and environmental aspects. The key is to use each type strategically.
- The foursquare can help to identify change tactics that may not have been previously considered.

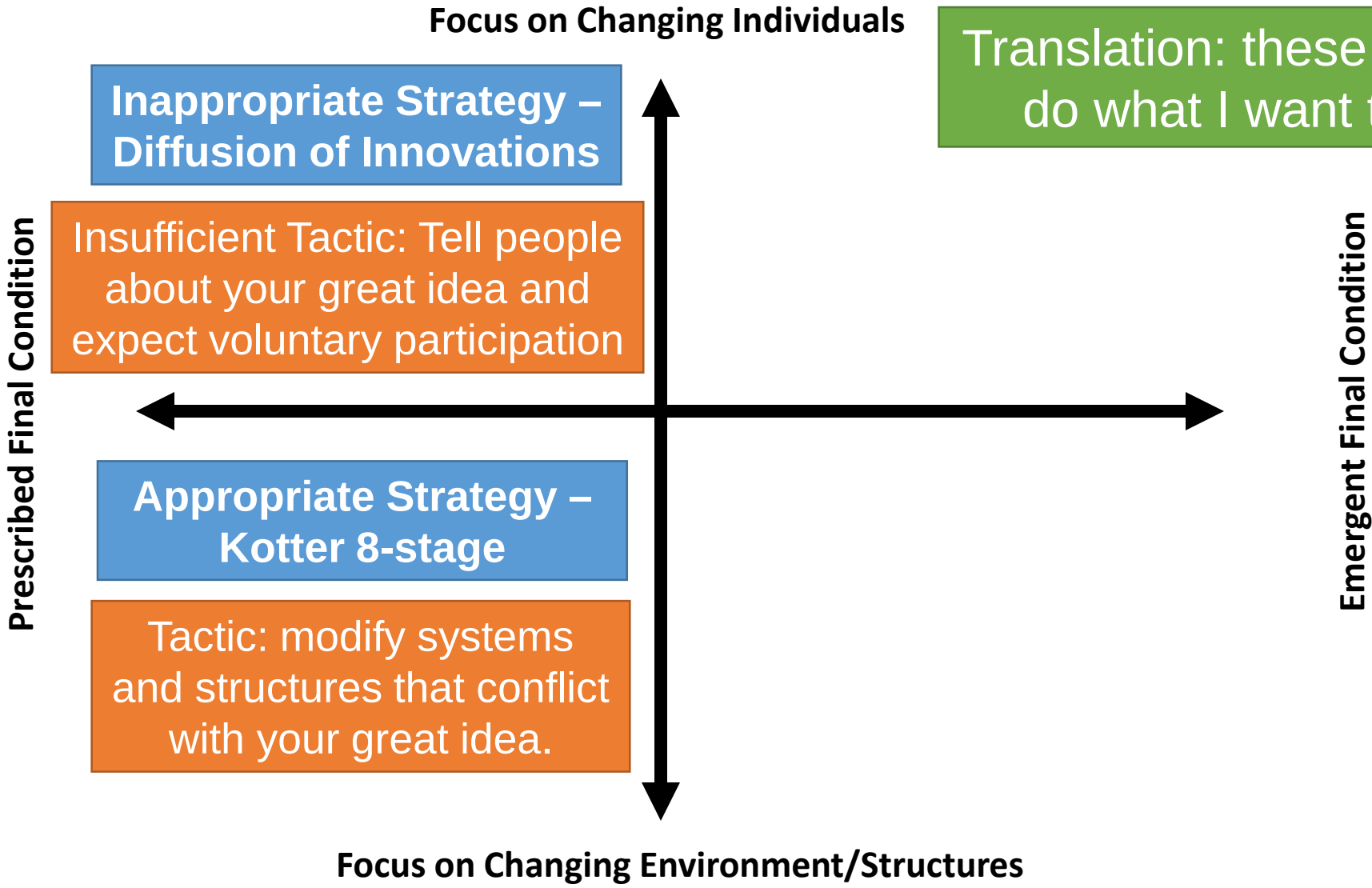
Assumption: People and systems resist change

Reality: Resistance is a symptom of 1) lack of alignment between strategies and tactic, 2) inappropriate change strategy, or 3) attempting to bridge too large of a gap.

Common Types of Resistance:

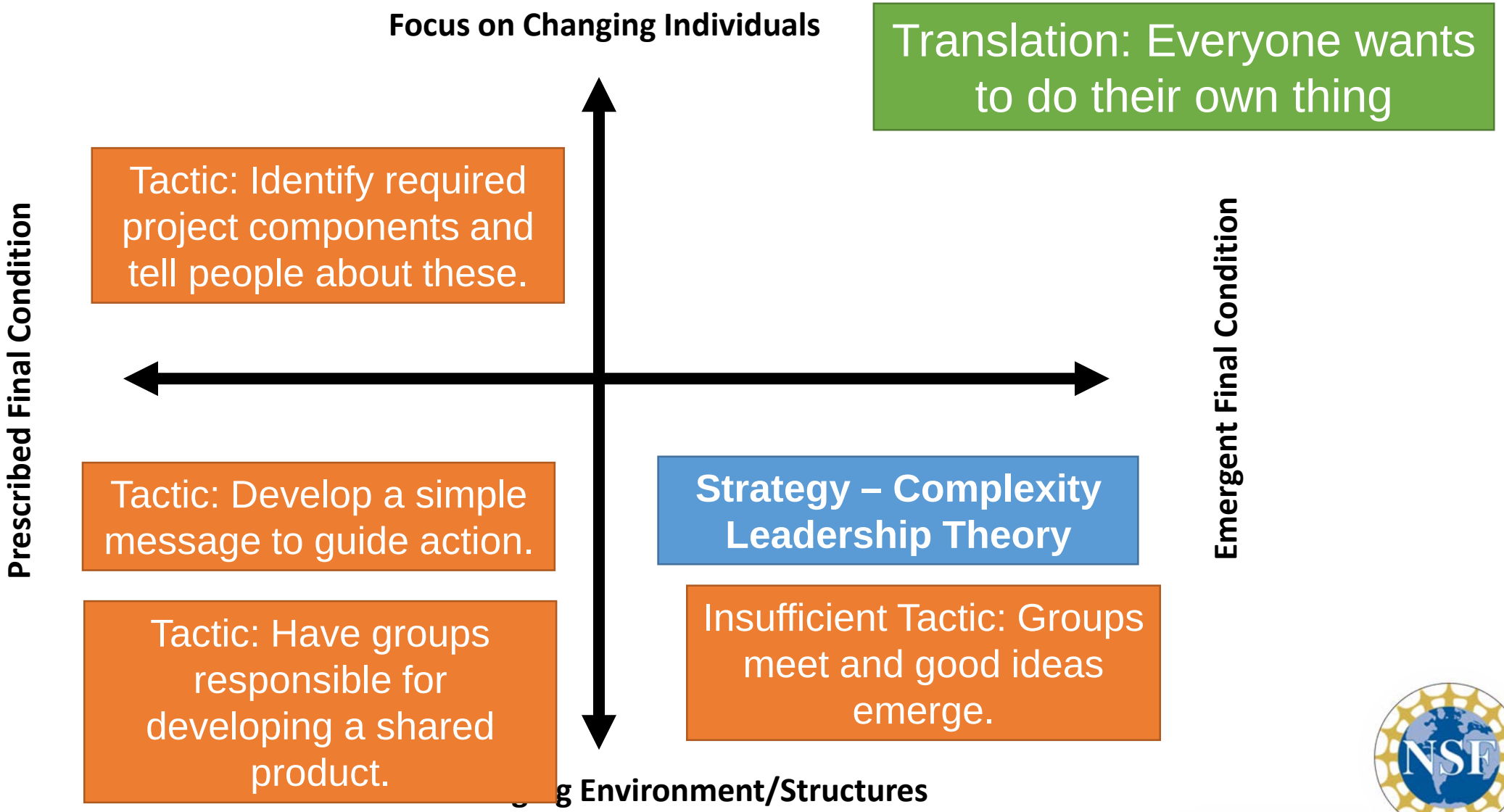
1. Difficulty getting buy-in from individuals
2. Difficulty achieving alignment of vision and collaboration across multiple individuals or units
3. Difficulty getting full buy-in/alignment from units (product must be implemented fully for success, but units would rather try pieces first)
4. Getting units to collaborate instead of compete

Difficulty getting buy-in from individuals



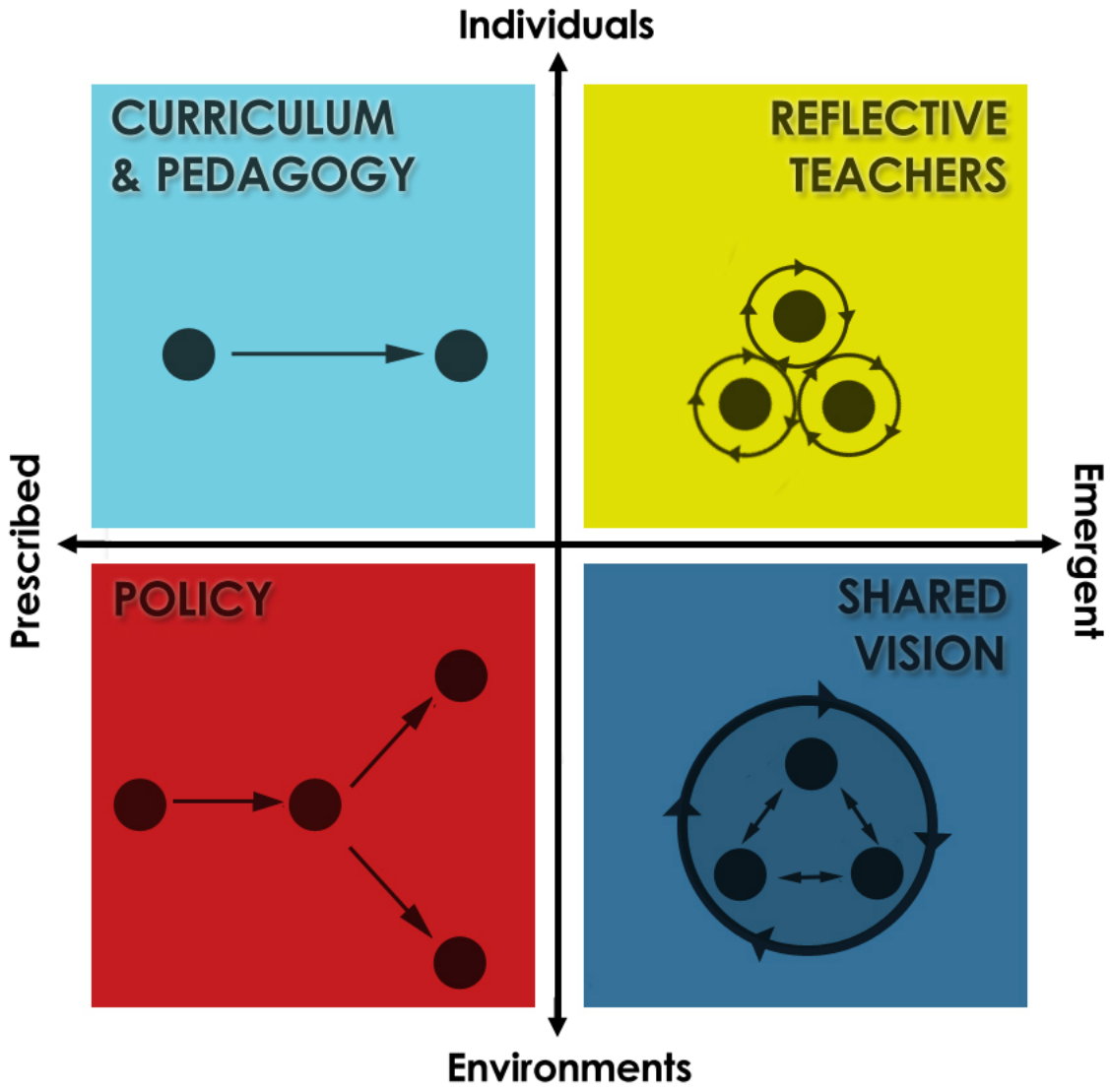
Translation: these people won't do what I want them to do

Difficulty achieving alignment of vision and collaboration across multiple individuals or units



Take-Away Messages

1. There is no ‘best’ change strategy. Depends on your project goals, institutional context, and resources.
2. Much is known about ‘best practices’ within change strategies (and this knowledge is not well used).
3. It is important for change tactics to align with change strategies



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Integrating theories of change & avoiding pitfalls

Vanessa Svihla, University of New Mexico

Overview

- A story
- Case study examples: flipped classrooms
- Example theories of change in RED projects
- Tips on integrating your change model and activities

A story: UNM FACETS project

- Submitted 2014 — unsuccessful
  - no expert in organizational change
  - Discipline-Based Educational Research + $$ as driver
  - no clear change model
- Submitted 2015 — successful!
  - found expert in organizational change
  - took time / collaborated with change expert so he understood our project ideas, observed who was passionate, invested
  - change expert identified / adapted a change model that fit project well
  - easily identify the steps we'd already taken
  - change expert as devil's advocate

Integrating change models: examples from the flipping classrooms RED cases

Dr. Taylor

- Top-down vision of exciting change: flipping all classes
- Social scientist added to proposal two weeks before deadline

Dr. Samara

- Brings in change expert early
- Change expert helps design project
- Flipping classrooms as diving off point for faculty to propose additional changes
- Change expert identifies a change model and adapts it to the project

Research, evaluation, change theory: a lack of integration

Change theory & strategies

- Citation to Diffusion of Innovations, disconnected from activities

Research Questions

- Do students learn more effectively if headings in videos are static or animated?
- Do students learn more effectively when there are multiple videos that are less than 10 minutes in length or when there is a single, longer video that is 50 minutes in length?

Evaluation Questions

- To what degree does the project team complete the deliverables as outlined in the proposal in the time scope allocated?
- What percentage of faculty flip all of their classes by the end of the second year?

Research + evaluation + change theory: an example of integration

Change model & strategies

- Kotter's model, with middle steps adapted to allow for an emergent final condition, activities clearly aligned to model

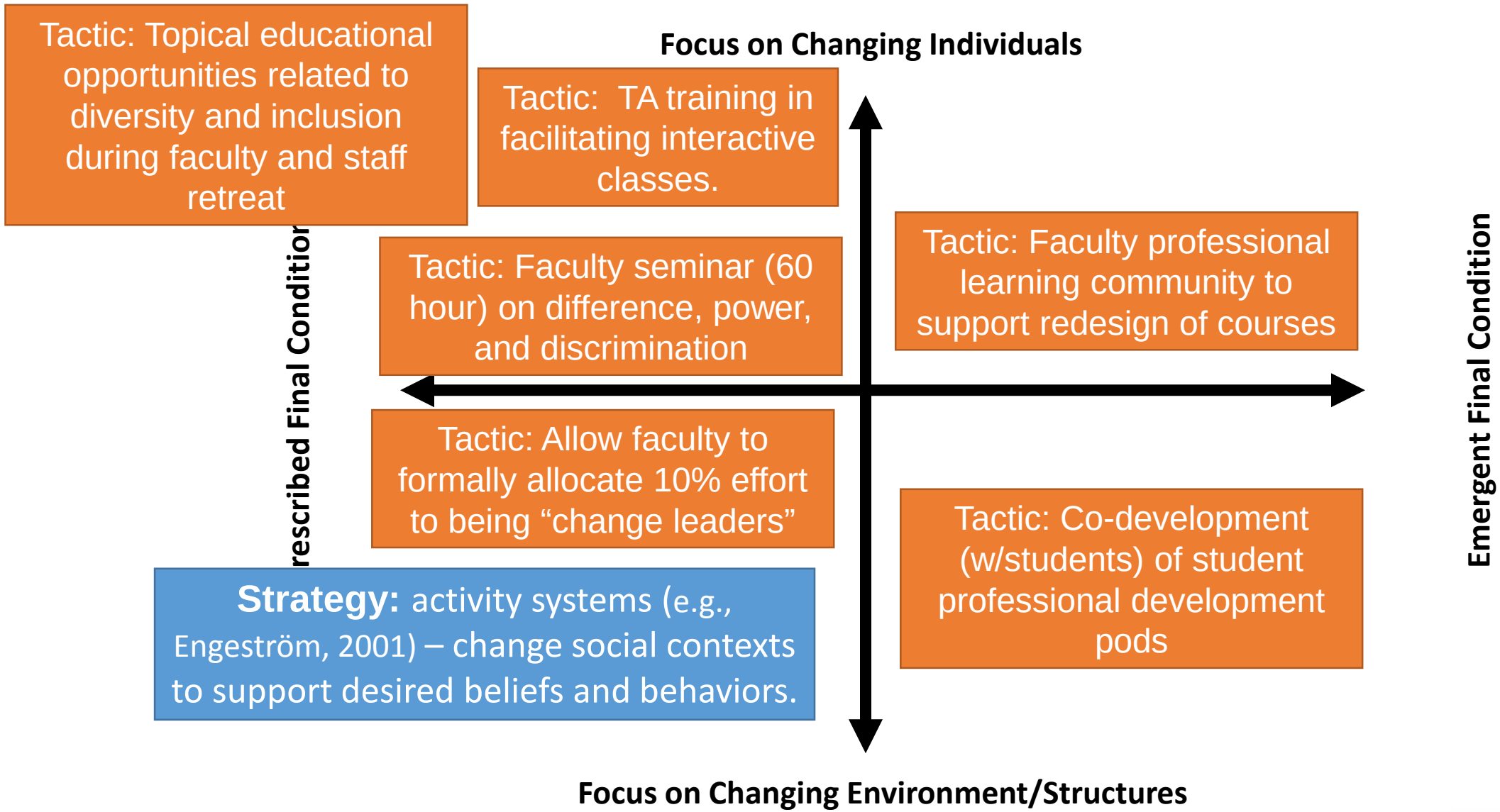
Research Questions

- To what extent do faculty beliefs change about how students learn?
- To what extent are new ideas faculty propose student-centered?
- How do faculty workgroups develop and implement new ideas in their teaching?

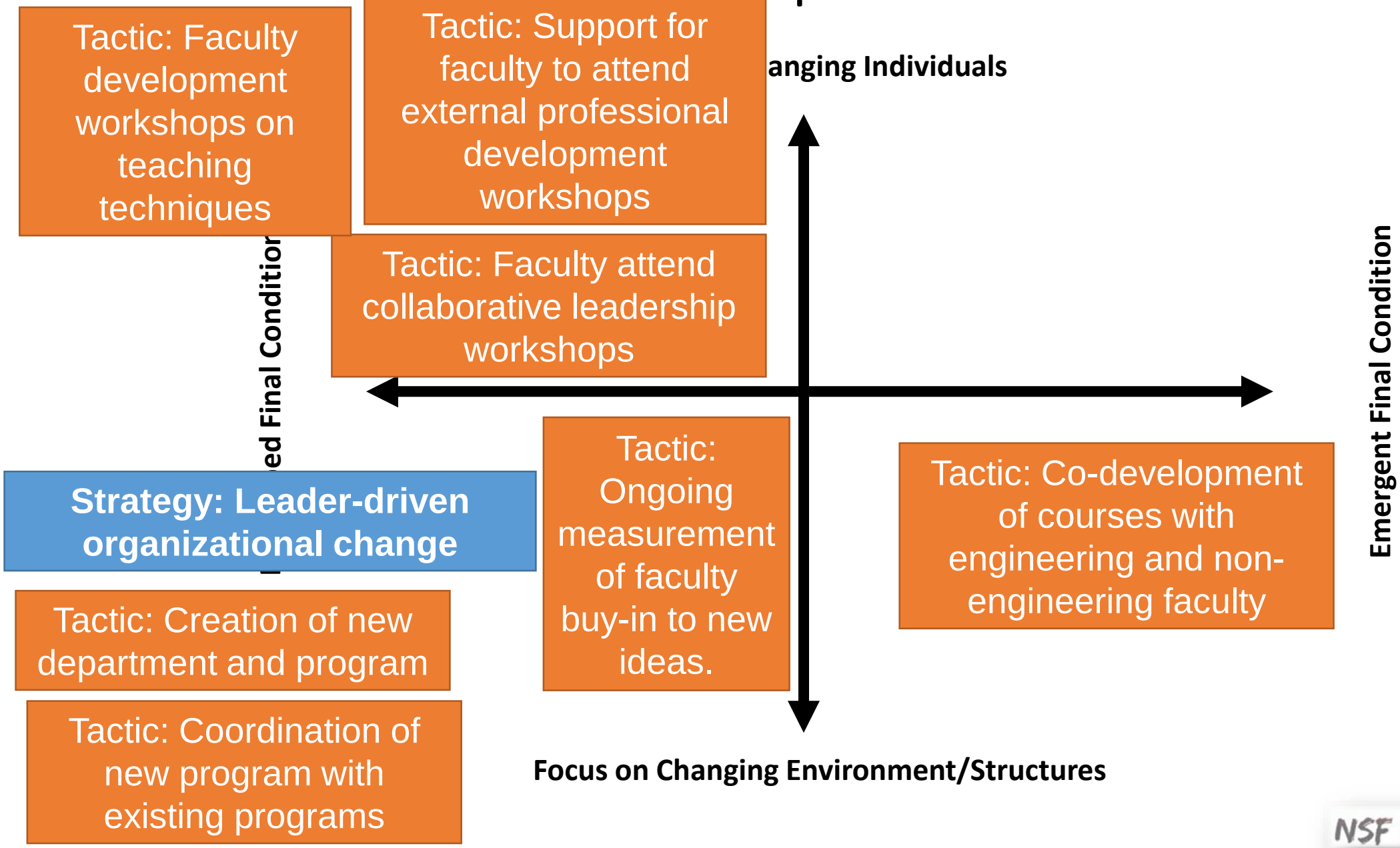
Evaluation questions

- What percentage of faculty flip at least one class?
- Do faculty implement and sustain the changes they propose in their teaching?
- Do student retention and learning outcomes improve by the end of grant period?

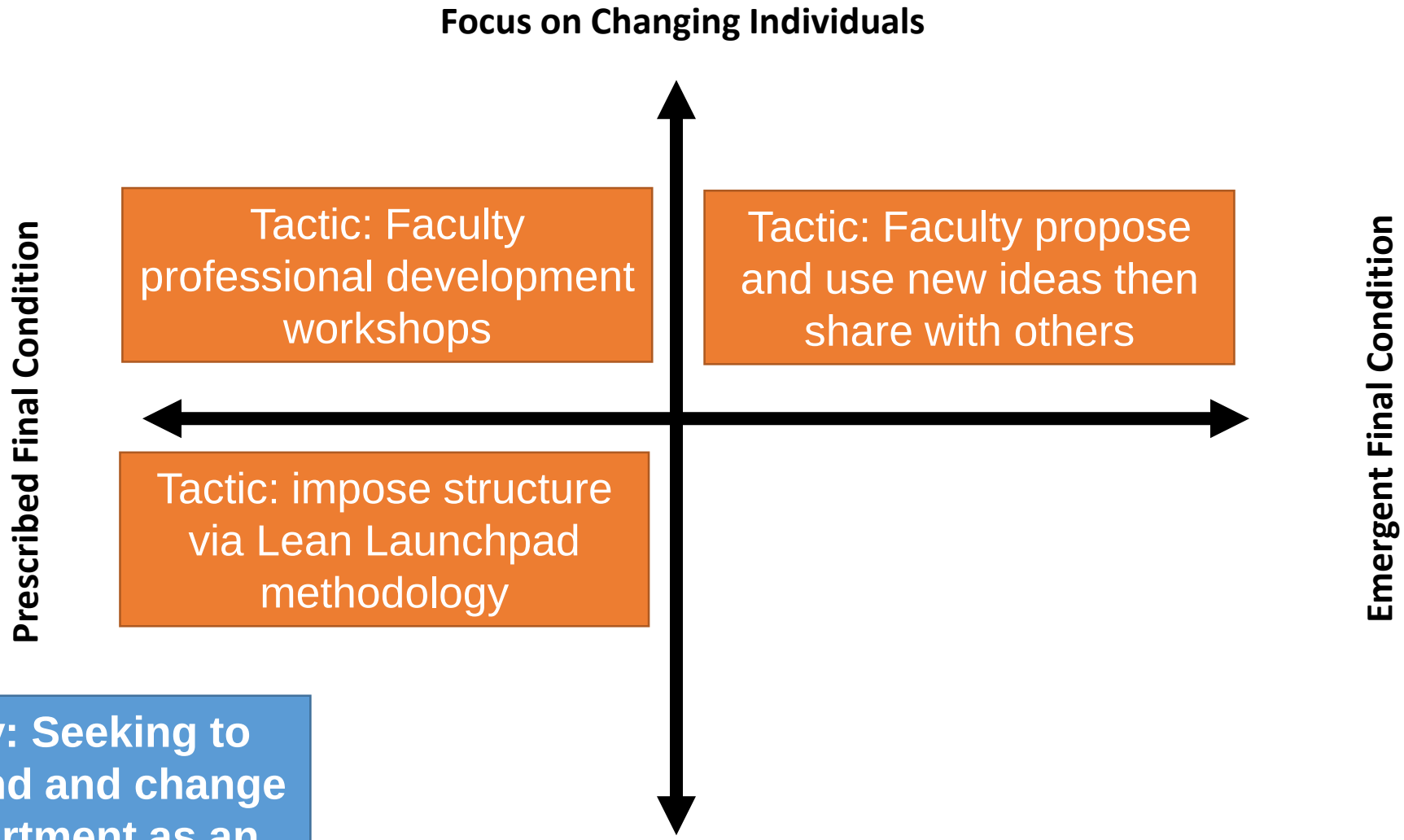
Example: OSU



Example: SDU

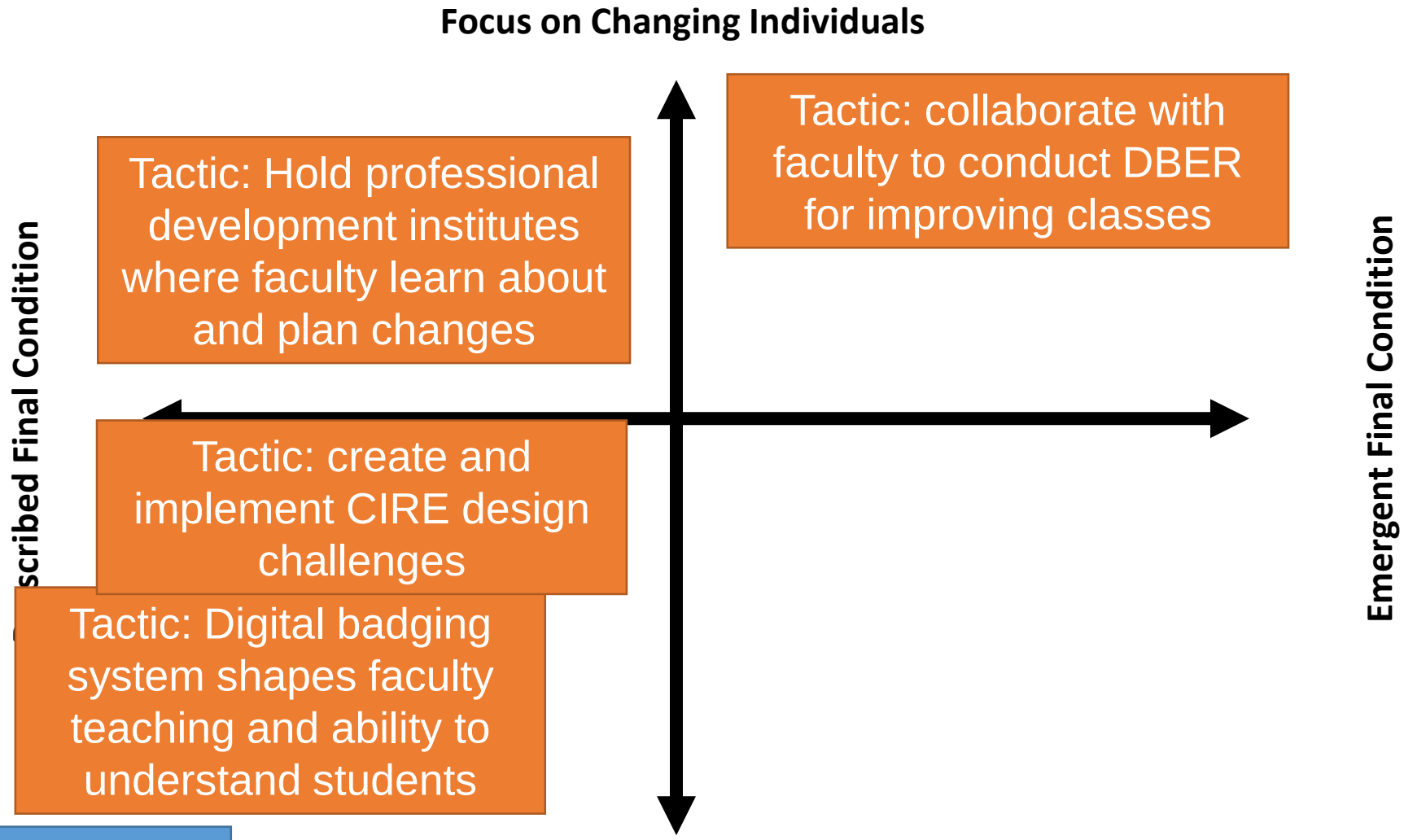

Tactic: Faculty development workshops on teaching techniques
Tactic: Support for faculty to attend external professional development workshops
anging Individuals
Tactic: Faculty attend collaborative leadership workshops
ed Final Condition
Strategy: Leader-driven organizational change
Tactic: Ongoing measurement of faculty buy-in to new ideas.
Tactic: Co-development of courses with engineering and non-engineering faculty
Emergent Final Condition
Tactic: Creation of new department and program
Tactic: Coordination of new program with existing programs
Focus on Changing Environment/Structures

Example: ASU



Strategy: Seeking to understand and change the department as an ecosystem

Example: UNM



Strategy (adapted): Kotter 8-stage model

By Scott Sanchez at English Wikipedia - Transferred from en.wikipedia to Commons., Public Domain, https://commons.wikimedia.org/w/index.php?curid=1821083

Tips on integrating your change model

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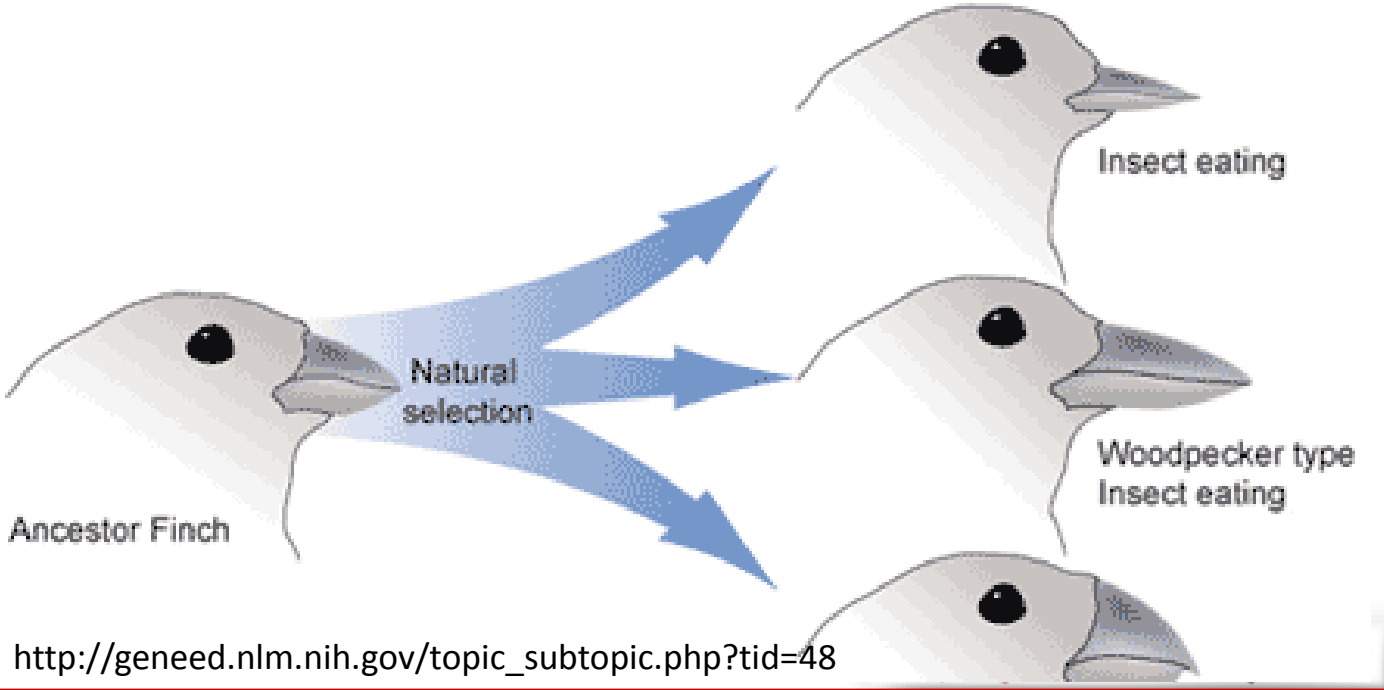
Building a change model

Finding & adapting a change model

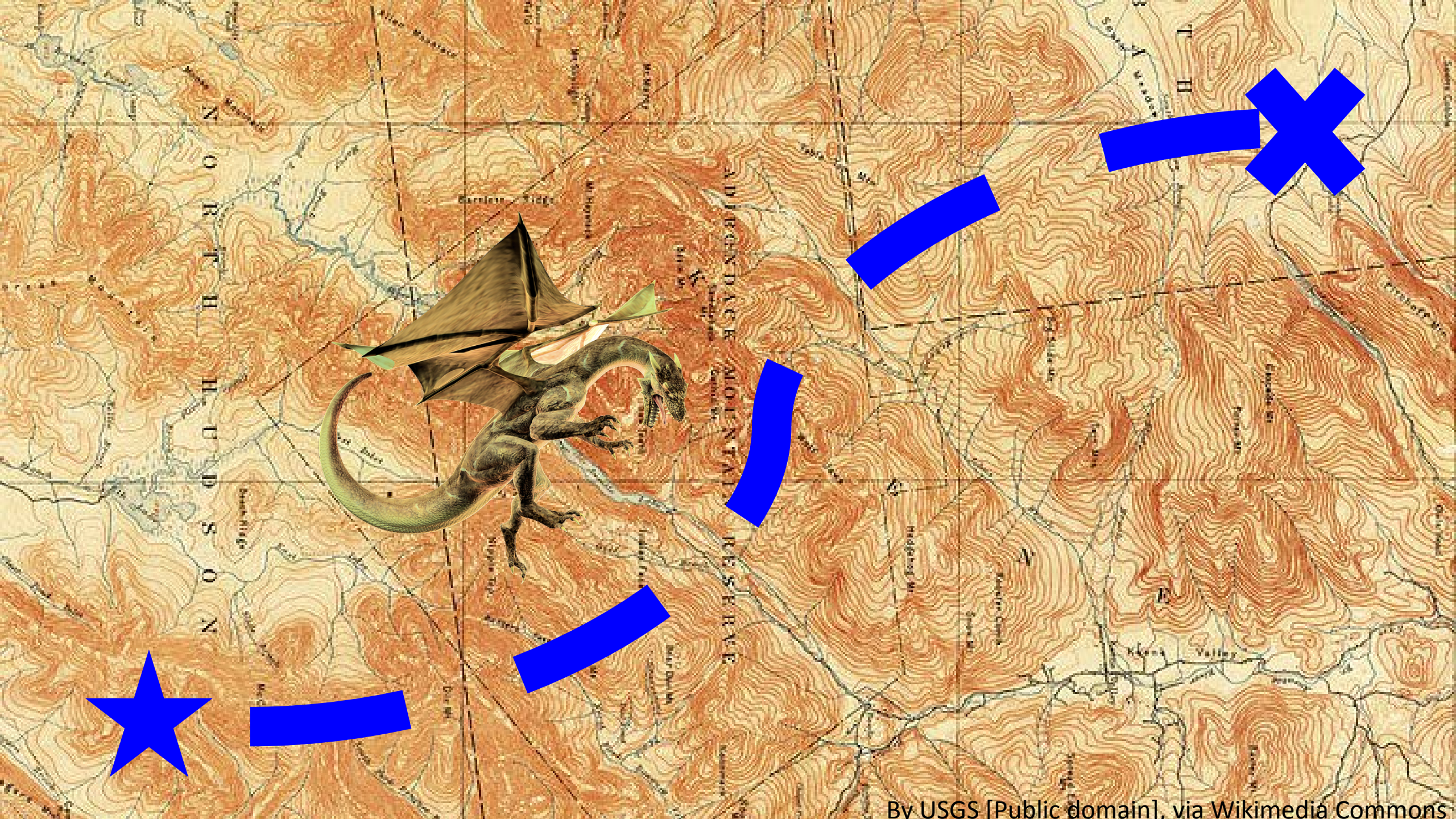


http://geneed.nlm.nih.gov/topic_subtopic.php?tid=48

https://www.flickr.com/photos/epublicist/3546059144

Be explicit about how your change model fits your project

- activities
- roles
- research plan
- evaluation plan
- your context



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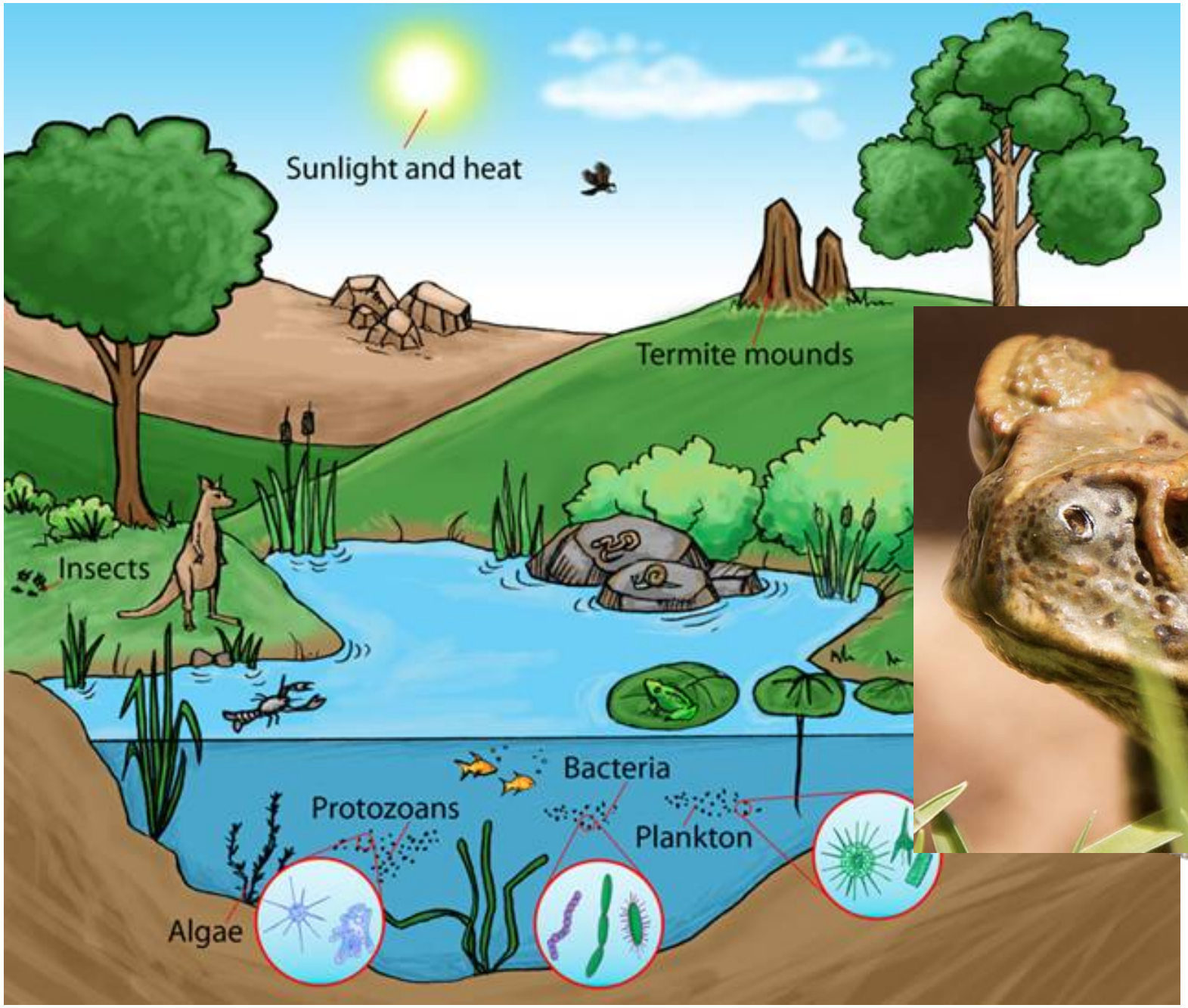
Your change model in your ecosystem



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Thank you! Questions?

- Enter questions in the Q&A panel
- We will prioritize questions that are broadly applicable
- Specific questions about the RFP should be addressed to the cognizant program officers

Name	Email	Phone
Kamau Bobb	kbobb@nsf.gov	(703) 292-4291
Elliot Douglas	edouglas@nsf.gov	(703) 292-7051
Olga Pierrakos	olpierra@nsf.gov	(703) 292-7936