Institutional Transformation: A New Framework Informed by Strategies Utilized at Highly Productive Institutions

Sylvia Hurtado & Krystle Cobian
STEM Institute
June 2017 | University of California, Los Angeles

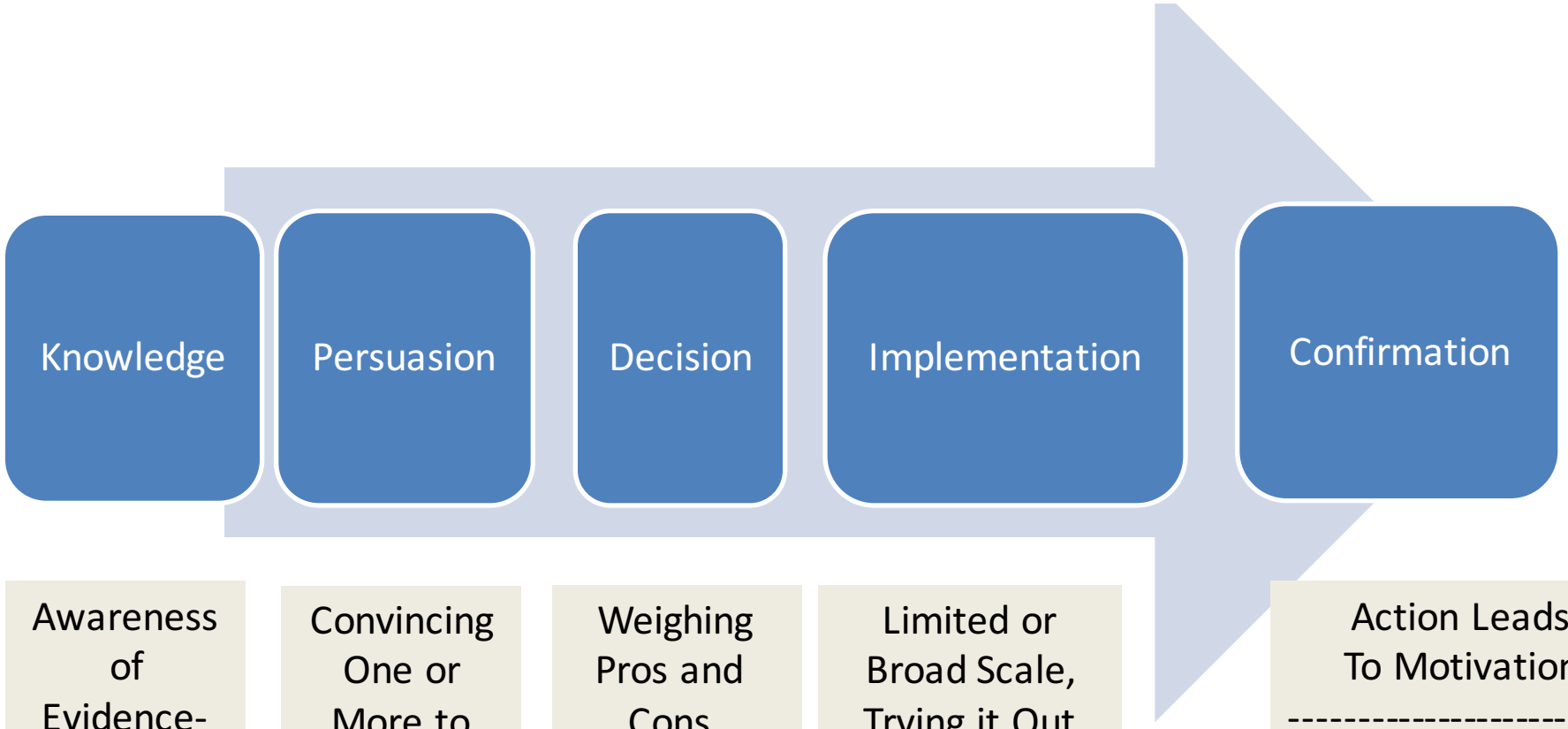
HERI
HIGHER EDUCATION RESEARCH INSTITUTE AT UCLA
HOME OF THE COOPERATIVE INSTITUTIONAL RESEARCH PROGRAM

Different Models of Institutional Change

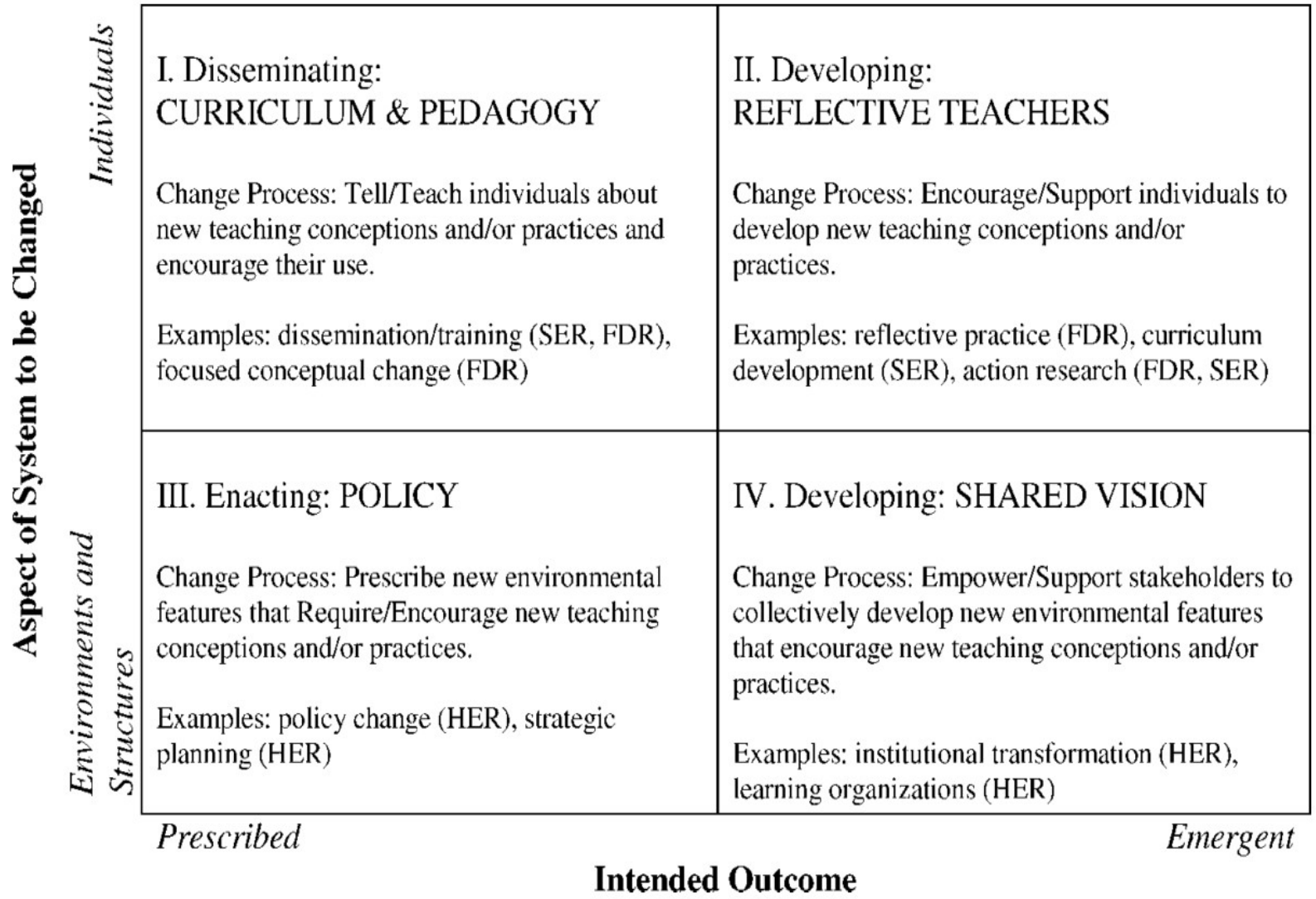
HERI
HIGHER EDUCATION RESEARCH INSTITUTE AT UCLA
HOME OF THE COOPERATIVE INSTITUTIONAL RESEARCH PROGRAM

Steps in the Adoption of Innovations

Rogers, *Diffusion of Innovations*, Free Press, 2003



Wieman "bring the teaching and research aspects of the culture much closer together " to facilitate change (2017)



C. Henderson, A. Beach, & N. Finkelstein, 2011, Facilitating Change in Undergraduate STEM Instructional Practices: An Analytic Review of the Literature, ***Journal of Research in Science Teaching***, 48, 8, 952-984

Research Questions

1. What strategies do institutions use to broaden undergraduate STEM degree completion, especially for traditionally underrepresented racial /ethnic minorities?
   - What strategies are specific to changing norms in STEM Teaching and Learning?
2. How are strategies organizationally integrated at the multiple organizational levels of the institution?

HERI

Methods

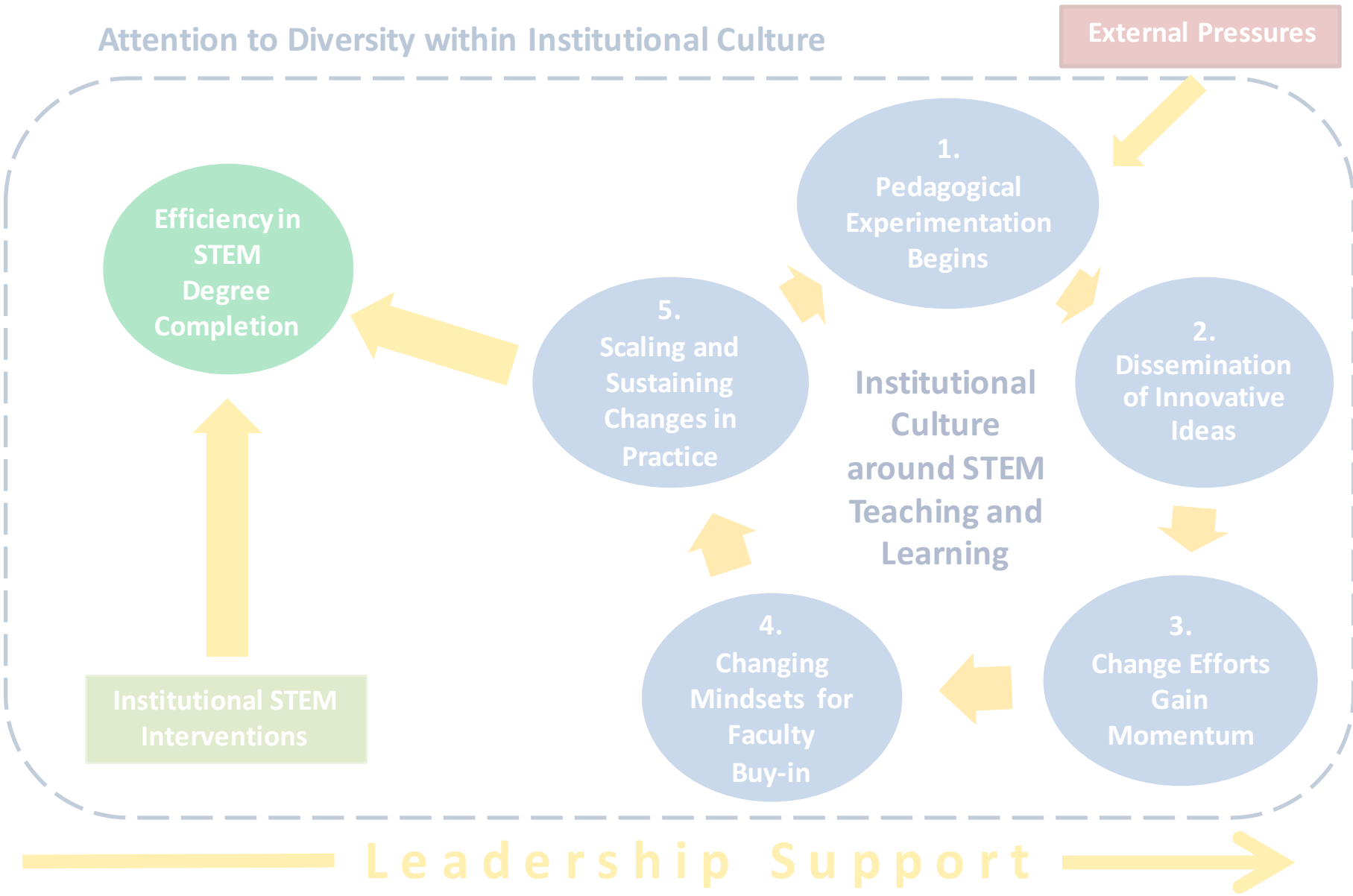
Sample

- Case studies from 11 diverse institutions
  - Institutions had 'exemplary success' in producing STEM degrees overall, or among a particular underrepresented racial group of interest
  - Efficiency scores generated by stochastic frontier analysis identified 'exemplar' campuses
  - Roughly 20-25 STEM faculty, program directors, and upper level administrators were interviewed at each institution
- We investigated evidence-based practices and the overall context for STEM education

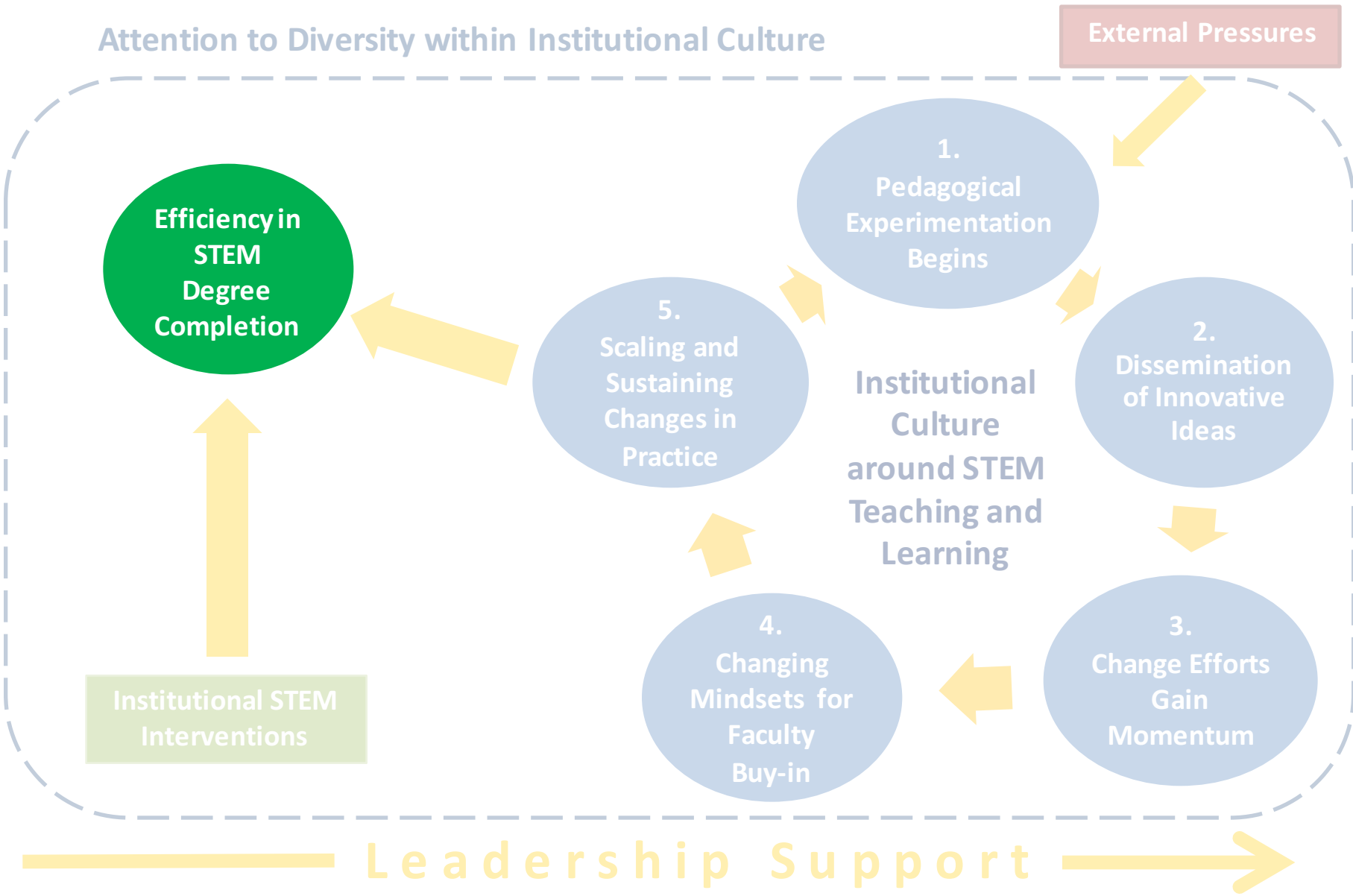
Coding and Analysis

- Constant Comparative Approach used to code
  - Transcripts open coded for salient larger themes followed by axial coding to determine how themes were interconnected.
- Analysis involved visually displaying the data within each code in spreadsheets by institution.
  - Easily allows for comparisons between institutions.

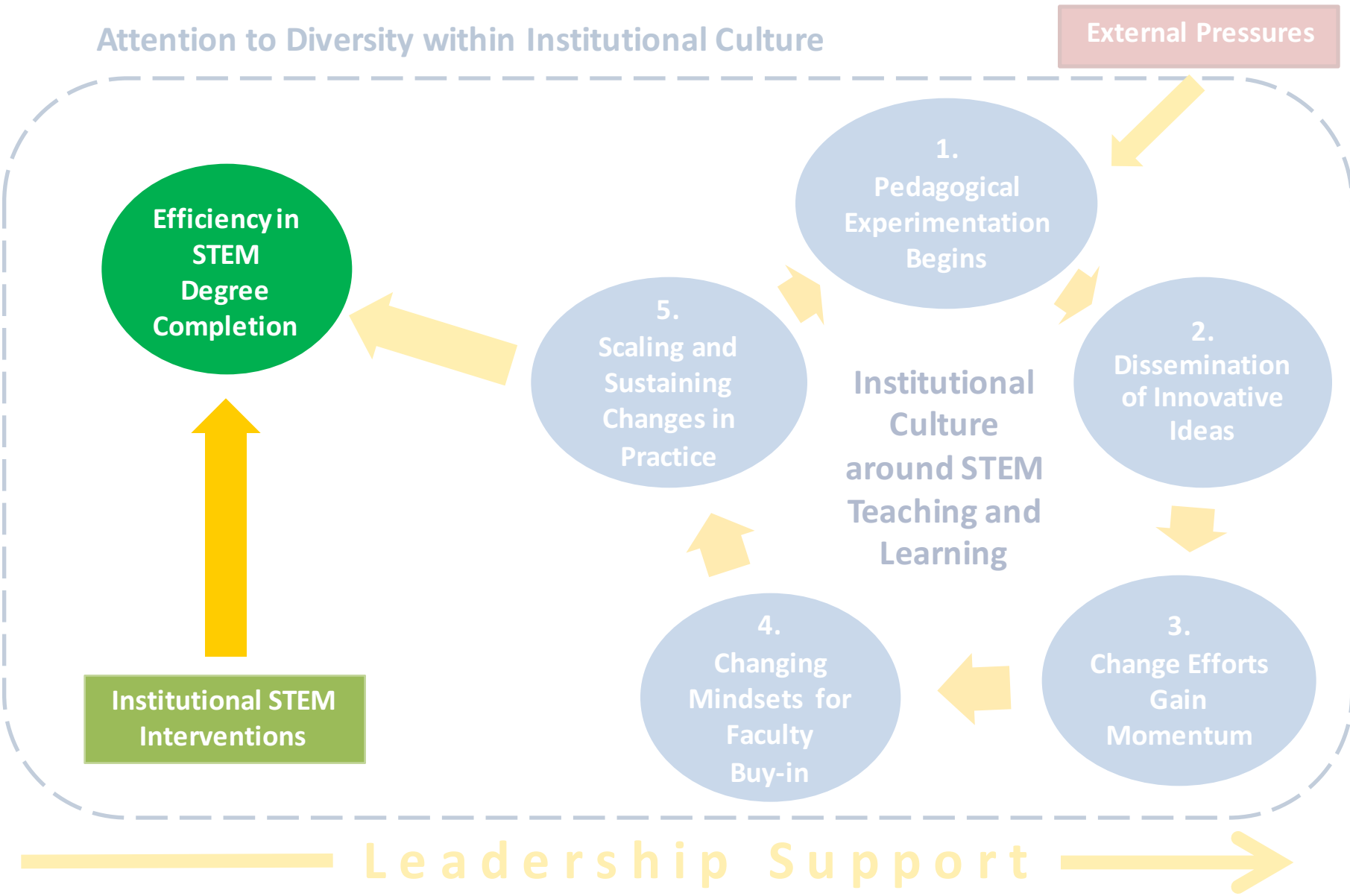
Organizational Perspective for Changing Norms in STEM Teaching and Learning



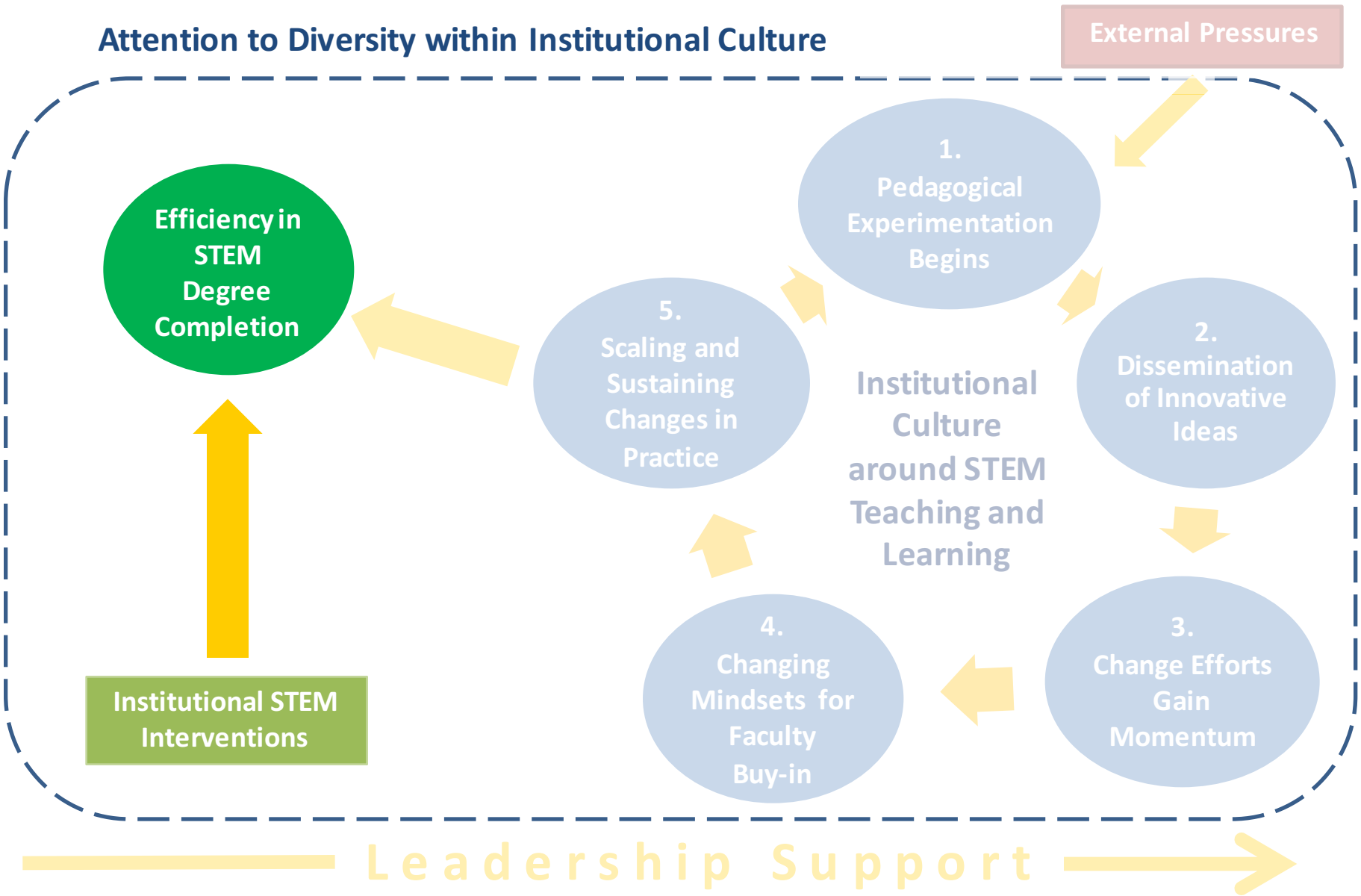
Organizational Perspective for Changing Norms in STEM Teaching and Learning



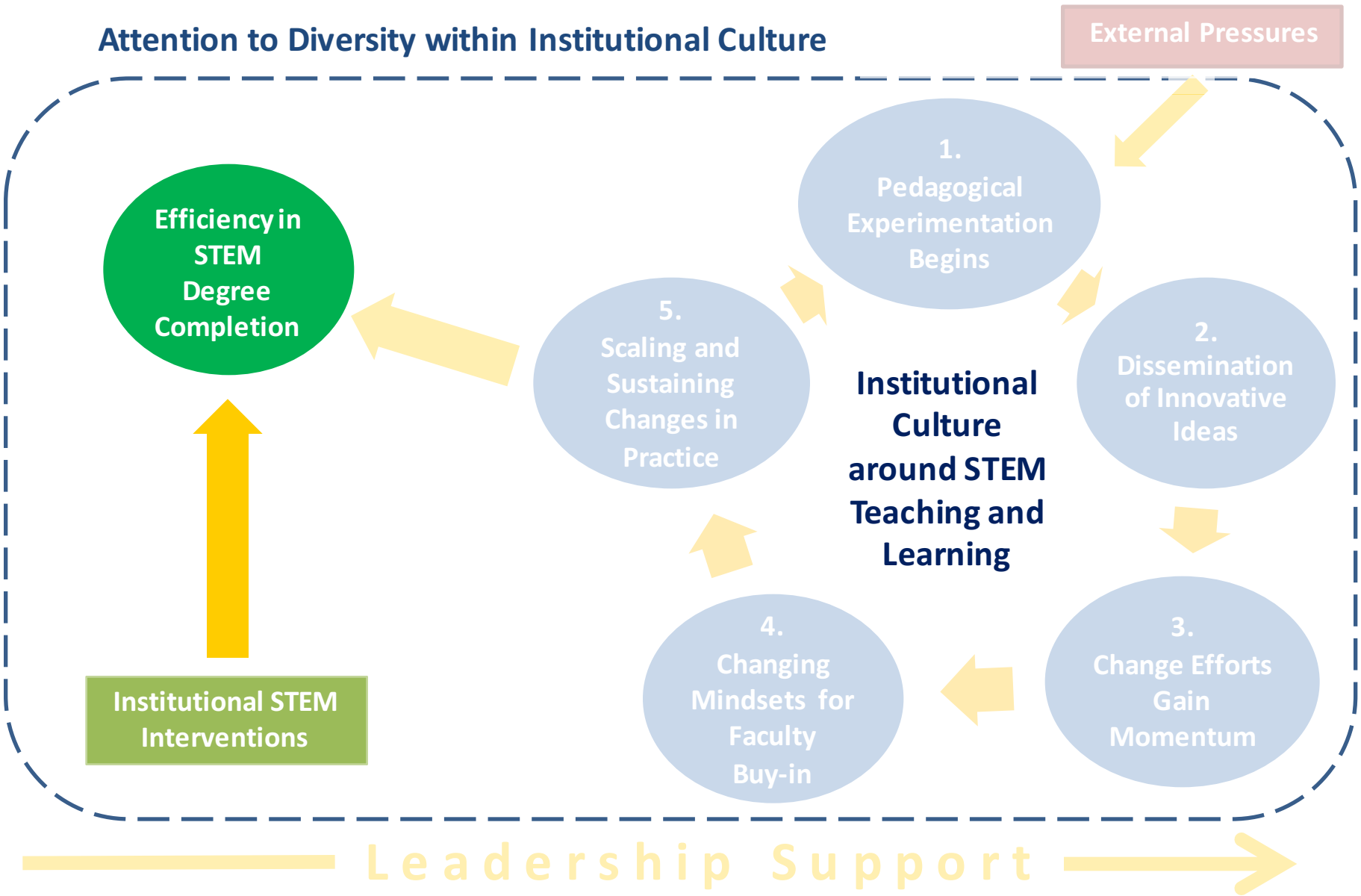
Organizational Perspective for Changing Norms in STEM Teaching and Learning



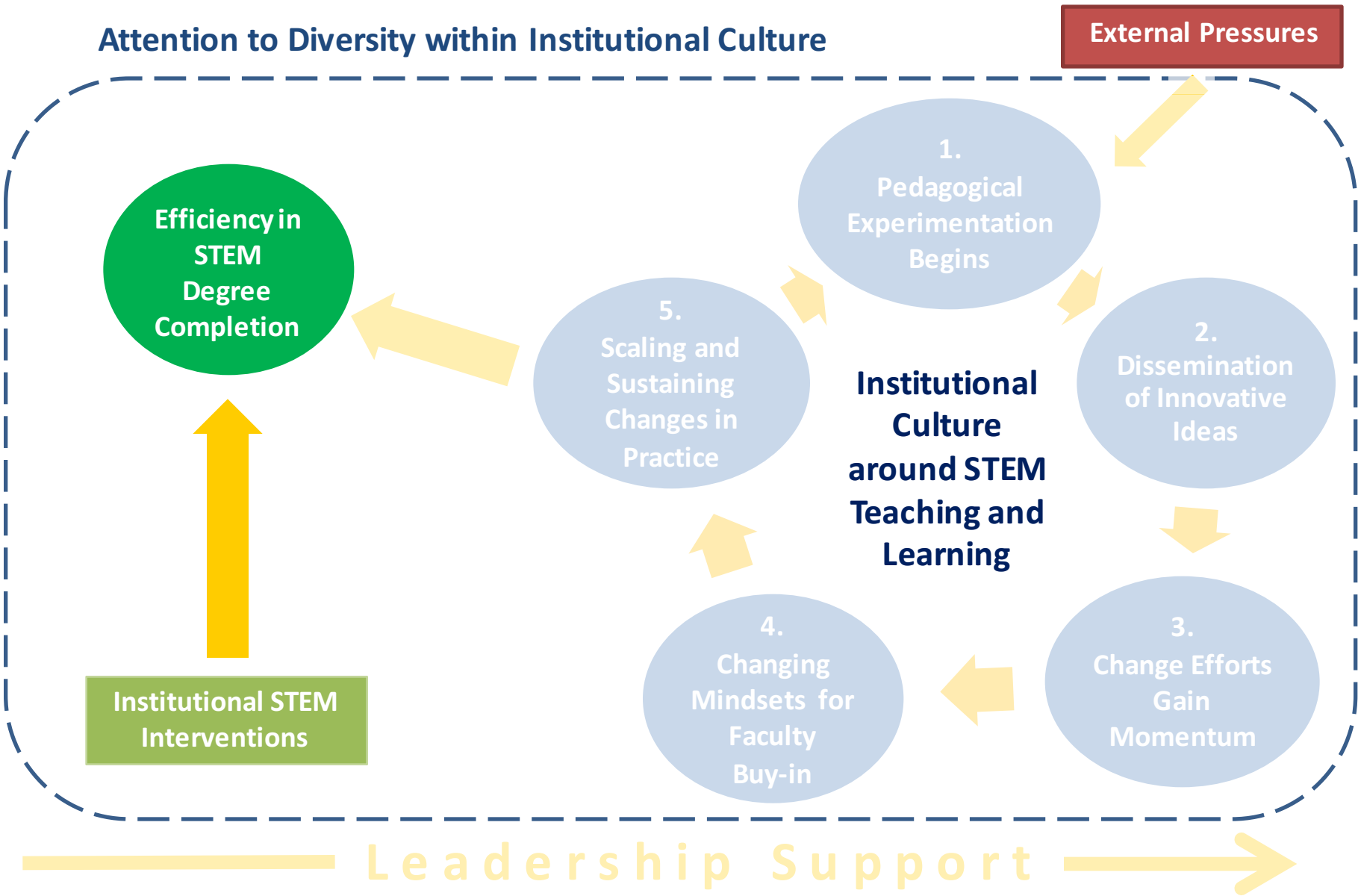
Organizational Perspective for Changing Norms in STEM Teaching and Learning



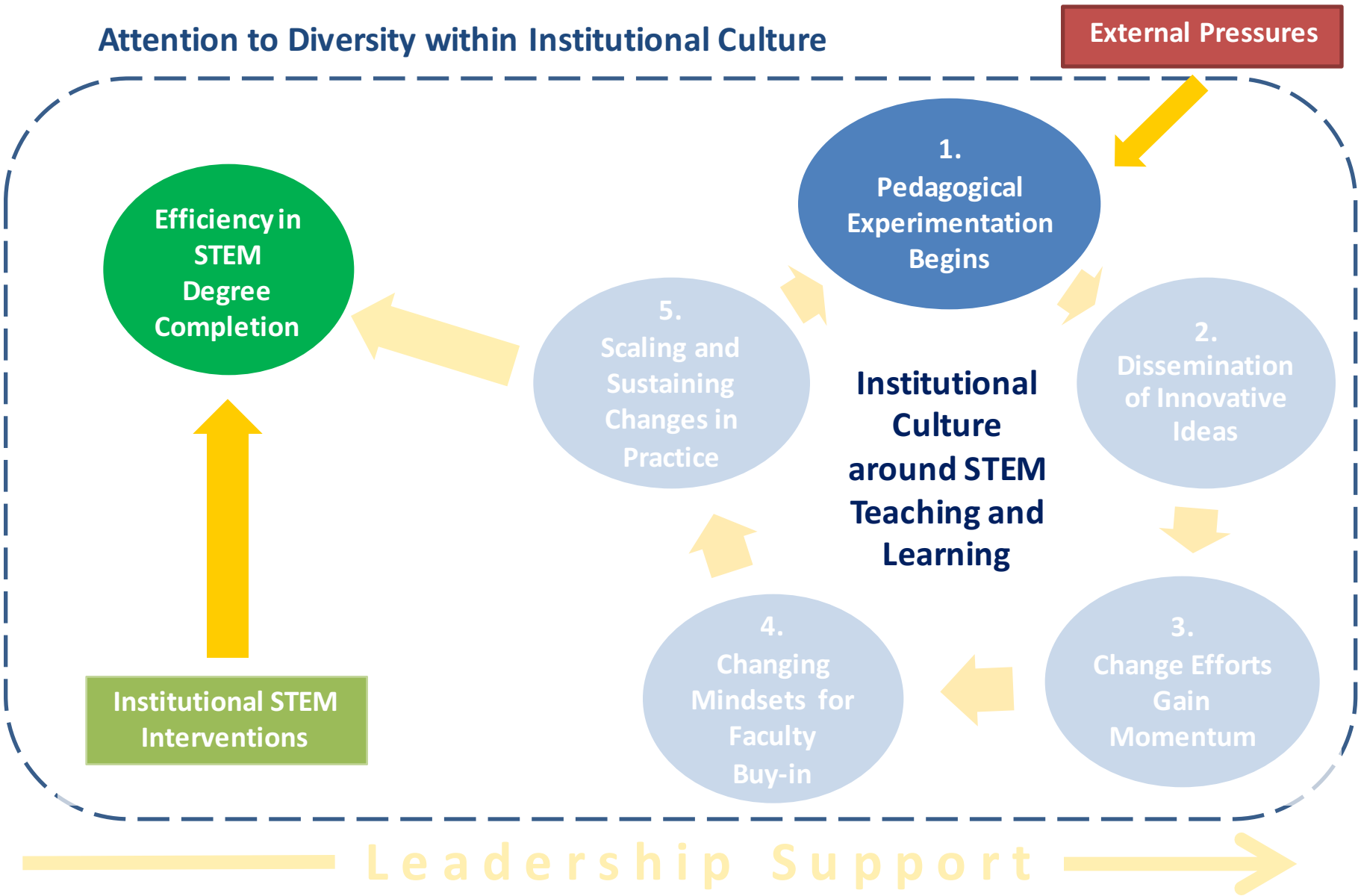
Organizational Perspective for Changing Norms in STEM Teaching and Learning



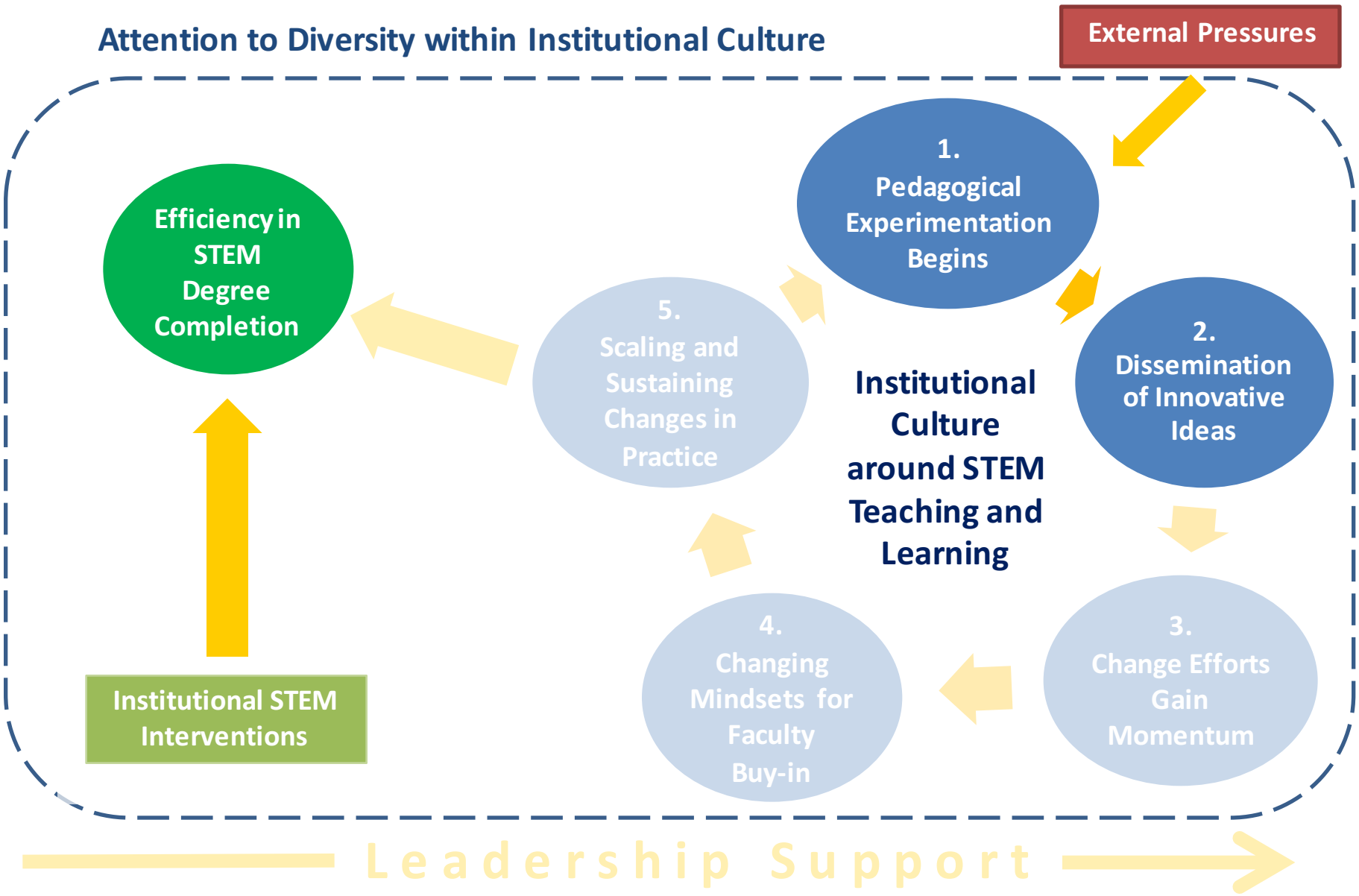
Organizational Perspective for Changing Norms in STEM Teaching and Learning



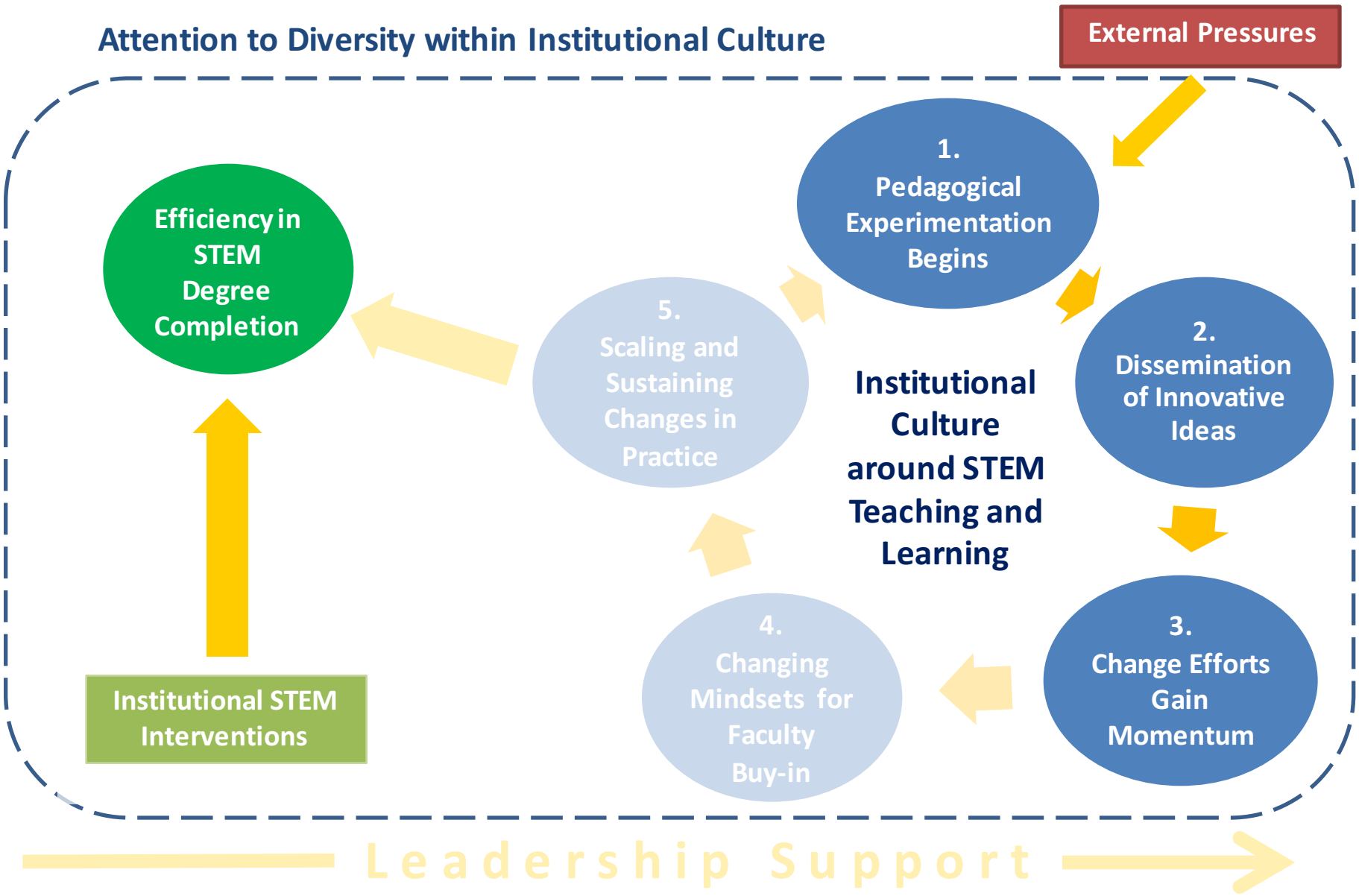
Organizational Perspective for Changing Norms in STEM Teaching and Learning



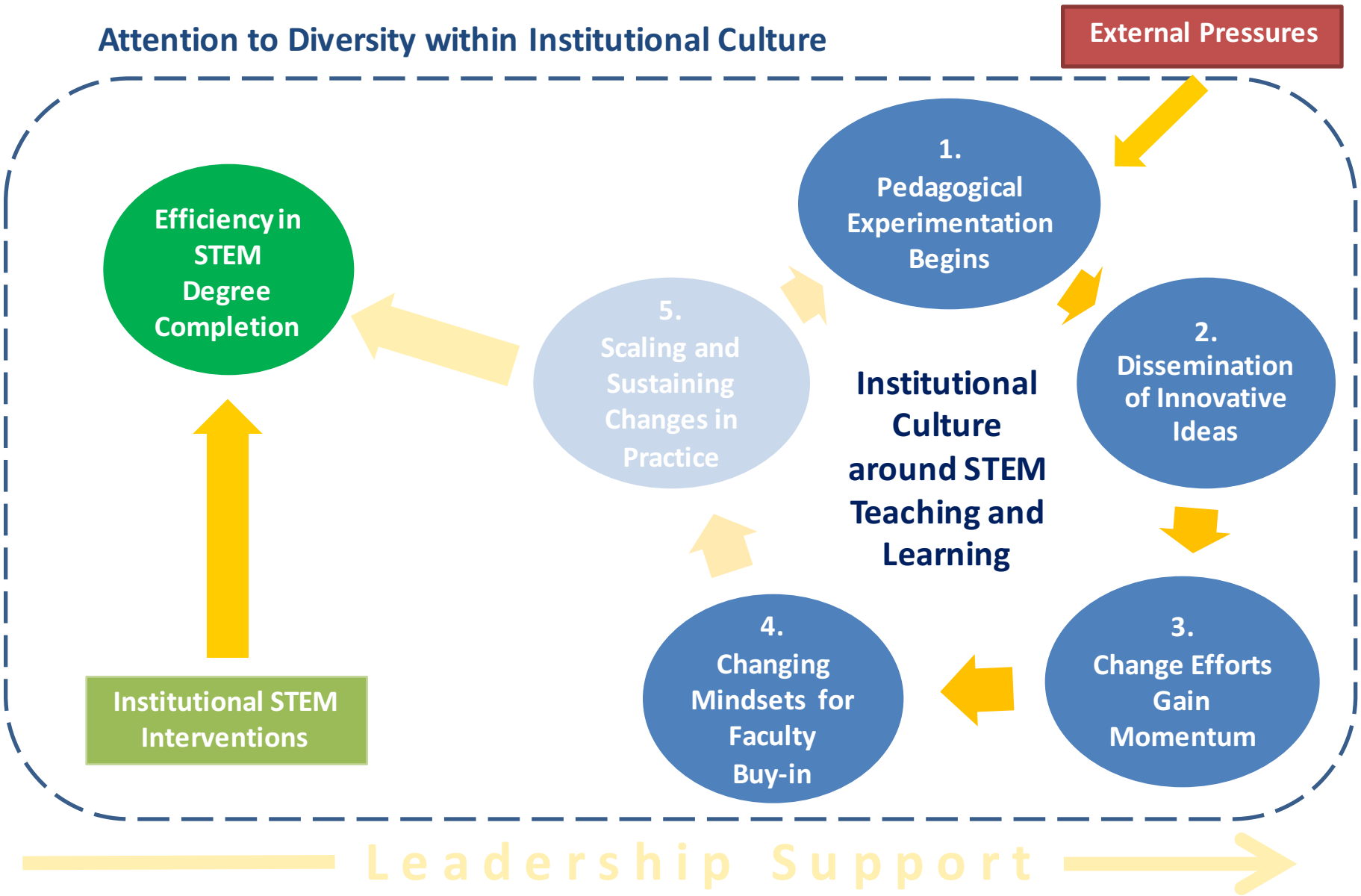
Organizational Perspective for Changing Norms in STEM Teaching and Learning



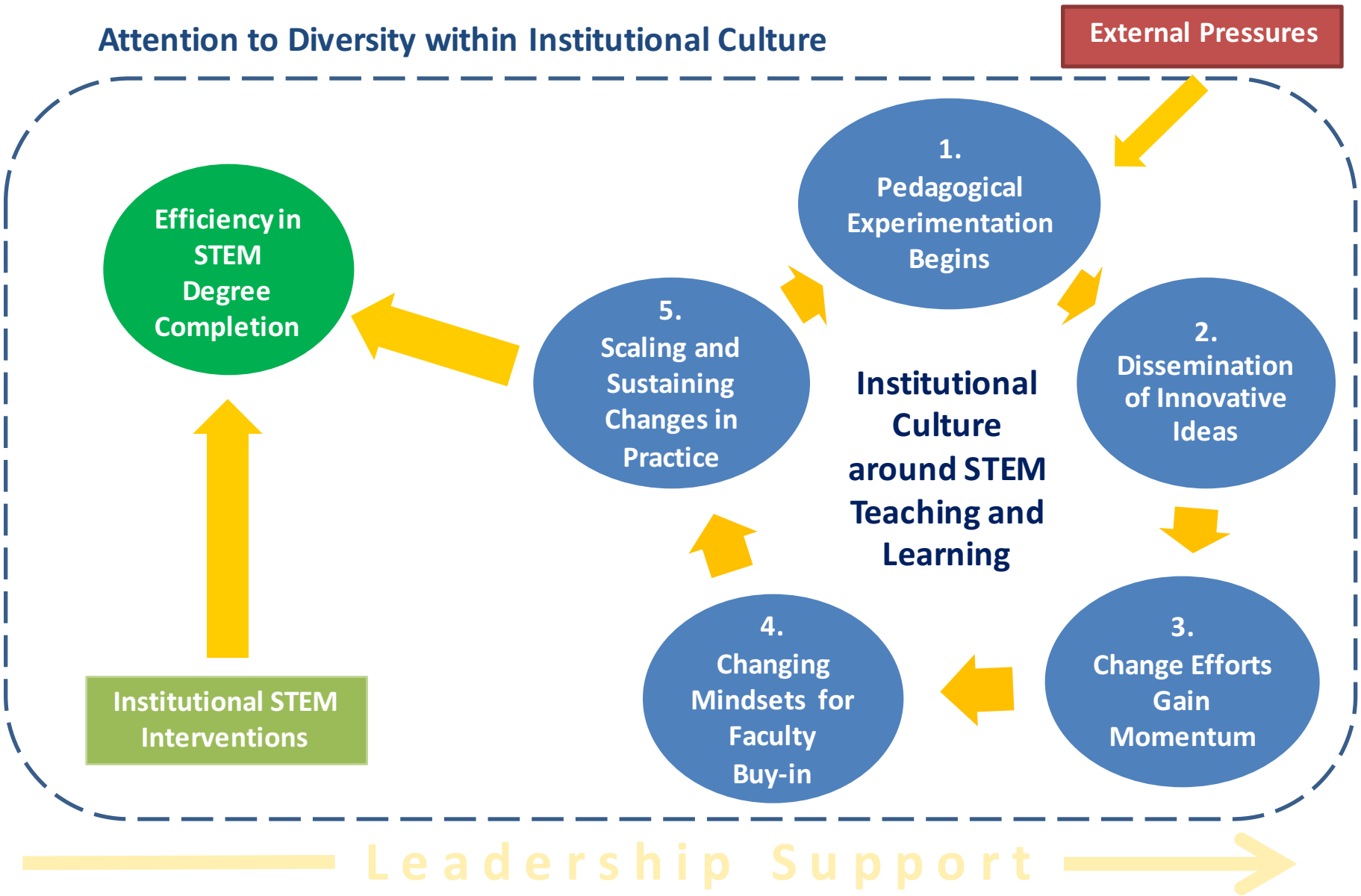
Organizational Perspective for Changing Norms in STEM Teaching and Learning



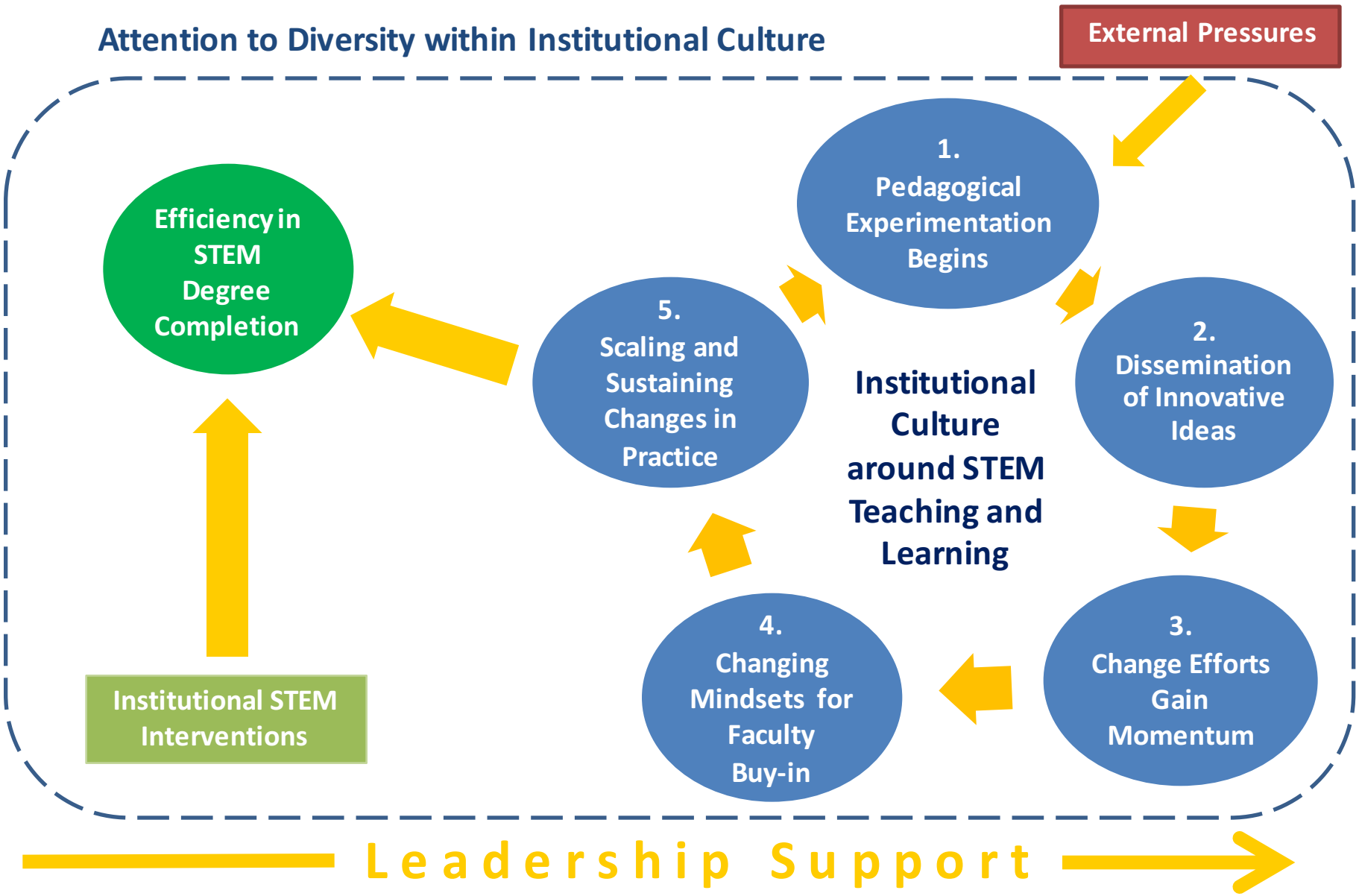
Organizational Perspective for Changing Norms in STEM Teaching and Learning



Organizational Perspective for Changing Norms in STEM Teaching and Learning



Organizational Perspective for Changing Norms in STEM Teaching and Learning



Institutional STEM Interventions

- Institutional Partnerships with Surrounding Community
- Comprehensive Programs for Students Specifically in STEM
- Undergraduate Research Opportunities
- Academic Support and Advising
- Mentoring Programs

We have faculty working on, arsenic, and prostate cancer, and uranium contamination in soils and in the livestock that people are eating. And Navajo students...will cheerfully come in and work on [this research]. And that relates in their minds to the cancer patterns that their community has. That's how we are able to attract fabulous faculty here, and keep them because of the setting we're in and regional problems that are the context for the work that we do. And that's also the context for what these students are trying get out of their college education. So again, I'm not sure that boils down to a catch phrase you can use, but to me, I see that that's what's going on in these classrooms and in these research labs.

~ Provost and Vice-President for Academic Affairs, University Serving Tribal Students

Attention to Diversity within Institutional Culture

- Institutions embraced increasingly diverse student body
- Leadership vocal about the importance of diversity
  - Hiring of diverse faculty & faculty who value teaching/doing research with diverse students
- Collaborations with nearby Native American communities
- Institution recognizes that effectively teaching diverse students requires attention to additional challenges that URMs face
- Services may need to be tailored so that they can target diverse students

When we hire faculty… we are looking for somebody who really loves being with students, who likes teaching students, who's not afraid to work with people from different diverse backgrounds.

~ Professor Emeritus in Biology, Master's Comprehensive HSI

HERI

External Pressures

We have this state performance funding now where all the universities [are under our state's] performance funding model. So there are ten metrics, nine of them had to do with instruction... Universities are graded one to five for excellence or improvement, you can score in either. But no minority serving institution has ever gotten a 70% graduation… The thing is that we can complain about what performance funding is but what it does is it provides that financial impetus to do the right thing. And I think luckily [our university] is doing that all. We were making the steps toward doing that before the model came into place. So it can satisfy the people who are focused financially but I think for most of our faculty, it isn't.

~ Dean of the College of Arts and Sciences, High Research HSI

Starting Change: Pedagogical Experimentation Begins

I use interactive methods and hands-on methods from the physics education research…I teach a large course… for 125 students. To make it interactive I'll pose a question and then students will turn and talk to their neighbor or in a small group about that question so that they are actually grappling with the content as opposed to sitting there and passively listening to me talk…Then it's the hands-on piece. There are a lot of demos and things for students to touch and play with so that we're actually doing science in the classroom rather than the knowledge fully coming from me… They're making observations and forming ideas based on what they're actually seeing such that the knowledge is coming from that experience and it's created by them…. When I was hired here, I think they just needed someone to teach physics… I have student achievement data and [students] are doing well… I use [the data] to inform my instruction. I want to see that students are actually learning…and I'm trying to teach in a way so that they will learn physics on a deeper level.

Physics Instructor, Smaller Research HSI

I had a statistician from the [Center for Teaching and Learning] working on it and it was clear that something good was going on. The Center wrote up a one page report and so I have to credit [an instructional consultant] in the center, who…sent it up the chain of command, He sent it to the provost right away. And they noticed, the chancellor, the provost, the deans they all noticed. And it got a lot of attention, but I kept feeling nervous like 'This isn't even published yet.'

Dissemination of Innovative Ideas

~ Director of Instructional Innovation for the College of Arts and Sciences & STEM Lecturer, Large Selective PWI

HERI

Change Efforts Gain Momentum

"Some of [the change] was done incrementally, so it's not like I sat there and knew, 'These were the 25 things we need to do to make this [change process] happen.' Sometimes you are only seeing five [tasks that must be done], and you do them and then you see the next five. And so…. when I selected [the Senior Associate Dean] to oversee the sciences, I didn't see this wave of transformation coming. And all of a sudden when we saw more student interest in the sciences needing to have more Active Learning techniques, I sat down with [the senior associate dean] and I said, 'What should we do?' We had a conversation about setting up the taskforce that he ended up leading and that taskforce recommended a leader in instructional innovation. So we finally looked around the room and [appointed a person to this role]."

~ Dean of the College of Arts and Sciences, Large Selective PWI

HERI

You have to have faculty who are able to be motivated, and there was a lot of discouraged faculty. But when you make a change and it works, people get encouraged by seeing the change working. So I think you have to talk that [change] up. You have to talk to your faculty and say, "Look here's what we're going to do, and here's going to be the outcome," and then when the outcome happens remind them that the outcome is connected to the change.

~ Professor and Chair of Physics and Astronomy, Large Selective PWI

Changing Mindsets for Faculty Buy-in

HERI

Scaling and Sustaining Changes in Practice

Each semester, those of us engaged in this [course reform and active learning effort] make a list of who our potential targets are and who are people that we wouldn't in a million years ask to do this. So it's spreading this through the faculty over the long-term… So we're trying to build up a cohort of about a third to a half of the department who has gone through this apprenticeship process [in active learning]... We don't expect to get 100% [of the faculty trained]. We expect to grow over a steady state as more young people come in because we have the expectation that every tenure track faculty member will teach a large enrollment course before the tenure decision is made.

~ Physics Professor, Large Selective PWI

HERI

Innovative Pedagogical Changes in the Classroom

- Some departments are making more strides than others in the use of innovative teaching techniques
- From lecture towards structured inquiry-based, active-learning classroom experiences
- In some cases the innovation in the classroom went beyond simply incorporating active learning technique and completely changing the classroom from a lecture format to a flipped or hybrid format – part online/part in classroom.
- There is a movement around accepting failure as a normal part of learning & having a growth mindset
- "High touch" culture for making contact with students falling behind in the classroom to convey concern for progress and to help students move forward

---------- Leadership Support ----------

You have to be in [the change process] for the long run. They take a while, but it isn't something that just happens with one person, but it does require both commitment from the top down and excited ideas from the bottom up. The bottom up being faculty... the people that are doing it... And at big public universities, people don't have a lot of extra time [to do new innovative things to change their teaching]... So finding ways that you can do little things like extra support when they put a grant and you make those matching funds...That kind of recognition I think has a huge impact. And then I think if you're going to get new faculty hires to actually care about it, allowing them to care about it and have that not be considered something that goes against them in tenure.

~ Chancellor of University, Large Selective PWI

HERI

---------- Leadership Support ----------

With help from the provost and support from our chancellor…we have invested in redesigning the classroom spaces so that they are appropriate for Active Learning. Physics for example is our best example… The classroom is now taught in round tables - six to eight students sit around a table… They were supposed to have read online [before the class begins] some module on what they would be working about in class. So they come in, sit around a table, and work on a problem … And the students are supposed to be working together in a team and their professor and the graduate TAs are walking around in the classroom.

~ Dean of the College of Arts and Sciences, Large Selective PWI

Central DPC Goal and Evaluation Focus

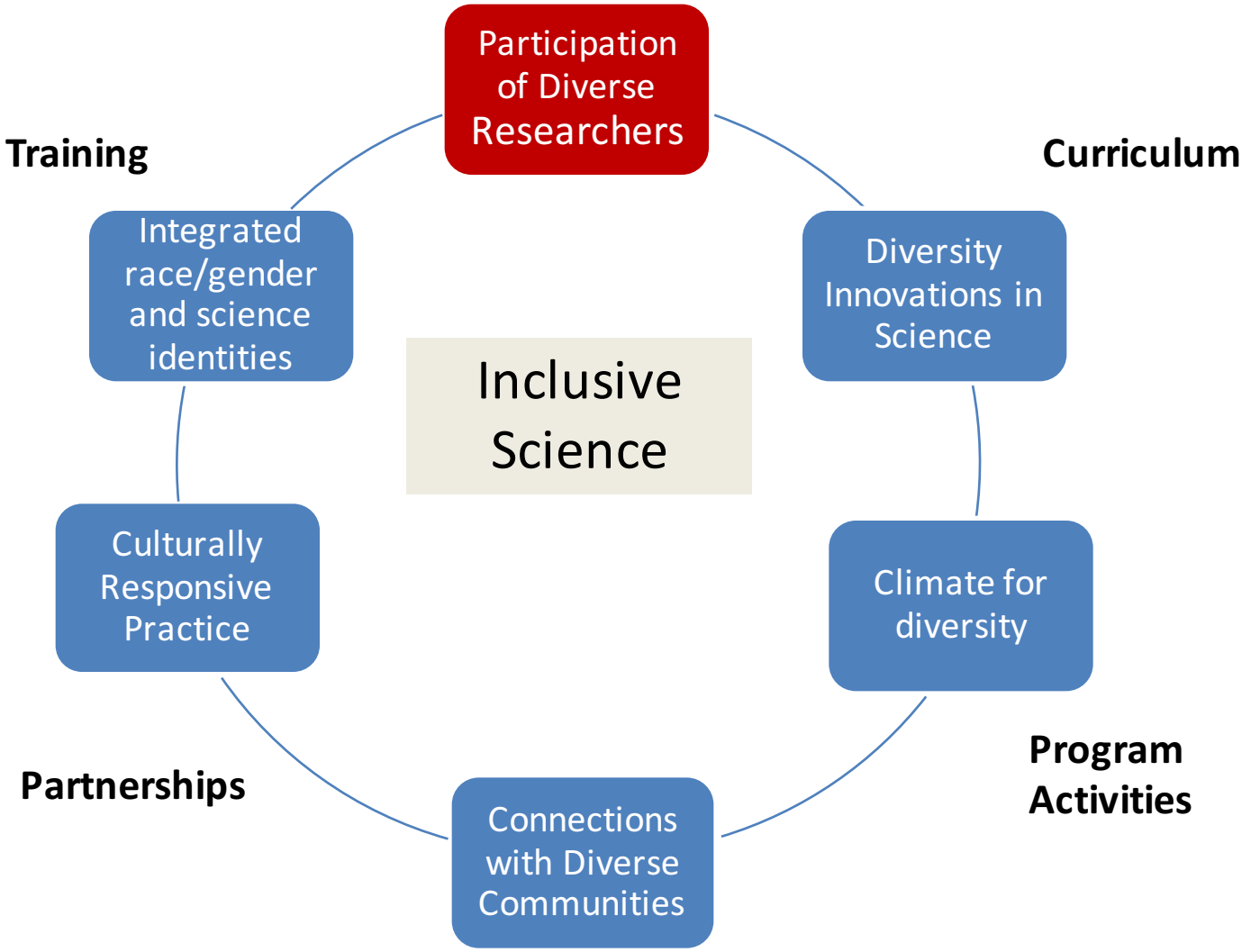
The primary goal is to increase participation rates of diverse researchers from college entry to career attainments

BUILD campuses have a diverse student body and are expected to increase the number pursuing biomedical careers

NRMN is expected to expand and diversify mentors and mentees engaged in biomedical research

Increased Participation of Diverse Researchers

Institutional Practices: Convergence of Commitment to Diversity and Science Training



Contact Us

Faculty/Co-PIs:
Sylvia Hurtado
Kevin Eagan

Postdoctoral Scholar:
Tanya Figueroa

Administrative Staff:
Dominique Harrison

Graduate Research Assistants:
Ana Gomez
Hector Ramos
Christina Zavala
Damani White-Lewis
Krystle Cobian

Papers and reports are available for download from project website:

http://heri.ucla.edu/nih

Project e-mail: herinih@ucla.edu