Professionalizing Educational Practice

through

Measurement and Assessment

at

University of Colorado
Boulder

Noah Finkelstein

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AAU project team

- **Paul Chinowsky:** Engineering, Faculty senate chair
- **Joel Corbo:** Research Associate/EAF
- **Melissa Dancy:** Physics, faculty use of DBER
- **Stan Deetz:** Grad School, Institutional/organizational change
- **Noah Finkelstein:** Physics, Sociocultural learning
- **Daniel Reinholz:** Research Associate/EAF

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Partners at CU

Initial departments:

- Integrative Physiology (1700 majors – 2nd largest at CU!)
- Mechanical Engineering (800 majors)
- Physics (300 majors, 2500 students/year in service courses)

Center for STEM Learning

- Directors: Finkelstein, Otero, Chinowsky
- Executive Board
  - Chancellor
  - Provost
  - Deans of Arts & Science, Engineering, Education, and Graduate School
  - Vice Chancellor of Strategic Relations

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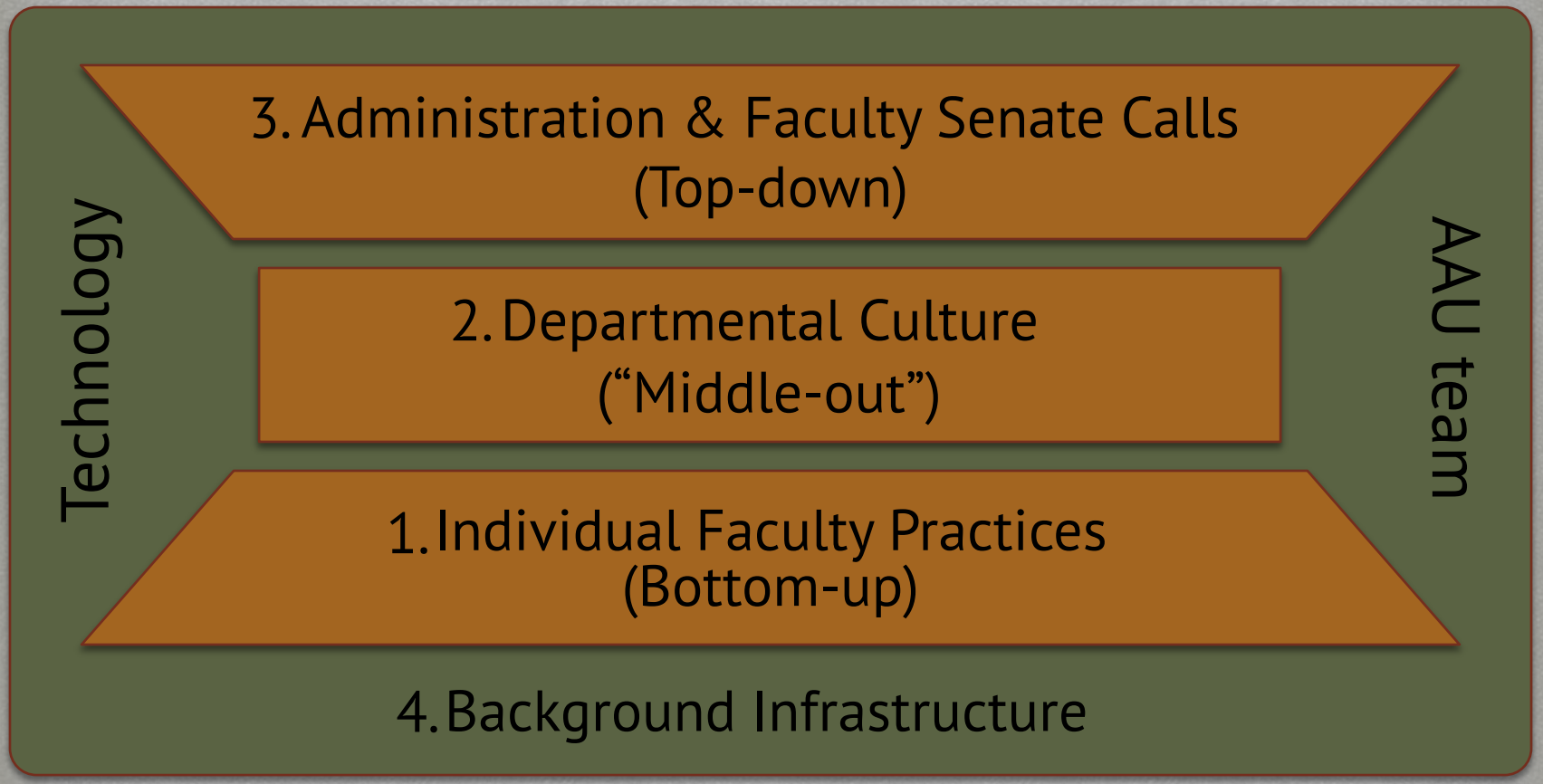
Overarching goal

Improve student learning and engagement, through

- systematic innovations in classroom practices
- intervention in the culture and mind-set of teaching and learning among faculty
- institutional reward systems and culture

Four layers of change



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Layer 1: Individual

Postdoc ⇔ individual faculty/large-enrollment course to

- Identify learning goals
- Implement measures of achievement of goals

What's working:

- Faculty open to meeting (10 so far)
- ~2200 students in affiliated courses
- Implemented pre/post concept assessments in 5 courses
- Emergent projects on student retention in intro physics and student study habits in anatomy

Layer 1: Individual

What's challenging:

- Faculty difficulty identifying clear goals
- Perception of time-commitment
- Example from interview:

  Q: [Have you] ever considered or tried using any kind of pre and post testing or any sort of research based instruments to try to measure [your teaching].

  A: Umm… No I have not… But… It… You know…

  Q: Or tried to use any systematic ways of measuring…

  A: No, I haven't done any of those.

  Q: And why is that?

  A: I haven't thought to do that. I feel like I'm being judged now. I'm pretty close to saying that we're done.

Layer 1: Individual

What's next:

- Targeting new courses
- Targeting new departments (how to determine?)
  - Molecular, Cellular, and Developmental Biology
  - Computer Science
  - Applied Mathematics
  - Psychology
  - Ecology & Evolutionary Biology
  - Etc.

Layer 1: Individual

Which is most important in department selection?

a) Who write "best" proposal? [democratic/open]

b) Who is deemed as ready by us? [opportunistic]

c) Who the dean/admin wants? [dictator]

d) Who has the most majors? [populist]

e) Who is likely to sustain the effort? [long view]

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Layer 2: Departmental

Department-wide cultural change process to encourage:

- integration of evidenced-based, learning-centered education
- continuous improvement process

Modeled on organizational change process.

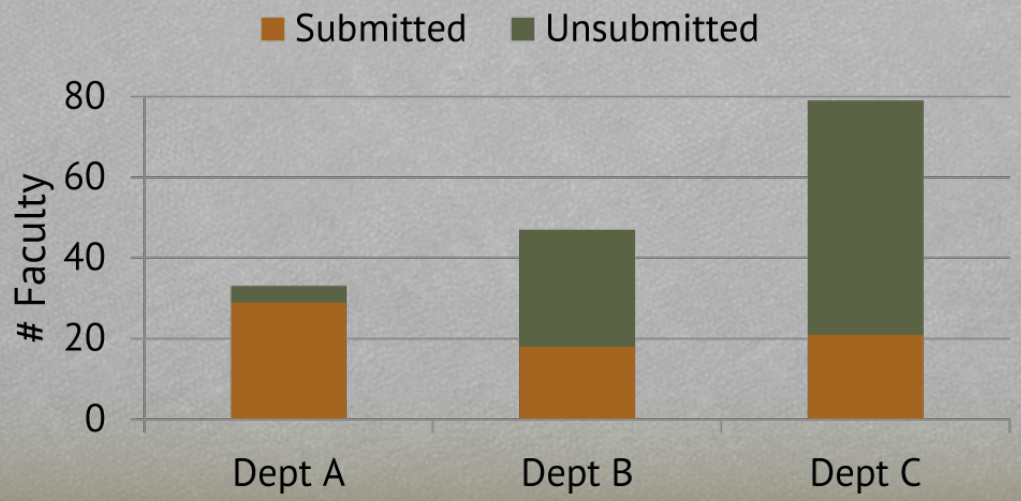
What's working:

- Understanding local practices, norms, role, values,…
- Faculty interviews to develop "mental maps"

Layer 2: Departmental

Why the department we are leaning towards?

- Five active teaching/course redesign committees
- From interview: "I think [teaching in the department] is generally good… I feel like I'm becoming more of an expert, and I value teaching as part of my profession, and I see that becoming a bigger and bigger part of my identity."
- AAU survey response:



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Layer 2: Departmental

What's challenging:

- We don't have good models
- Perception of zero-sum game
- Where does the real $$ come from
- ID'ing appropriate departmental levers

What's next:

- Designing strategic approach
- Finalize department
- Get department on board
- Continue interviews/meet with curriculum committee
- Design and begin implementing change process

Studying Two Approaches

Developed framework for implementing/studying the two approaches:

What	Why	How
Engage faculty in discussions of learning goals.	Faculty more likely to measure goals if they know what they are.	One on one discussions

complementing

What	Why	How
Developing systems of increasing individual & dept'l capacity to meet learning goals.	Departments will not adopt a learning-centered approach without the resources to do so.	Following a retreat to develop vision, work with departments to identify needs and implement mechanisms to meet change goals.

(plus 6 more pages…)

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Layer 3: Administrative

Promote a culture of educational excellence:

- Senior administration: Require evidence of student learning in tenure & promotion
- Faculty senate: Prioritize education-based teaching practice

What's working:

- Senate shifted Teaching Awards focus to evidence-based practices
- Working group to develop framework for teaching excellence
- Engagement by senior administration (Assoc. Provost)
- Networking key campus programs

Layer 3: Administrative

What's challenging:

- Decoupling of administrative & academic units
- Competing goals/resources on campus:
- Voluntary labor required (currently)

What's next:

- Waiting for progress in other layers before T&P changes
- Crafting political language

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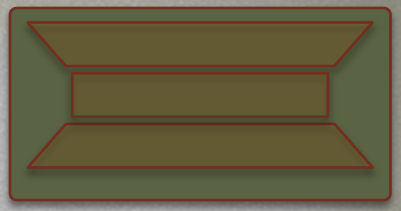
Layer 4: Infrastructure



Tech Infrastructure:

- Import UC Davis tools for institutional student data visualization
- Create tool kits to implement and publicly share measures of student learning

Expanding AAU Team/Resources

- Hiring more staff
- Increasing campus/CSL prioritization

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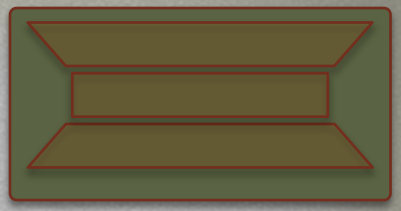
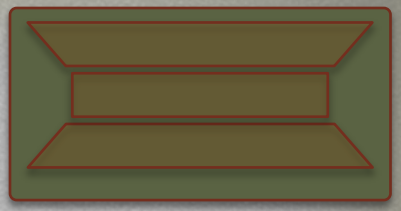
Layer 4: Infrastructure



What's working:

- Office of Information Technology: STEM education one of five focus areas
- Identifying discipline-specific assessments (e.g., FCI) and common assessments (e.g., TDOP)
- Dean's buy-in for new approaches ($$)

Layer 4: Infrastructure



What's challenging:

- Politics around amassing the necessary data
- Time/resources to address needs
- Allocating enough staff

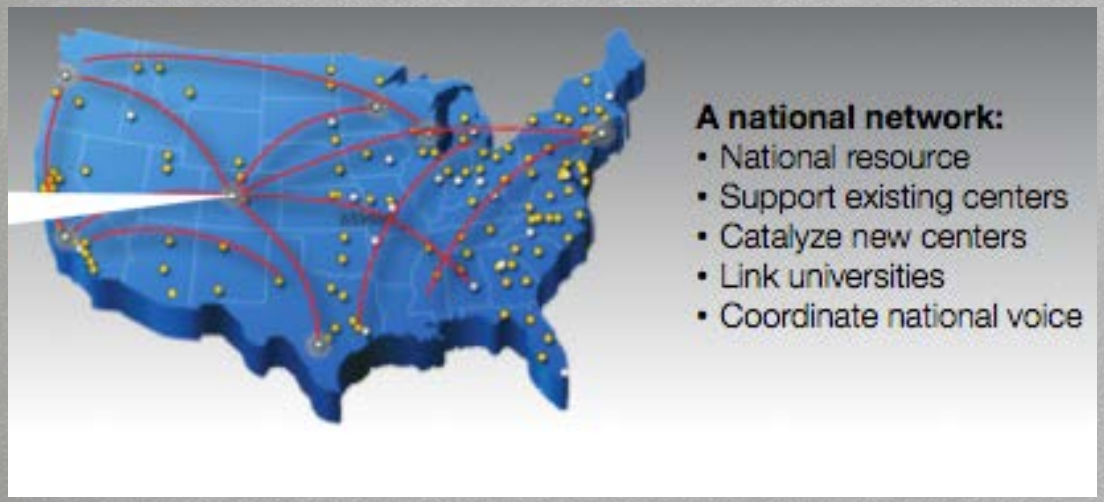
What's next:

- Engage OIT on projects
- Build network of programs on campus

Emergent Activities: Scaling

BAY VIEW ALLIANCE

National network of Centers for STEM Learning



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Big picture prognosis

Successes

- All layers moving forward, with most action on 1 & 2
- Buy-in from individual faculty through senior administration

Challenges

- Underfunded by an order of magnitude
- Despite buy-in, institutional goals not entirely commensurate with ours

Next steps

- Celebrate small wins
- And build

Questions?

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