

Phase 1 Report



The Final Phase of a Multi-Year Initiative

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Jack R. Lohmann
...and many colleagues!

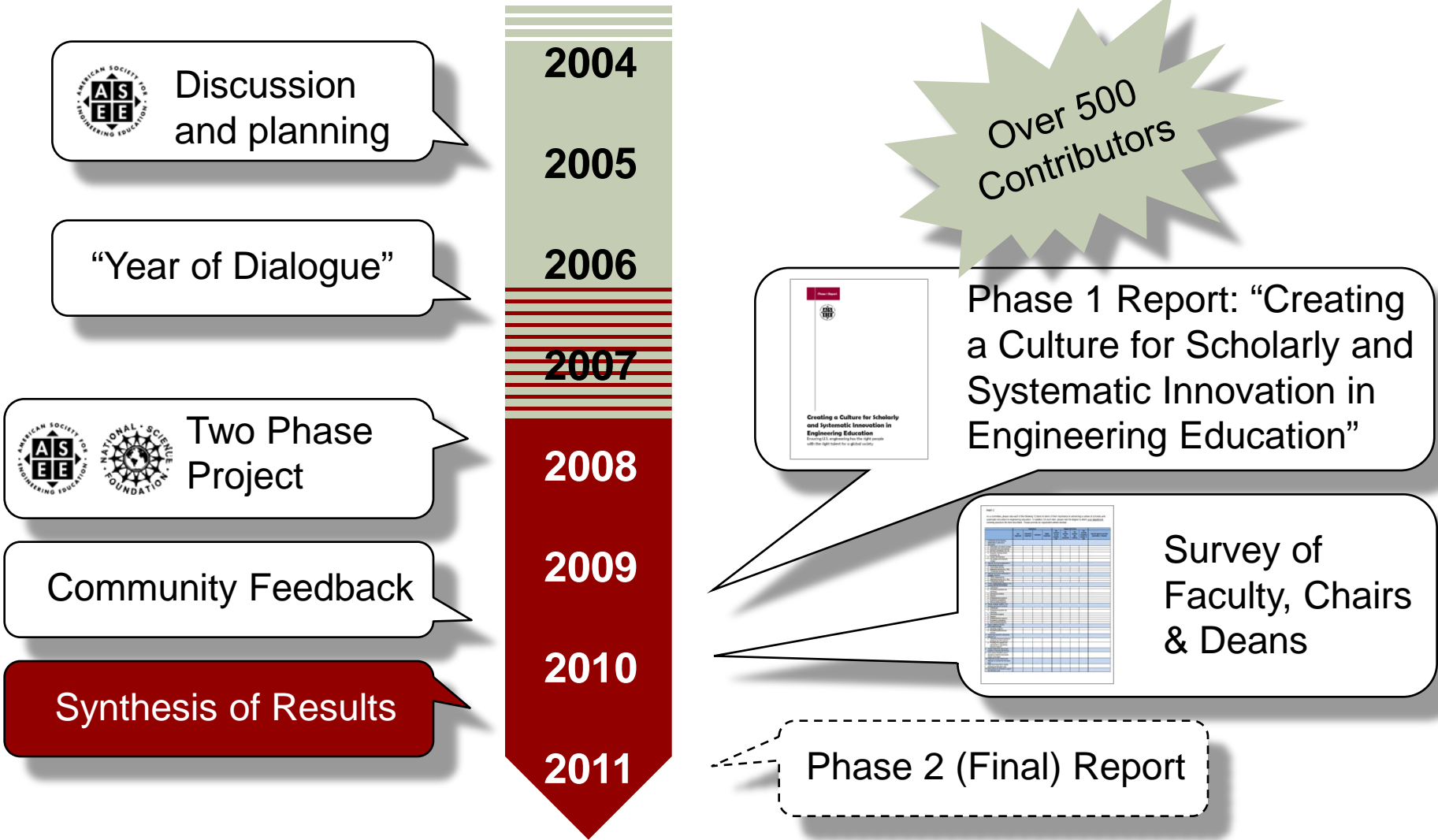
2011 ASEE Conference — Vancouver
29 June 2011

**Creating a Culture for Scholarly
and Systematic Innovation in
Engineering Education**

Ensuring U.S. engineering has the right people
with the right talent for a global society

U.S. engineering education for the 21st century

“How could/should ASEE contribute?”



Summarize key points from Phase 1

**Share some survey data
and observations from Phase 2
“The state of the culture”**

**Seek your thoughts:
where do we go from here?**

a universal and fundamental question...

...and the report's major recommendation



Q: “How can we create an environment in which many exciting, engaging, and empowering engineering educational innovations can flourish and make a significant difference in educating future engineers?”

A: “Create and sustain a vibrant engineering academic culture for scholarly and systematic educational innovation — just as we have for technological innovation — to ensure that the U.S. engineering profession has the right people with the right talent for a global society.”

who, what, and how



Most reports emphasize **“what”** needs to change (e.g., topics to cover, experiences to offer)

“Who” should drive the change and **“how”** have not been as fully discussed — but they largely determine how quickly and how well **“what”** occurs and how it is sustained

“who” should drive change?

engineering education depends on many stakeholders, but...



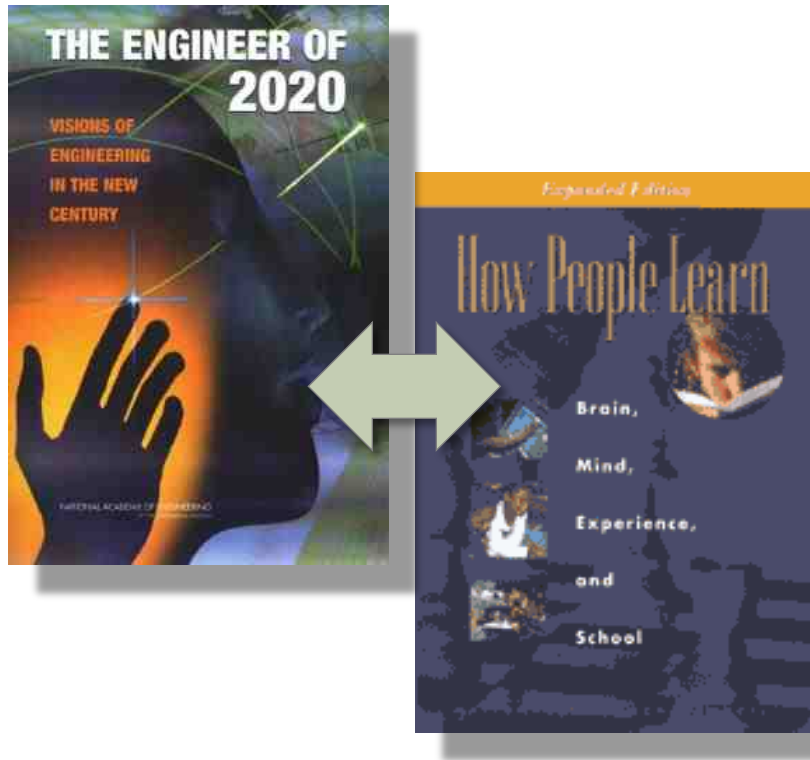
...engineering faculty and administrators are key
They determine the content of the program, decide how it is delivered, and shape the environment in which it is offered

We need to –

- strengthen career-long professional development
- create supportive environments
- form broader collaborations

“what” change is needed?

integrate what we know about engineering with what we know about learning



High-quality learning environments are the result of attention to both content and how people learn

There is ample evidence that our engineering programs need to be more –

- engaging
- relevant
- welcoming

“How” to drive change

connecting communities



Engineering education innovation depends on a **vibrant community of scholars and practitioners working in collaboration** to advance the frontiers of knowledge and practice...and it also depends on support –

- Adequate fiscal resources
- Appropriate facilities
- Reputable journals
- Highly-regarded conferences
- Prestigious recognitions

Phase 2 – feedback and a baseline study

heart of the feedback — two samples of engineering programs

Research Team

Barbara M. Olds, *Chair*
National Science Foundation

Maura J. Borrego, *Vice Chair*
Virginia Tech

Mary Besterfield-Sacre
University of Pittsburgh

Monica F. Cox
Purdue University

156 Engineering Schools invited

Random Sample

100 colleges and 200 designated departments
selected randomly

Focused Sample

73 “Top 20” colleges and ~140 undesignated
departments by selected attributes (e.g., size,
degrees, diversity)

Carnegie Classification

26 Bachelors

40 Masters

90 PhD



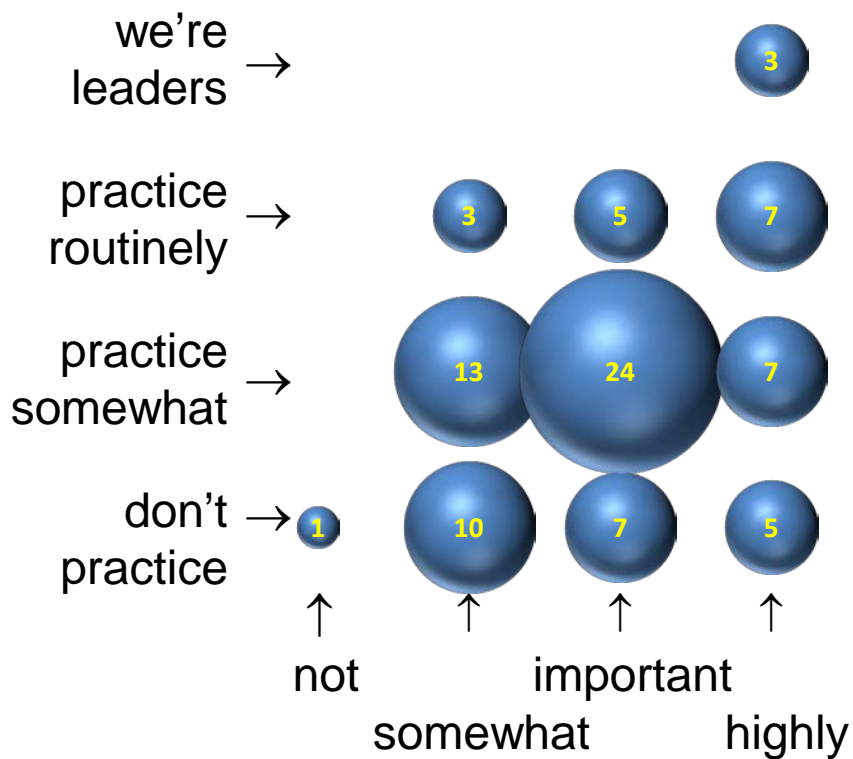
46%
Response
Rate

classifying faculty committee results

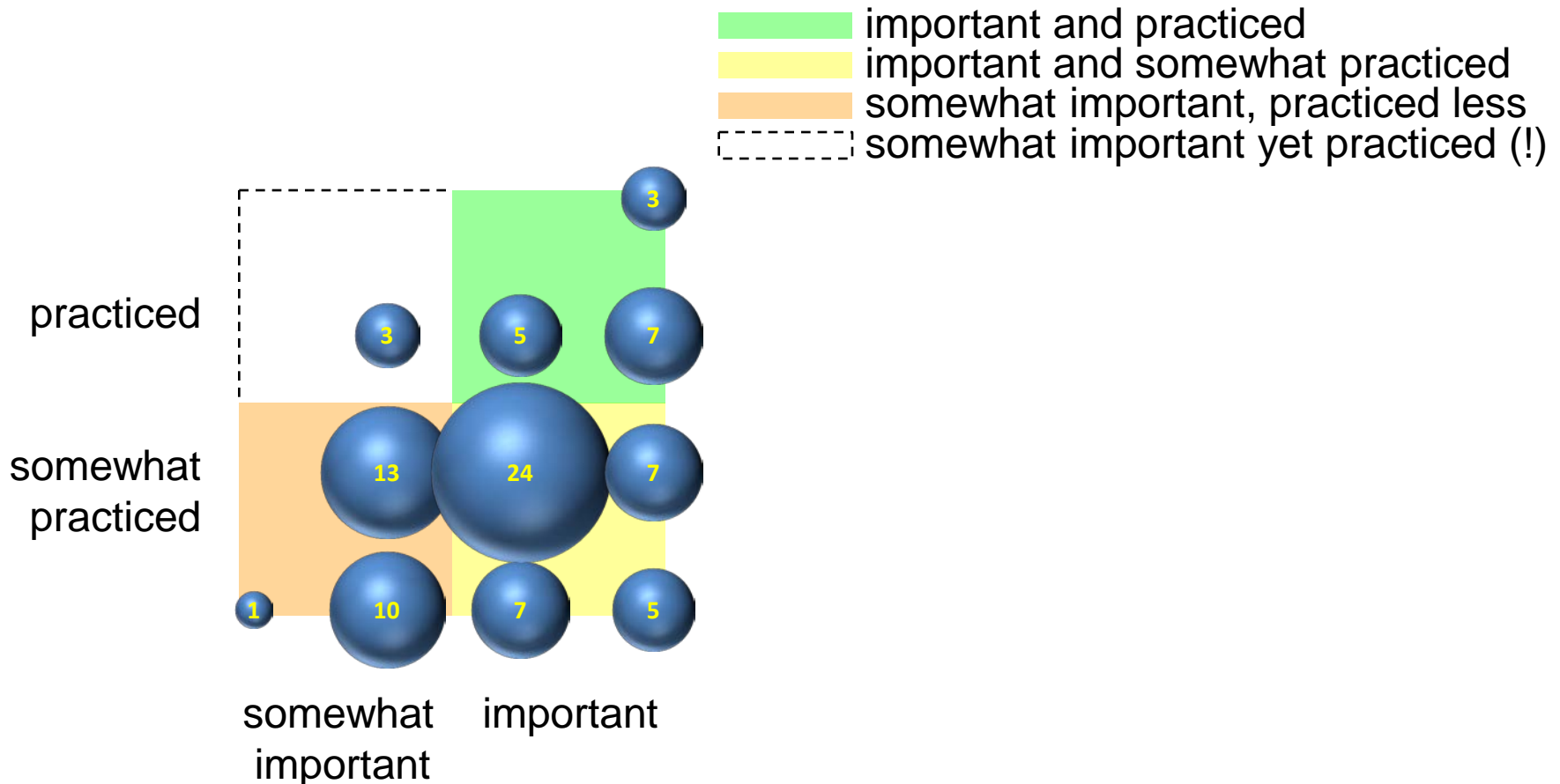
example of “check the box” statements

	Importance				Degree of Practice			
	Not Important	Somewhat Important	Important	Highly Important	We currently do not practice this	We practice this somewhat	We practice this routinely	We consider ourselves leaders in this
1. Collaborate with the following stakeholders in educational innovations:								
a. Mathematics and natural sciences								
b. Humanities and social sciences								
c. Business, architecture, law, etc.								
d. Education, learning science, psychology, etc.								
e. Industry and employers								
f. Pre-colleges and community colleges								

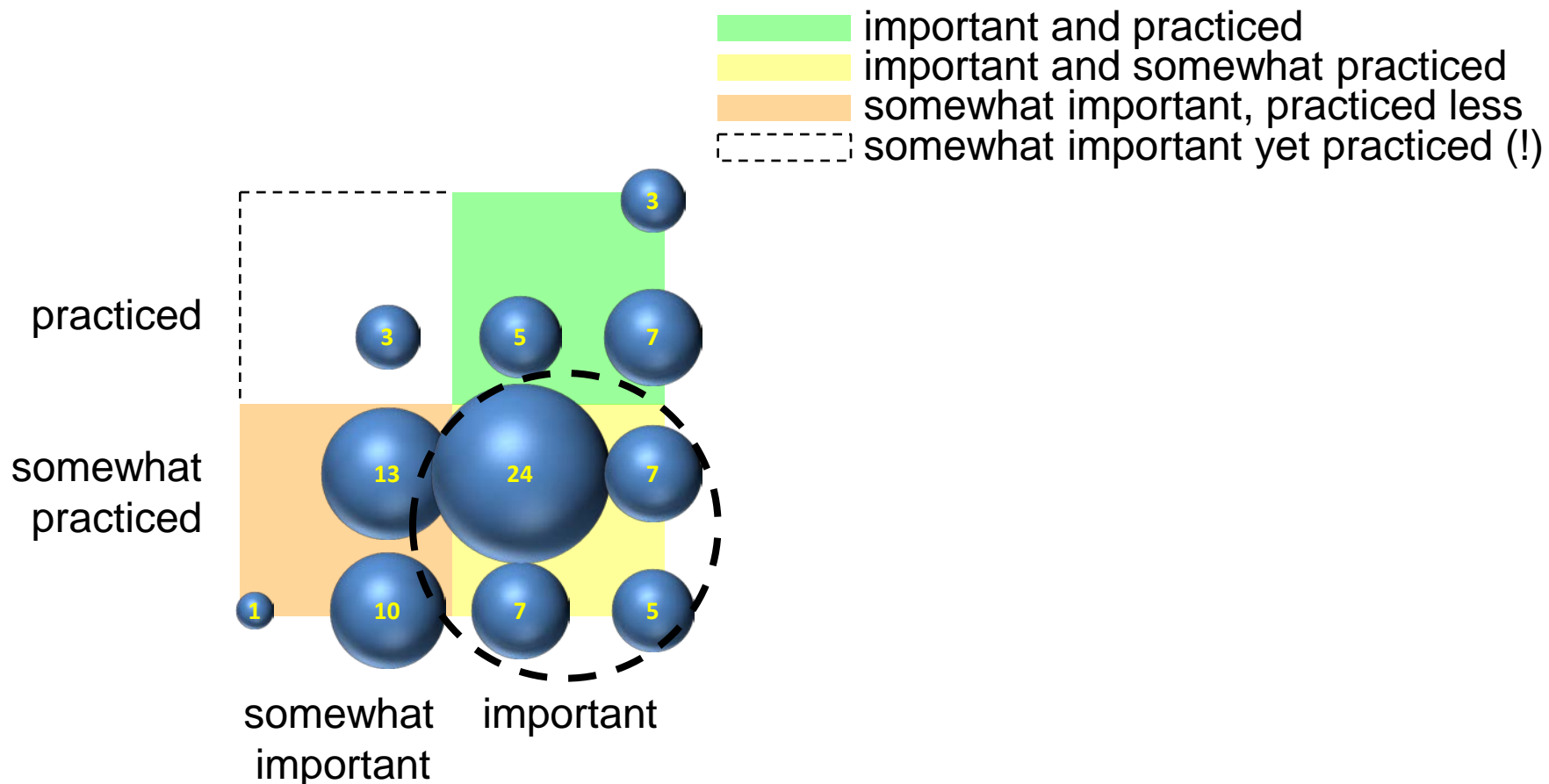
compiling the responses



four categories of responses

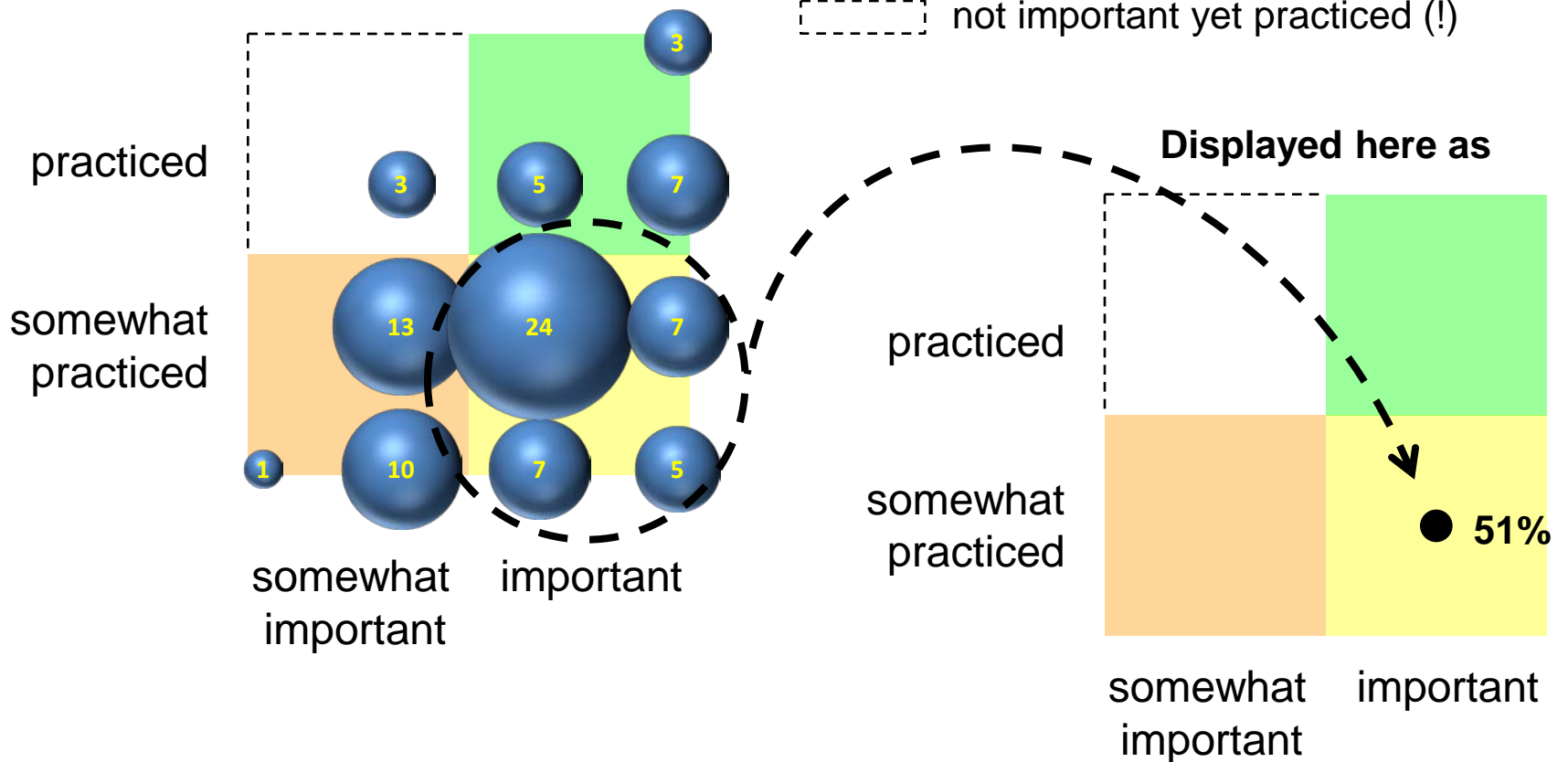


dominant response



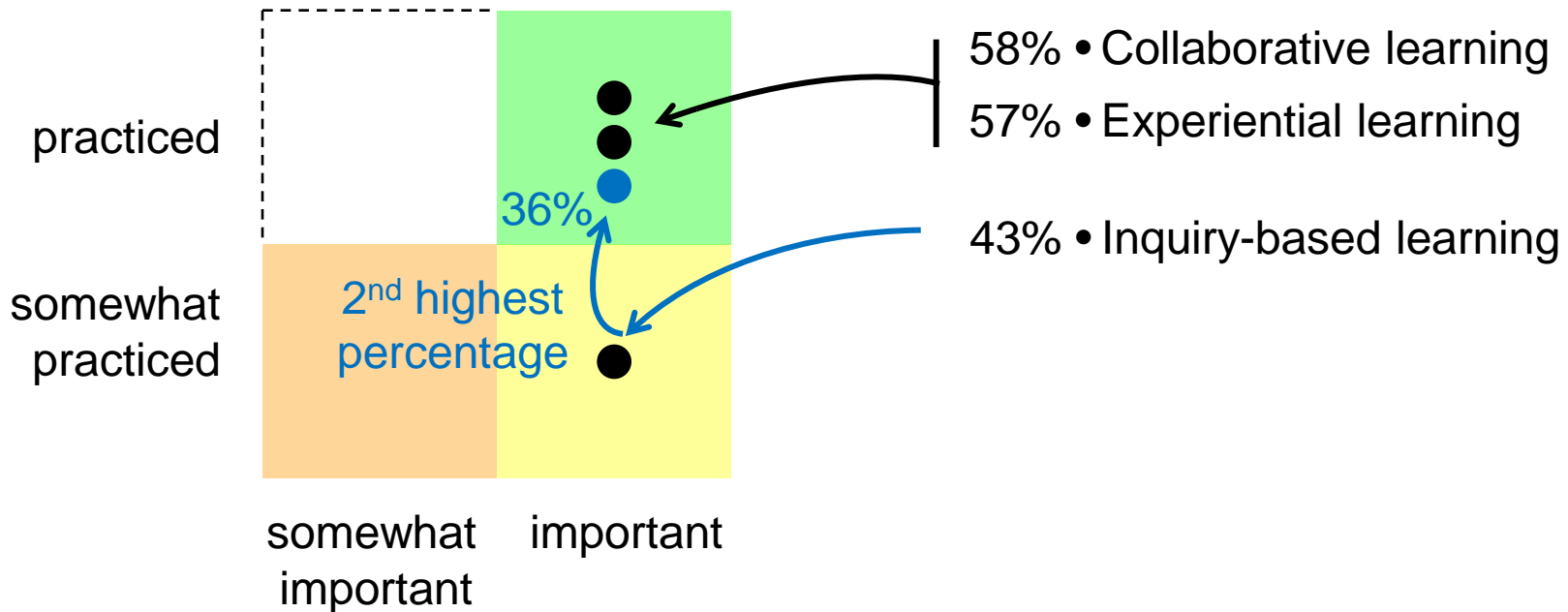
displaying dominant response

- important and practiced
- important and somewhat practiced
- not important and practiced less
- not important yet practiced (!)



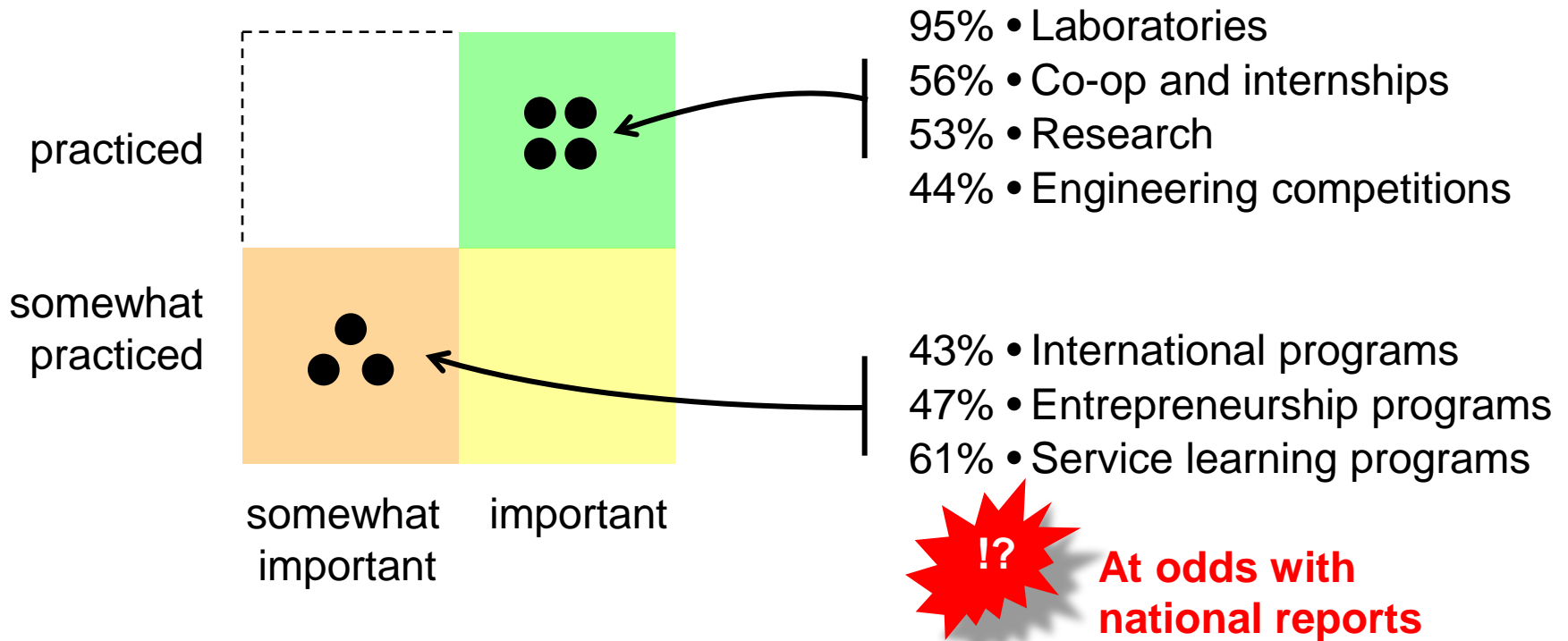
broaden pedagogical approaches to include . . .

(undergraduates, have graduates, too)



broaden pedagogical approaches to include . . .

(undergraduates, have graduates, too)



department heads and engineering deans

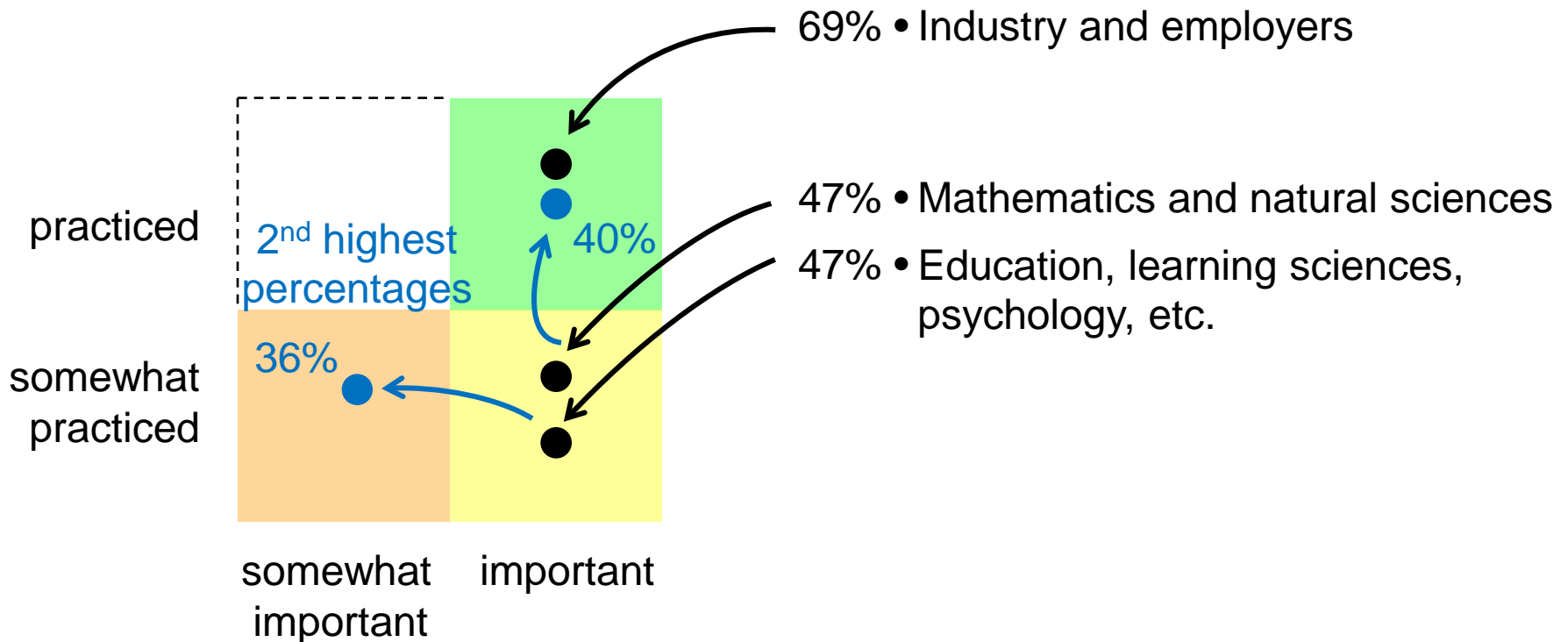
We have created highly experiential learning experiences in our labs that encourages students to work in self-directing teams. It is expensive but we believe in their long-term value. [chair]

We do well in the number of undergraduates who participate in co-op/internships, and in the number who have research experiences. [dean]

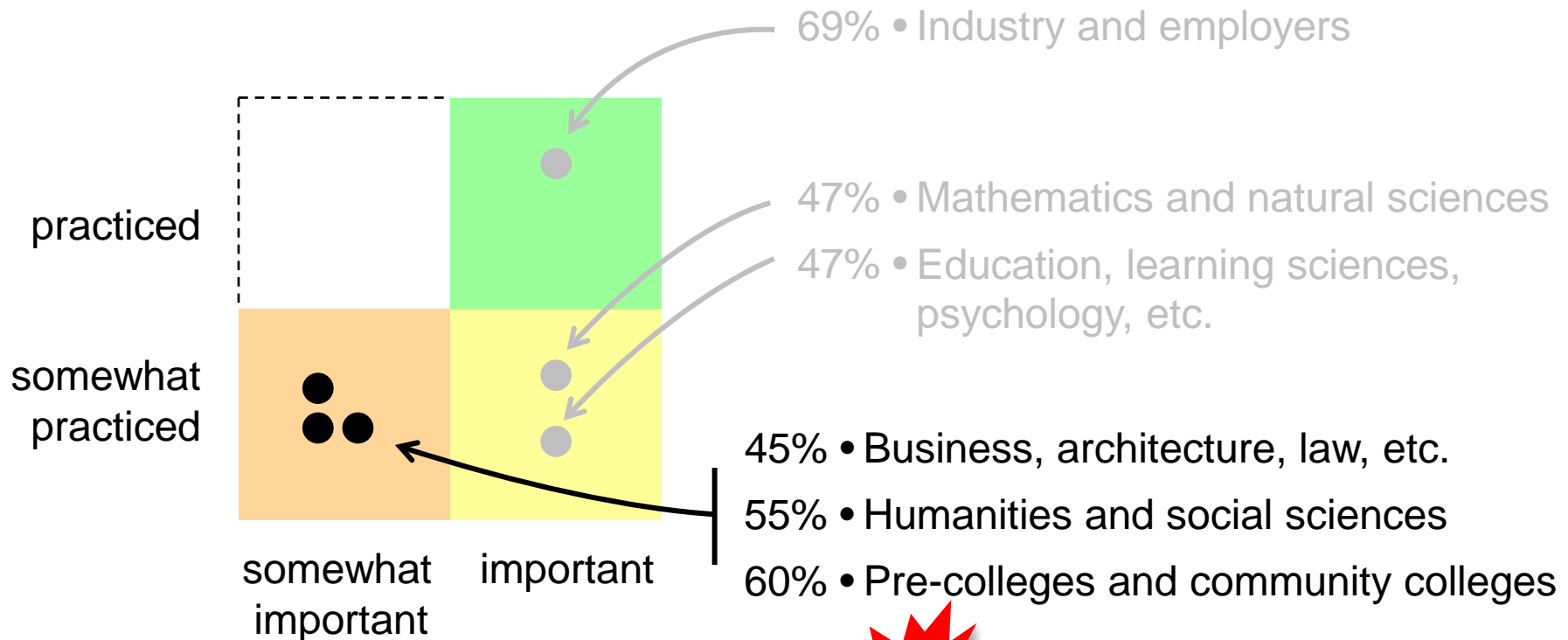
Incorporating more humanities, social sciences, the arts, and entrepreneurship in ways that do not diminish the rigor and quality of the technical component of the curriculum continues to be a challenge. [chair]

There is a portion of faculty who view “professional skills” as less valuable than “technical skills”. [chair]

form broader collaborations with . . .

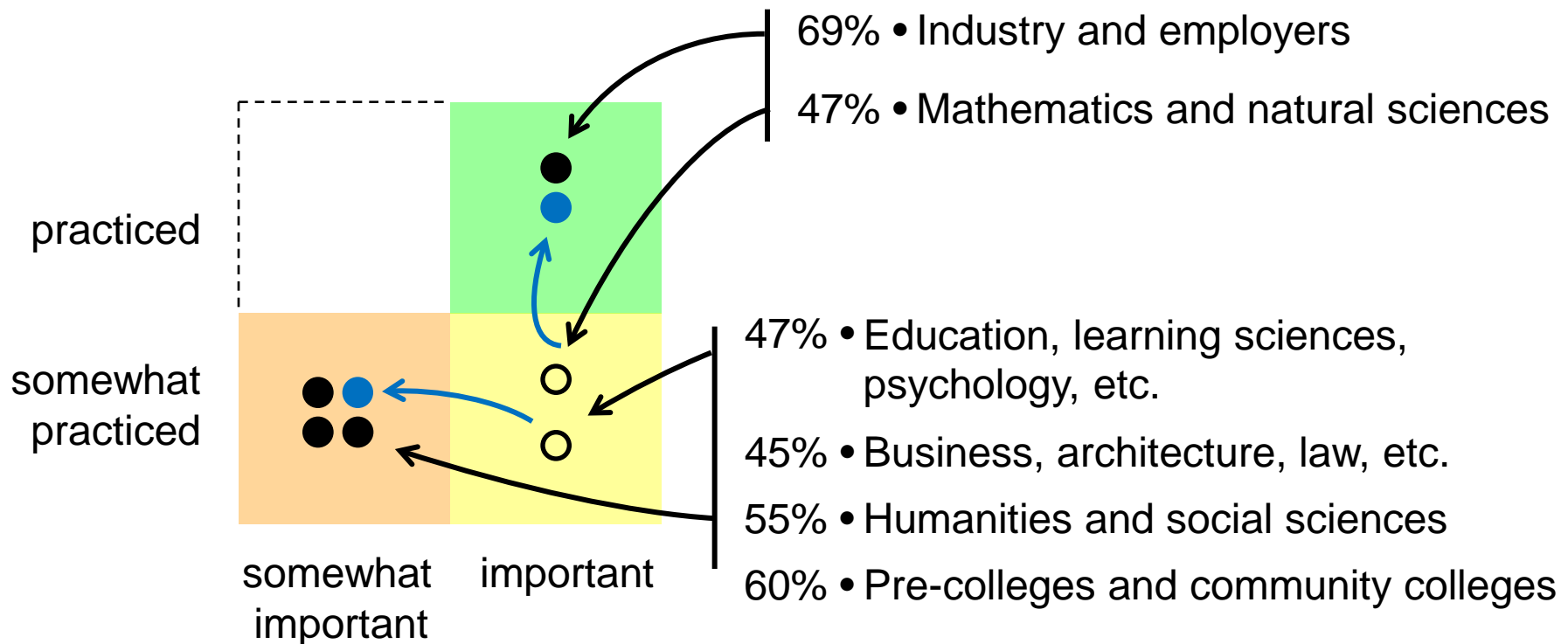


form broader collaborations with . . .



At odds with national reports

form broader collaborations with . . .



department heads and engineering deans

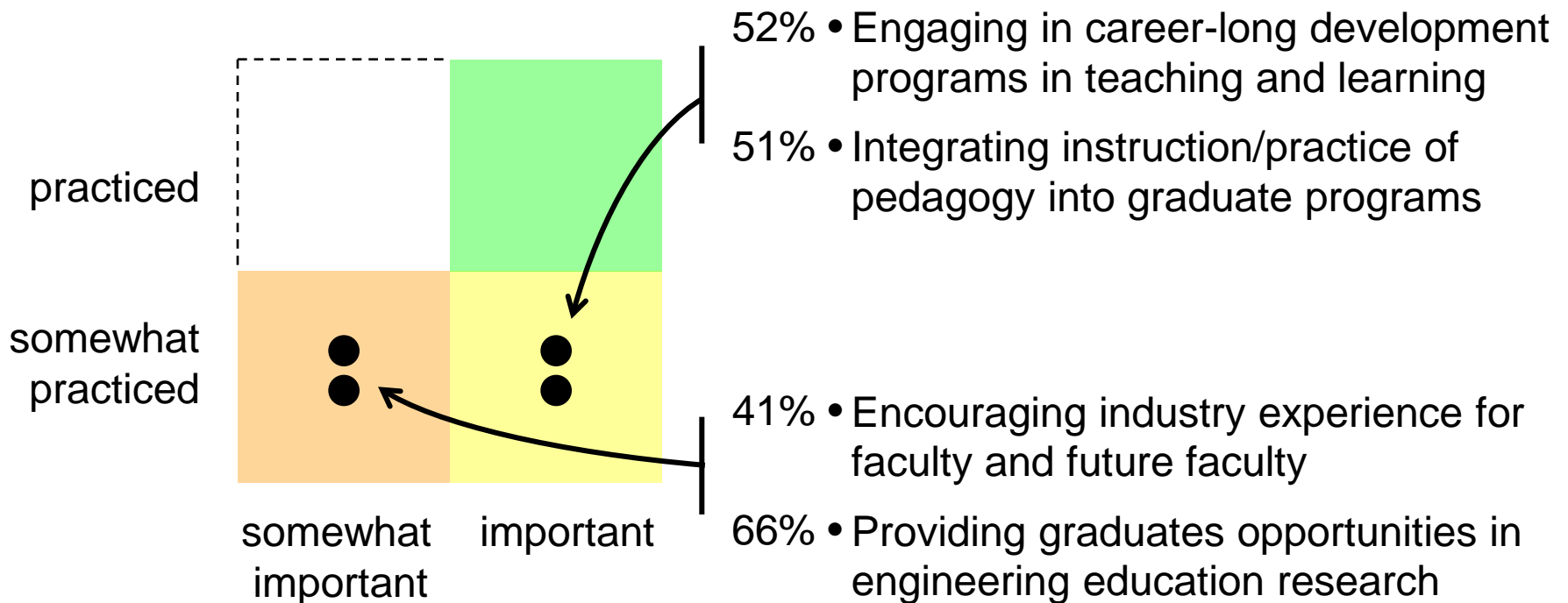
Our faculty are generally not motivated to go beyond what is necessary for ABET. [chair]

The main challenge is to leverage the existing passion for excellent teaching into a passion for engineering education innovation based on research rather than the “what seems to work” model. [chair]

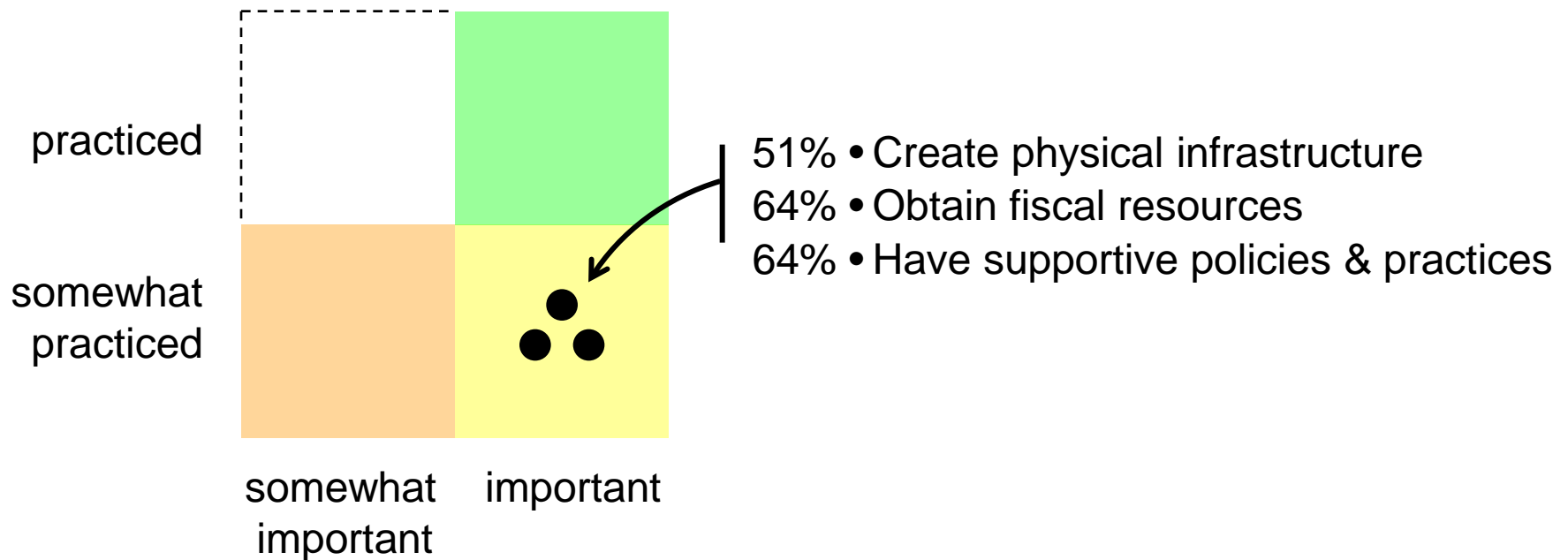
It is difficult enough to collaborate with the sciences that are closer to engineering but collaboration with the social sciences and humanities can be both frustrating and difficult. [chair]

Multi-disciplinary connections with faculty in other areas, such as psychology and education, need to be developed. This is a challenge, but a great opportunity. [chair]

preparing new and future faculty by . . .



supporting communities in innovation



department heads and engineering deans

I do not subscribe to the idea that new tools, styles or technologies should be our focus to enhancing teaching. A solid blackboard-based style will continue to be our most salient approach. [chair]

I share my faculty's discomfort in engineering education as a distinct field. We favor creating cross-cutting communities where engineering educators are supported by learning specialists. [chair]

We do not have a college of education. To compensate, our goal is to establish an endowed chair in engineering education to drive systemic change. [dean]

We are launching a program enhancement for PhD students interested in academic careers. I believe this will help bridge the schism in the community between those originally from engineering fields and those from education fields. [dean]

some observations and implications

who

There is significant support for . . .

...career-long faculty development programs

...integrating pedagogy in graduate education

...better infrastructure for education innovation

However, . . .

...the focus is largely on teaching rather also educational scholarship

...collaborations beyond engineering and industry are not a priority

...rewards, incentives, time, financial support, etc, remain impediments

some observations and implications

what

It is clear that engineering programs . . .
...value active modes of learning (to a degree)
...prefer innovating in established learning environments

However, . . .

...support is lacking for some learning approaches that also favor
making programs more engaging, relevant, and welcoming
...“buy-in” (at all levels) remains a challenge

some observations and implications

how

There is significant support for . . .

...more physical and fiscal resources and policies and practices supporting educational innovation (duh!)

But there is not a consensus about . . .

...what constitutes educational innovation: better teaching? assessment/ABET? education research? . . .

...how to go about doing it: “in-house”? in collaboration? “ad hoc”? systematically? . . .

an emerging and overarching recommendation

Improve the environment for educational innovation for engineering faculty to help them advance both their pedagogical abilities and their educational scholarship.


- Begin with their graduate education and continue throughout their careers.
- Encourage movement into new and diverse learning environments.
- Facilitate their ability to work in broader disciplinary environments and across educational system boundaries.

So where do we go from here?

1. Unstructured Q&A

2. Structured feedback

your turn

How can  and its members help address these issues?

- 1) Promote career-long faculty development beginning with graduate education?
- 2) Encourage movement into new and diverse learning environments?
- 3) Facilitate broader disciplinary and educational system collaborations?

“think - pair - share”

Think (5 minutes)

- Pick one (or more) questions
- Think for a few moments, then write your thoughts on the card


Pair (10 minutes)

- Turn to your neighbor, introduce yourself
- Talk about your responses

Share

- As a group, we'll share responses
- Turn in your cards to be part of the Phase 2 report

your turn

How can  and its members help address these issues?

- 1) Promote career-long faculty development beginning with graduate education?
- 2) Encourage movement into new and diverse learning environments?
- 3) Facilitate broader disciplinary and educational system collaborations?

Thank you!
Don't forget
your cards!!!

www.asee.org > Member Resources > Reports

or

http://www.asee.org/about-us/the-organization/advisory-committees/CCSSIE/CCSSIE_Phase1Report_June2009.pdf

(direct link to report)

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