Leaving Lecturing for Active Learning: Faculty Experiences at Three Medical Schools

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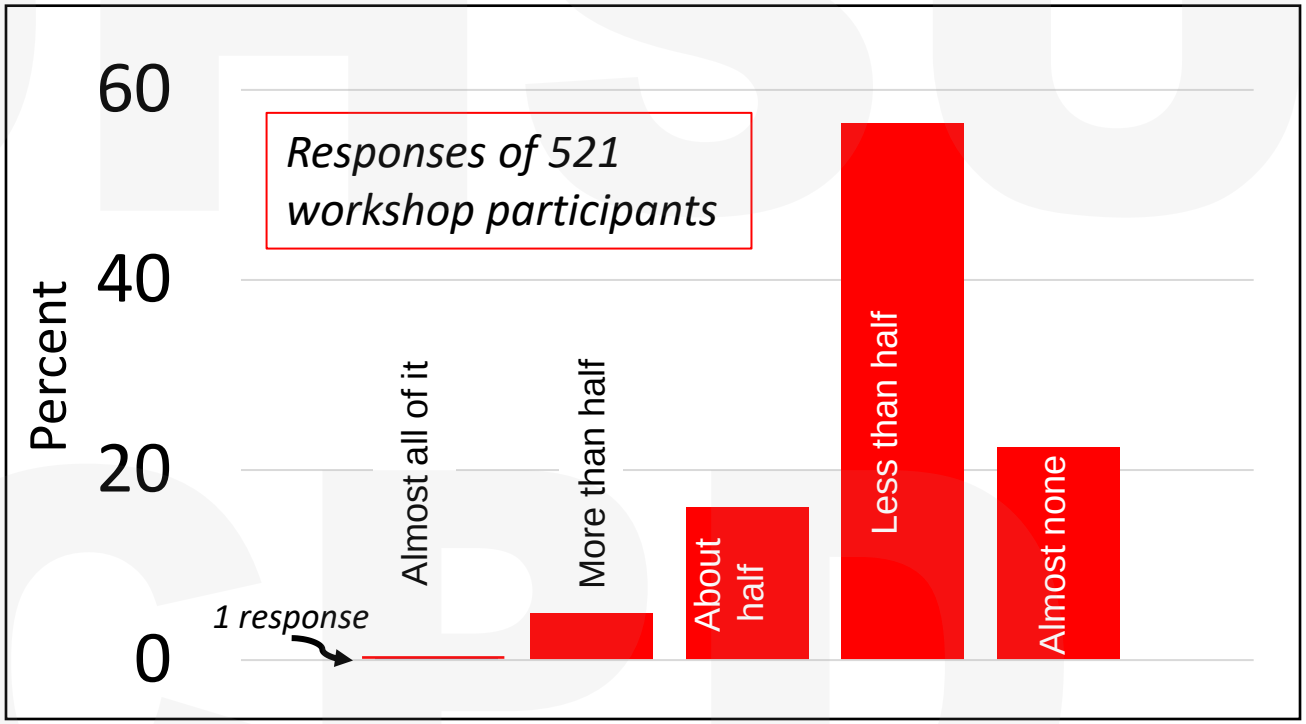
(no conflicts to disclose)

How much information do you think you can recall two days after attending a typical one-hour lecture on a topic that is mostly new to you?

A. Almost all of it
B. More than half
C. About half
D. Less than half
E. Almost none of it

UNM SOM teaching-workshop participants acknowledge that learning from lectures is minimal

How much information do you think you can recall two days after attending a typical one-hour lecture on a topic that is mostly new to you?

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Who is the Adult Learner?

The Roadmap:

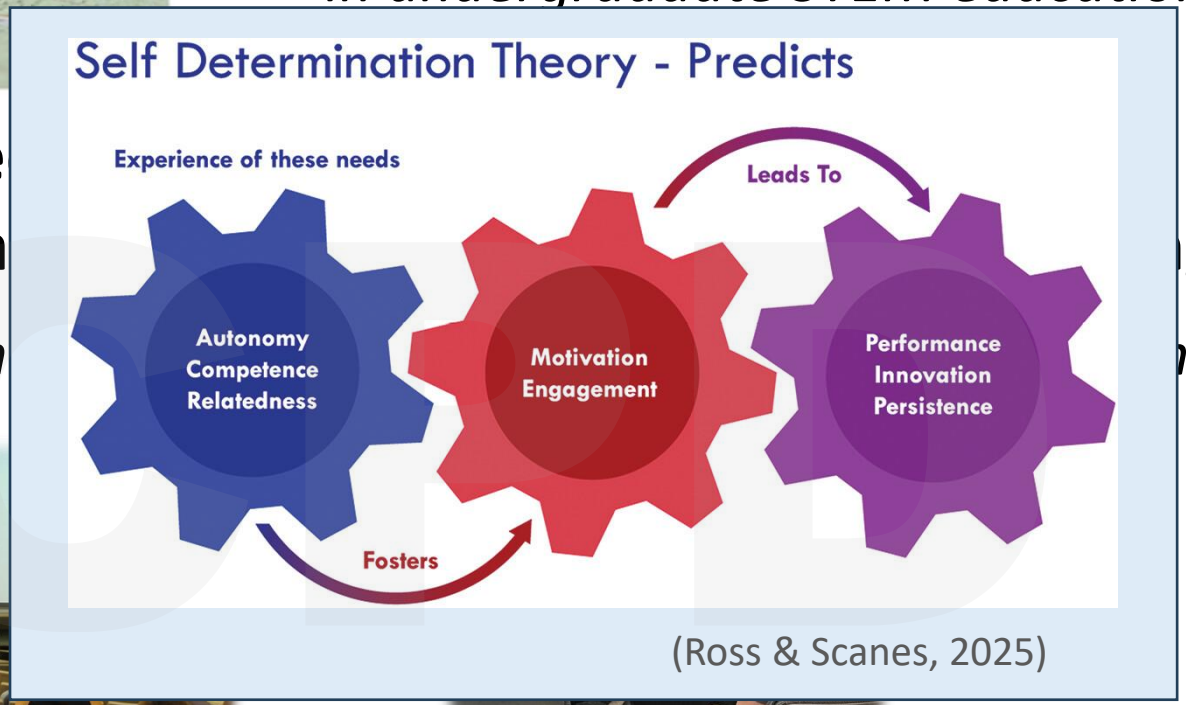
Why is learning through interactive engagement of learners viewed as superior to learning from lecture from an expert?

Insights from three decades of research in undergraduate STEM education

How do me

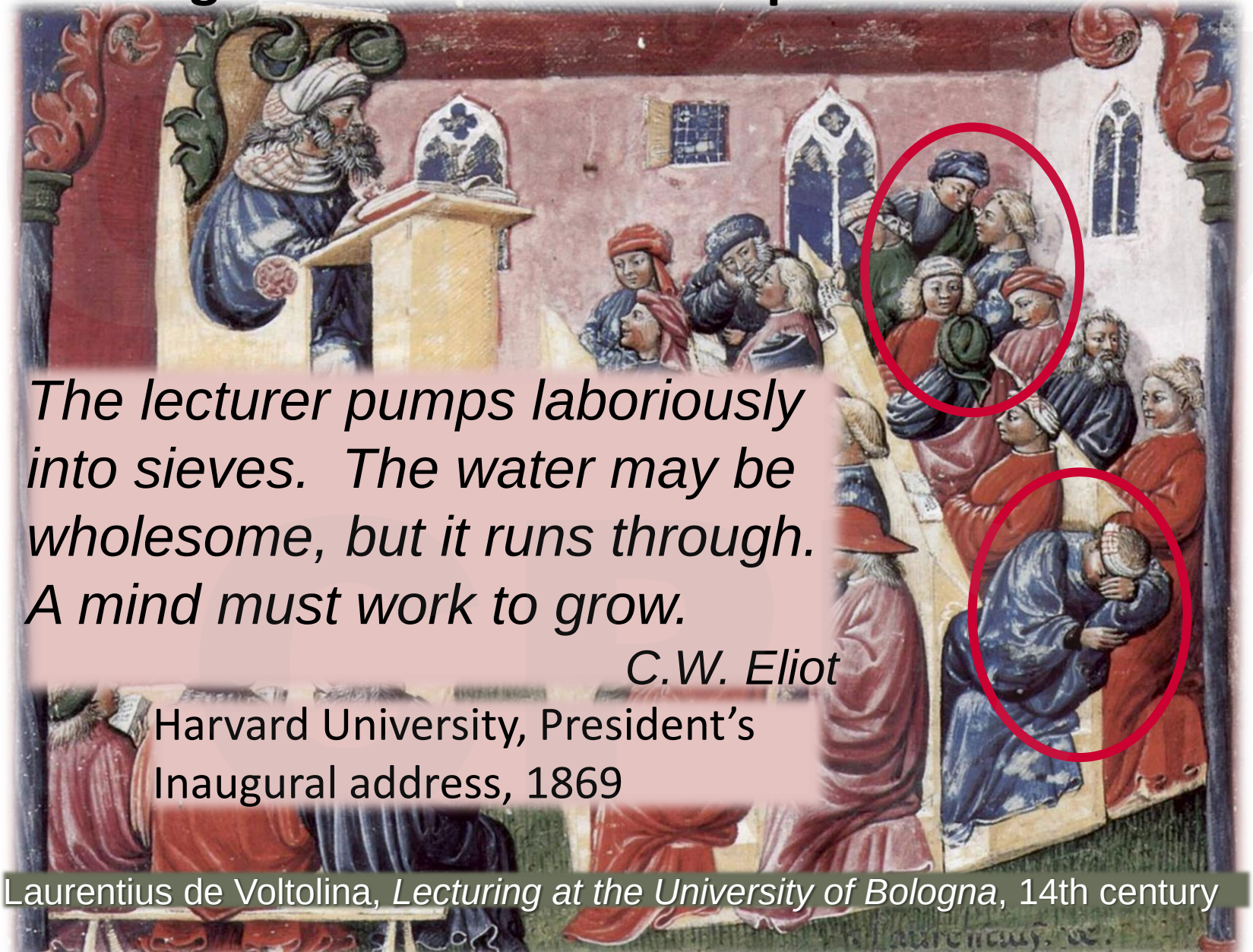
institutiona **g?**

Insigh *hools*



(Ross & Scanes, 2025)

Learning as solitary experience
Knowledge transmitted from expert to learner



The lecturer pumps laboriously into sieves. The water may be wholesome, but it runs through. A mind must work to grow.

C.W. Eliot

Harvard University, President's Inaugural address, 1869

Laurentius de Voltolina, *Lecturing at the University of Bologna*, 14th century

Learning as a social experience
Knowledge as constructed, not simply delivered

Raphael, *School of Athens*

Active learning increases student performance in science, engineering, and mathematics

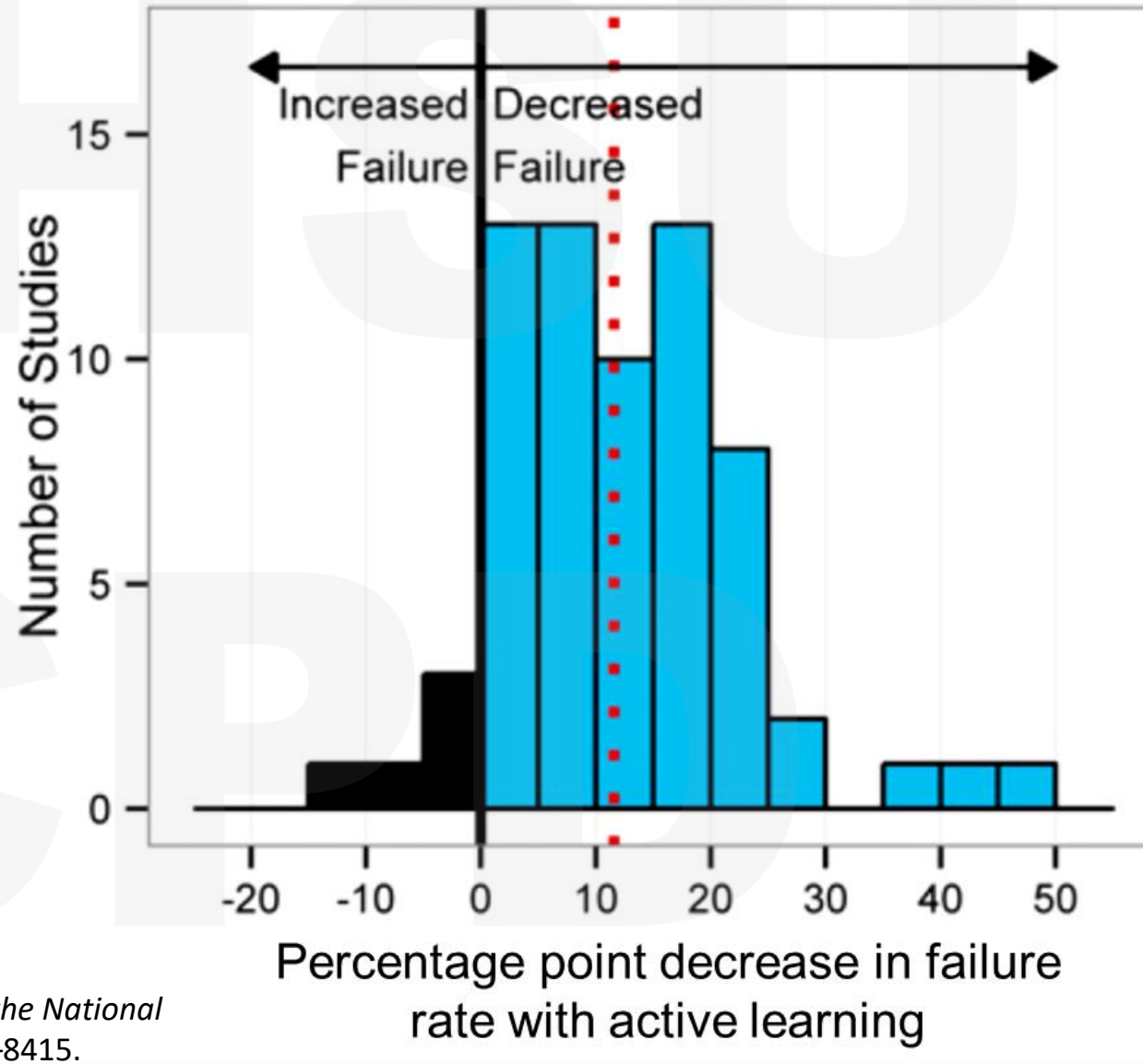
Scott Freeman[a,1], Sarah L. Eddy[a], Miles McDono
and Mary Pat Wenderoth[a]

[a]Department of Biology, University of Washington, Seattle,

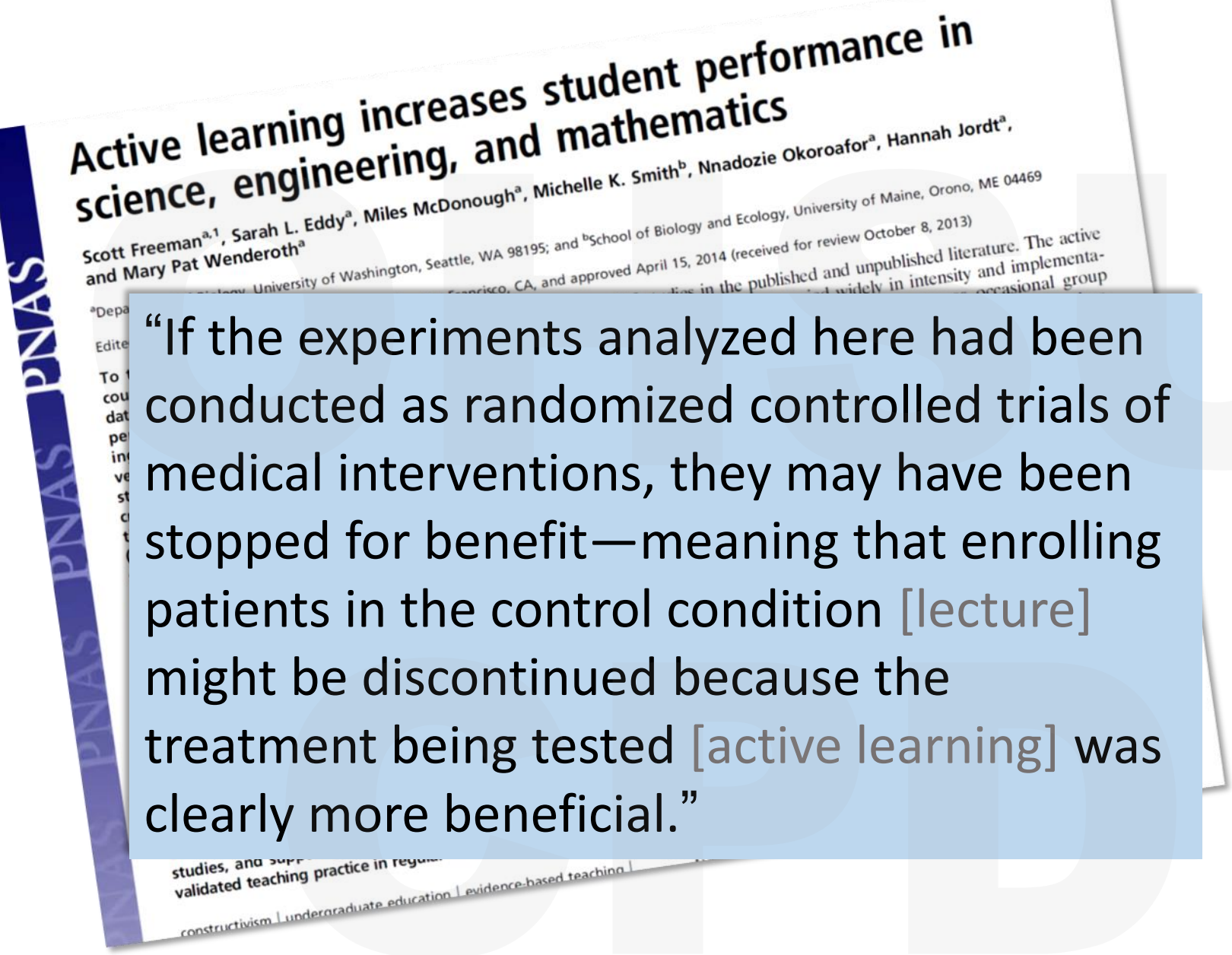
Edited* by Bruce Alberts, University of California, San Franc

To test the hypothesis that lecturing maximizes course performance, we metaanalyzed 225 studies data on examination scores or failure rates when com performance in undergraduate science, technol ing, and mathematics (STEM) courses under trad versus active learning. The effect sizes indicate t student performance on examinations and concep creased by 0.47 SDs under active learning (n = that the odds ratio for failing was 1.95 under tra (n = 67 studies). These results indicate that ave scores improved by about 6% in active learning students in classes with traditional lecturing w likely to fail than were students in classes wi Heterogeneity analyses indicated that both the STEM disciplines, that active learning incre cept inventories more than on course examin tive learning appears effective across all class greatest effects are in small ($n \leq 50$) classes. and fail-safe n calculations suggest that the publication bias. The results also appear rob methodological rigor of the included studies of controls over student quality and instruc largest and most comprehensive metaana STEM education published to date. The resul the continued use of traditional lecturing studies, and support active learning as t validated teaching practice in regular class

constructivism | undergraduate education | ev



Freeman, S. *et al.* (2014) *Proceedings of the National Academy of Sciences*, *111*(23), 8410–8415.



"If the experiments analyzed here had been conducted as randomized controlled trials of medical interventions, they may have been stopped for benefit—meaning that enrolling patients in the control condition [lecture] might be discontinued because the treatment being tested [active learning] was clearly more beneficial."

Freeman, S. *et al.* (2014) *Proceedings of the National Academy of Sciences*, *111*(23), 8410–8415.

"…any college or university that is teaching its STEM courses by traditional lectures is providing an inferior education to its students."

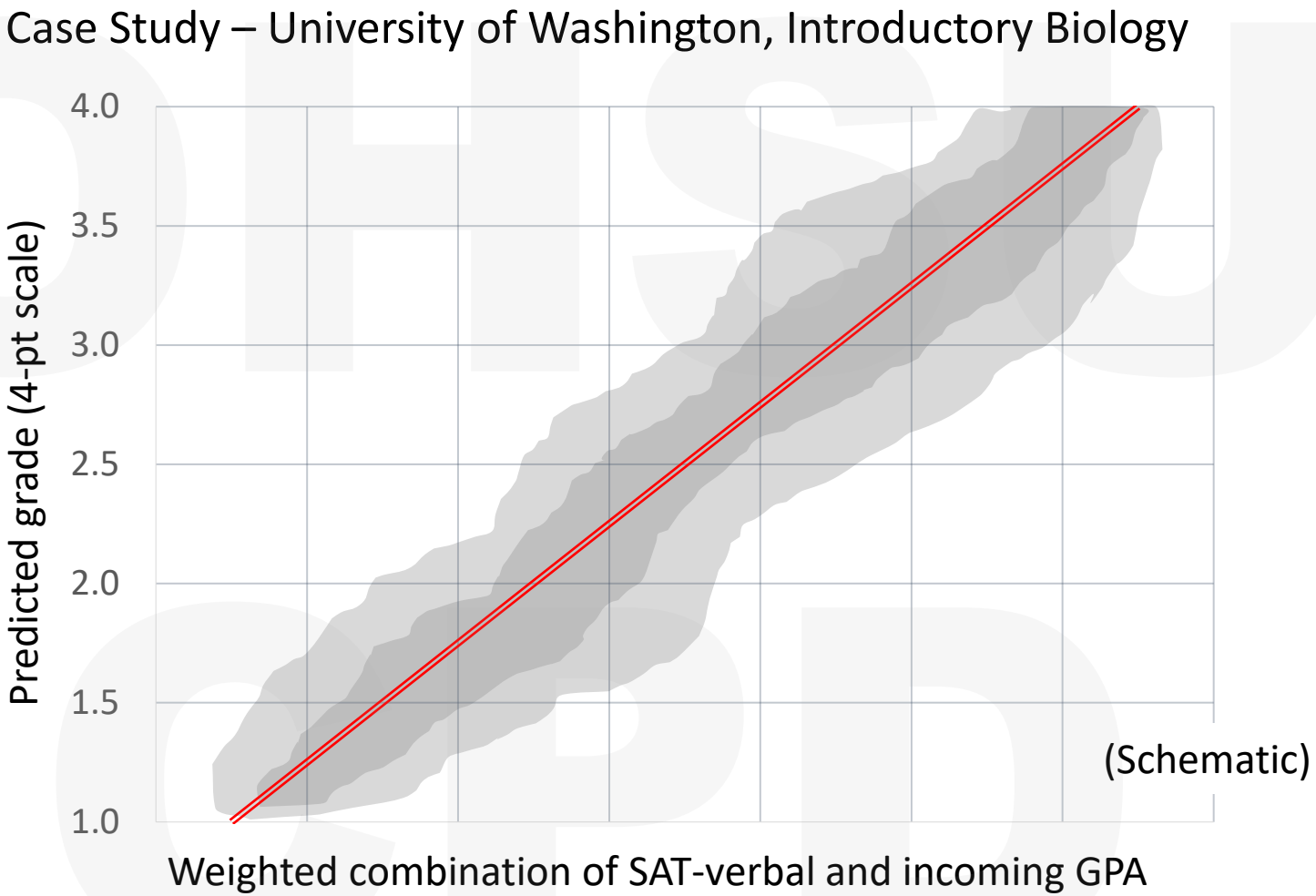
Carl Wieman, Nobel Laureate, Physics
Proceedings of the National Academy of Sciences, 2014

Case Study:
University of Washington, Introductory Biology

Scott Freeman

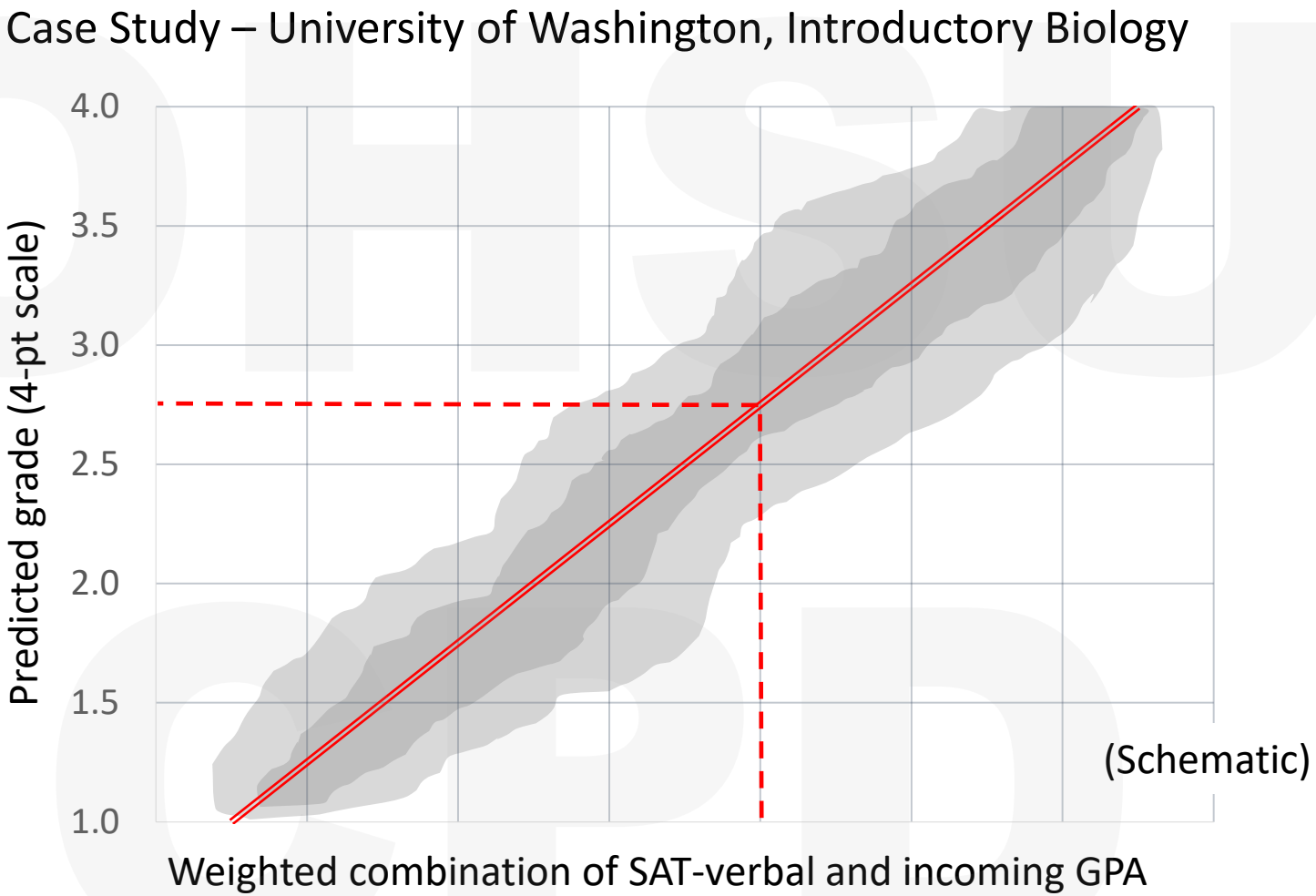
Educational Opportunity Program (EOP) students are from educationally or economically disadvantaged backgrounds; most are first generation to college; 76% are from under-represented minorities

Student preparation is a predictor of course grade



Haak et al., 2011, Increased Structure and active learning reduce the achievement gap in introductory biology, *Science*, 332 (6034): 1213

Student preparation is a predictor of course grade



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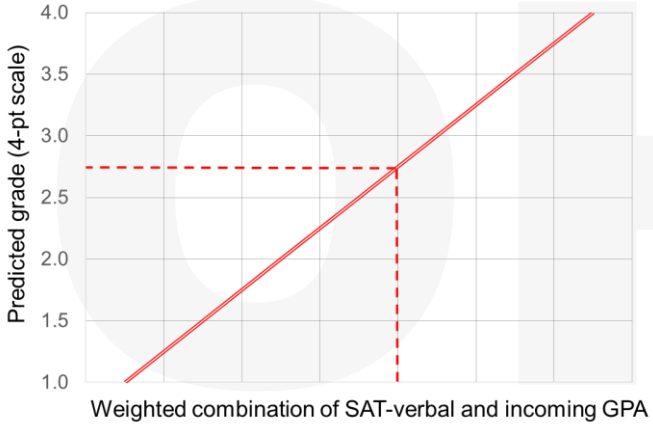
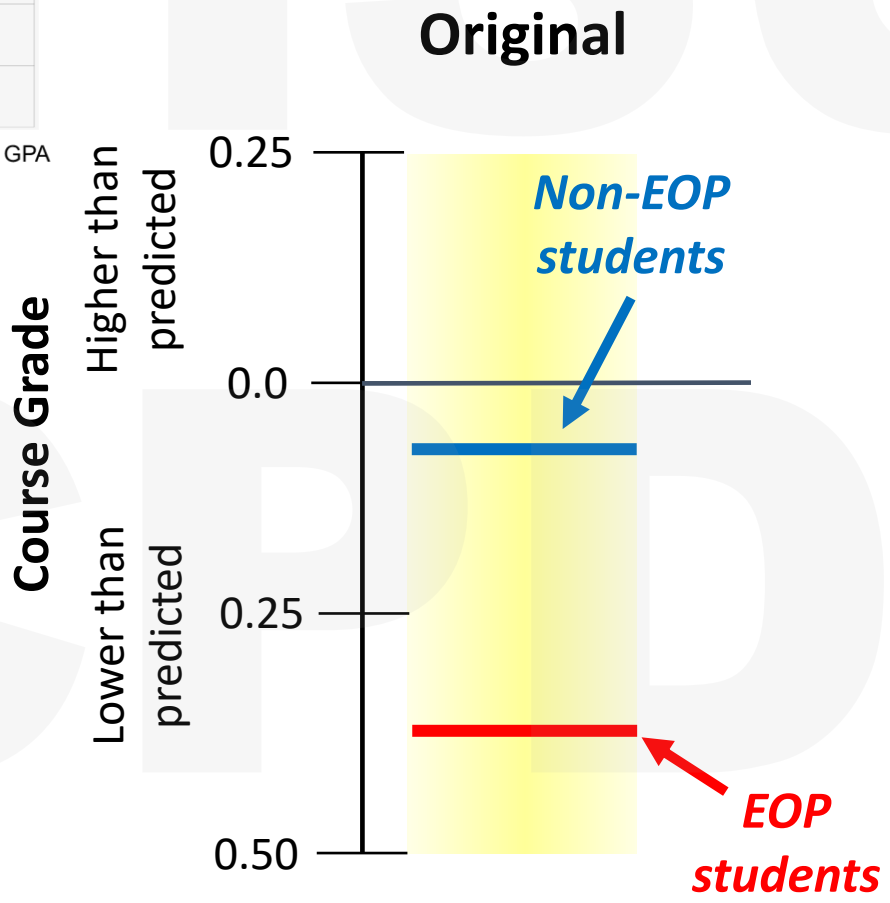
Traditional approach discriminates students with comparable preparation





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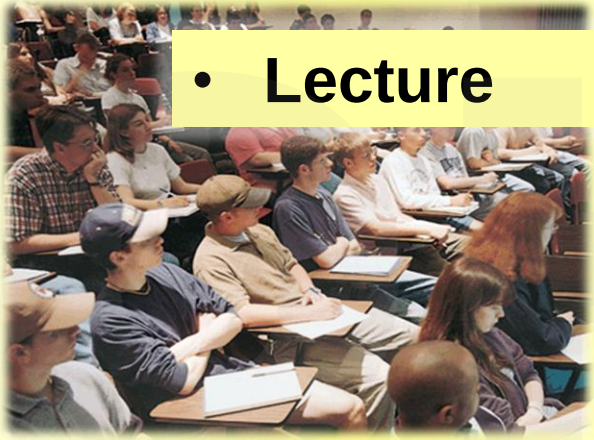
Original



- Lecture

- Questions to class

- Clicker quizzes

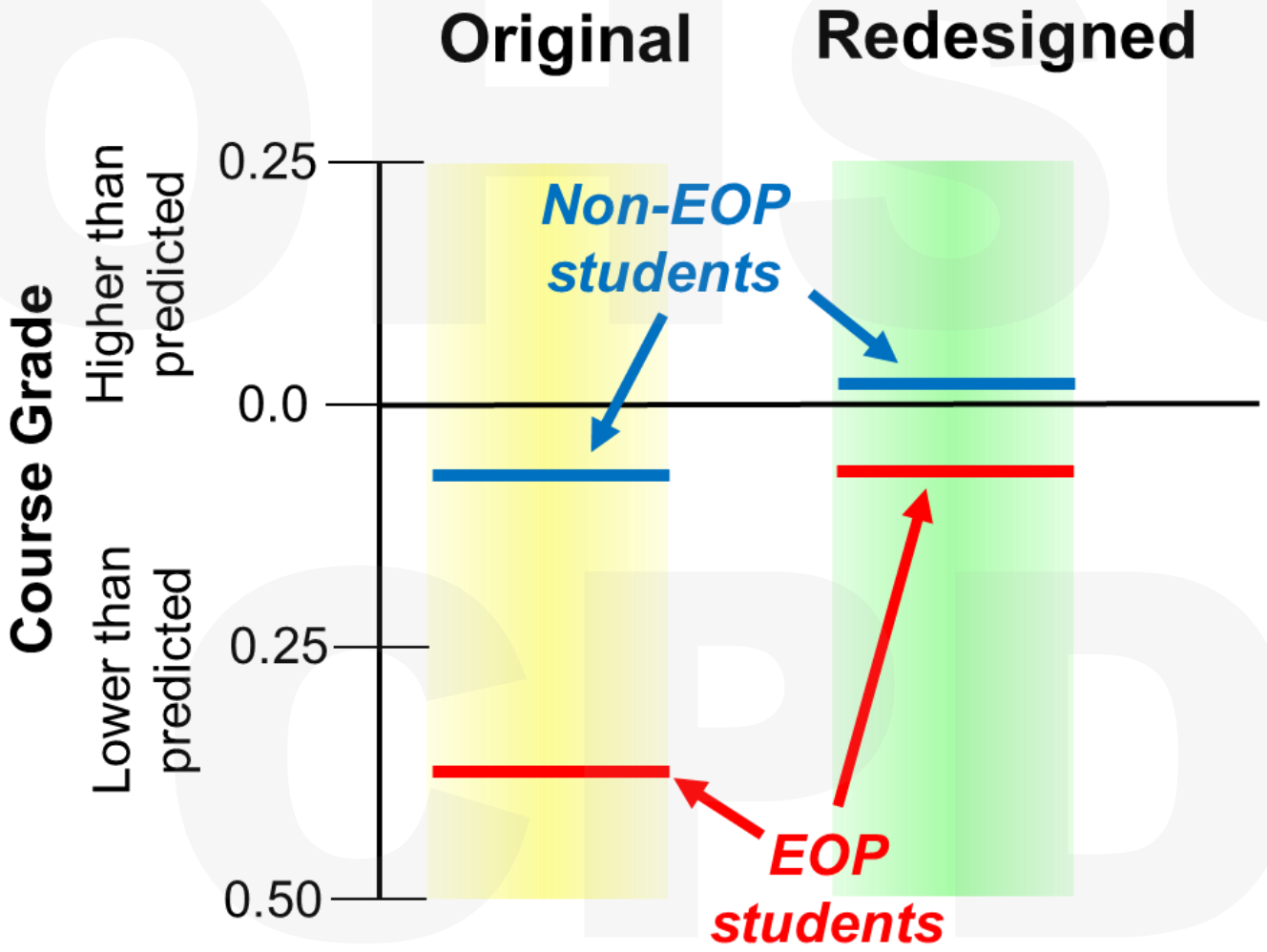
Redesigned

- Discussion
- Small-group work

- Peer instruction with clickers

- Pre-class preparation

Course redesign increases student learning and decreases success gap in majors' biology



Haak et al., 2011, Increased structure and active learning reduce the achievement gap in introductory biology, *Science*, 332 (6034): 1213

The NEW ENGLAND JOURNAL of MEDICINE

Lecture Halls without Lectures — A Proposal for Medical Education

Authors: Charles G. Prober, M.D., and Chip Heath, Ph.D.

Published May 3, 2012 | N Engl J Med 2012;366:1657-1659 | DOI: 10.1056/NEJMp1202451 | VOL. 366 NO. 18

npr Shots HEALTH NEWS FROM NPR

Vermont Medical School Says Goodbye To Lectures

AUGUST 3, 2017

HEARD ON ALL THINGS CONSIDERED

ACADEMIC MEDICINE
Journal of the Association of American Medical Colleges

Experience of Medical School Faculty in the Transition from Lectures to Active Learning

UTHealth Houston McGovern Medical School

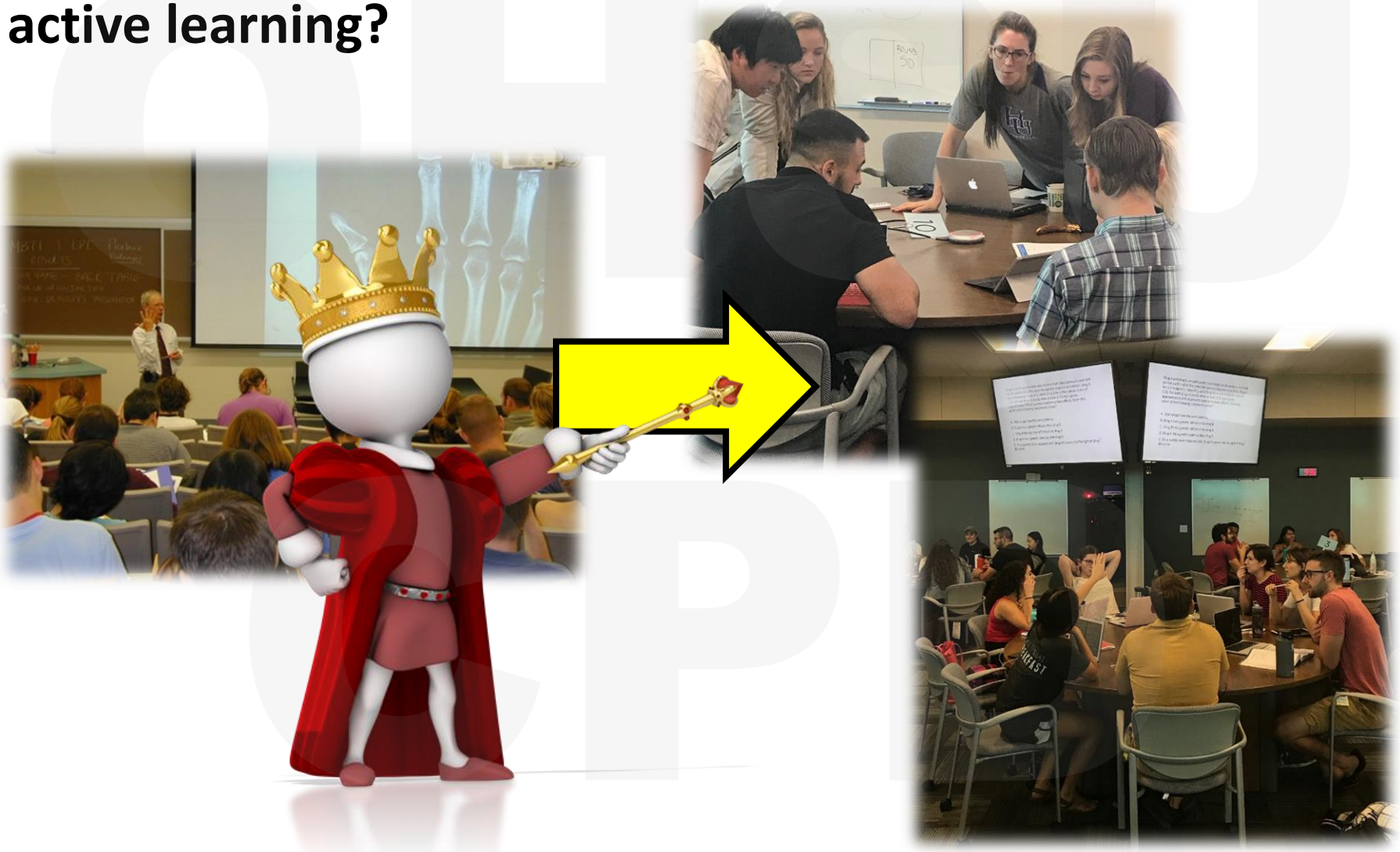
The University of Vermont LARNER COLLEGE OF MEDICINE

UNM SCHOOL OF MEDICINE

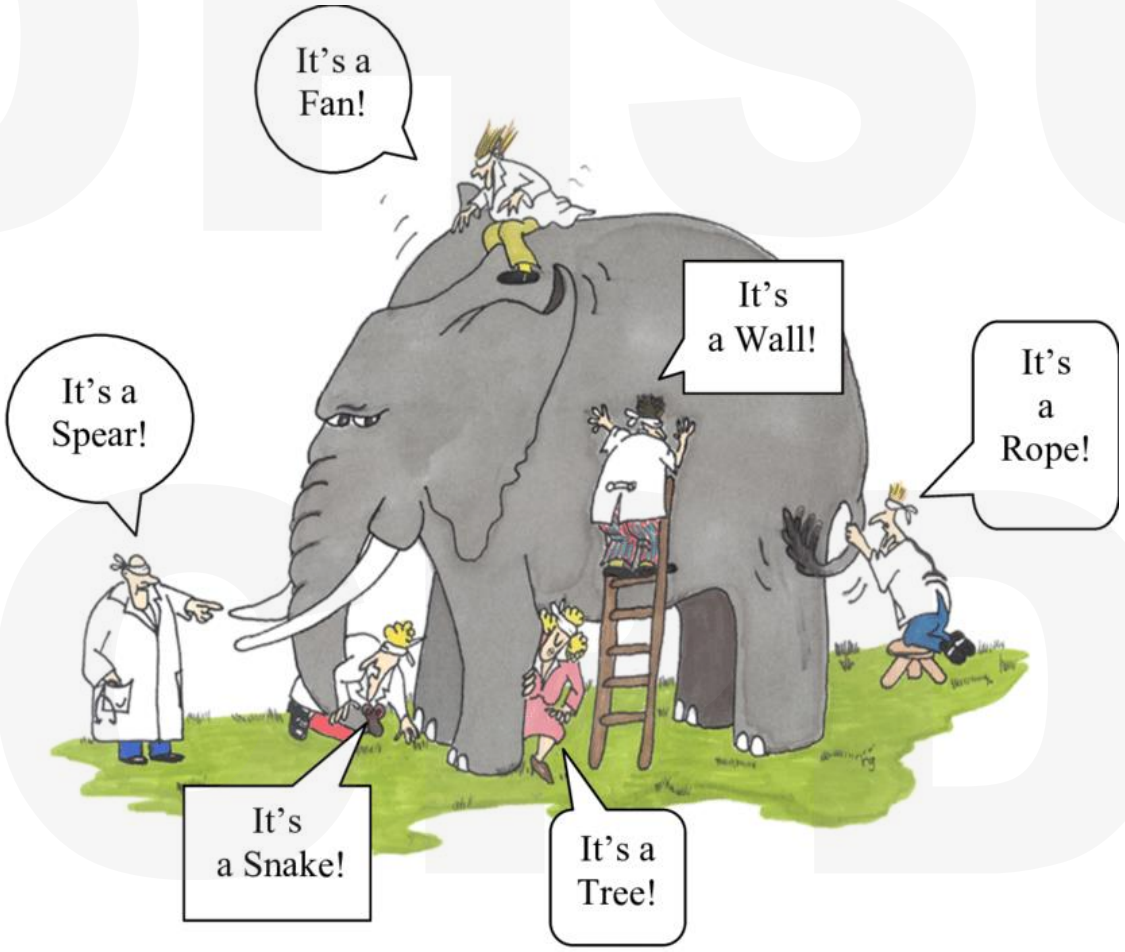
Kathryn Huggett
Larner College of Medicine
University of Vermont

Peggy Hsieh & Allison Ownby
McGovern Medical School at
UTHealth Houston

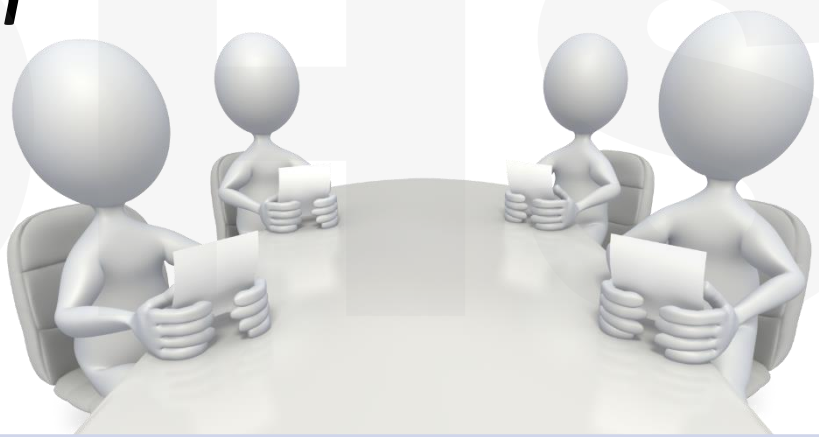
Research question: How do medical school faculty experience changing from lecturing to active learning?



Phenomenography seeks to know the full variability of experience from interviews rather than to define "the elephant".



The research pathway culminates in an *outcome space* of relational *categories of phenomenon description*



Interviews (15)

Identify categories of description

Categorize utterances

Develop outcome space

UTHealth Houston McGovern Medical School

The University of Vermont LARNER COLLEGE OF MEDICINE

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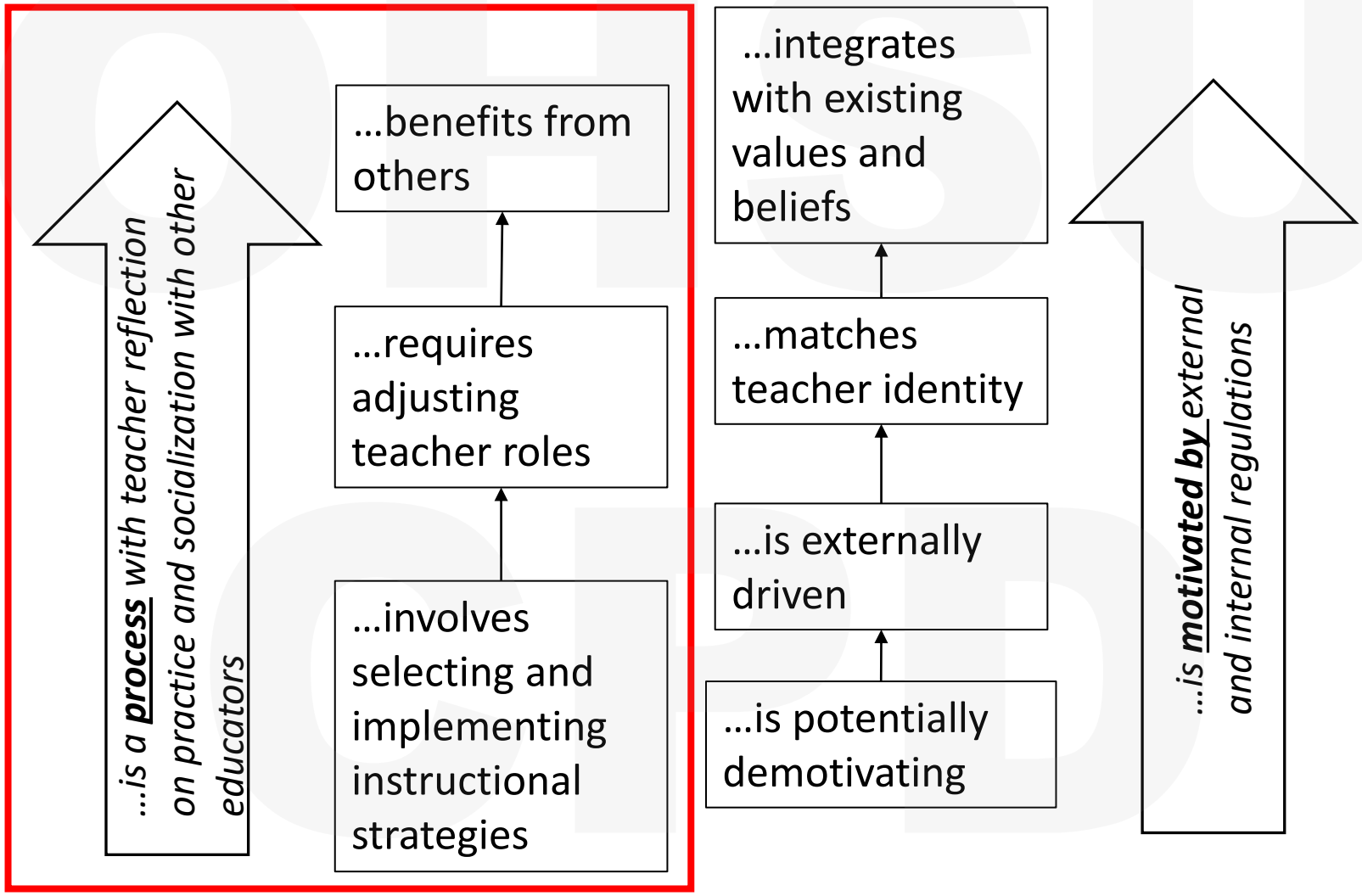
The change in instructional focus from lecture-based to active learning…



The change in instructional focus involves selecting and implementing instructional strategies

- Pre-work for active class participation

> "So, they watch this video ahead of time. And then they come to class and then I give them a whole series of questions that we have to work through that are based on that material."

The change in instructional focus involves selecting and implementing instructional strategies

- Growing recognition among faculty of the importance of “social learning.”
- Adopted teaching methods characterized by a higher degree of organization such as case-based learning (CBL), team-based learning (TBL), and peer instruction (PI).

"We emphasized the aspects of social learning and one of the ulterior motives behind this is to sort of alleviate this notion - to address the issue - of the empty classrooms syndrome. I give them several, what I consider difficult Poll Everywhere questions… and then we have a spirited debate about competing answers. "

The change in instructional focus requires adjusting teacher roles

- Facilitating knowledge creation vs delivering knowledge

"Instead of confidently delivering a prepared lecture, I had to be able to spontaneously respond to the questions and problems that arose during the TBL session. Kind of scary at first but eventually it became fun and exciting."

The change in instructional focus requires adjusting teacher roles

- Curators of knowledge:

"I would make the pre-class summary notes, I would curate the videos, I would edit the videos myself, …"

The change in instructional focus benefits from others

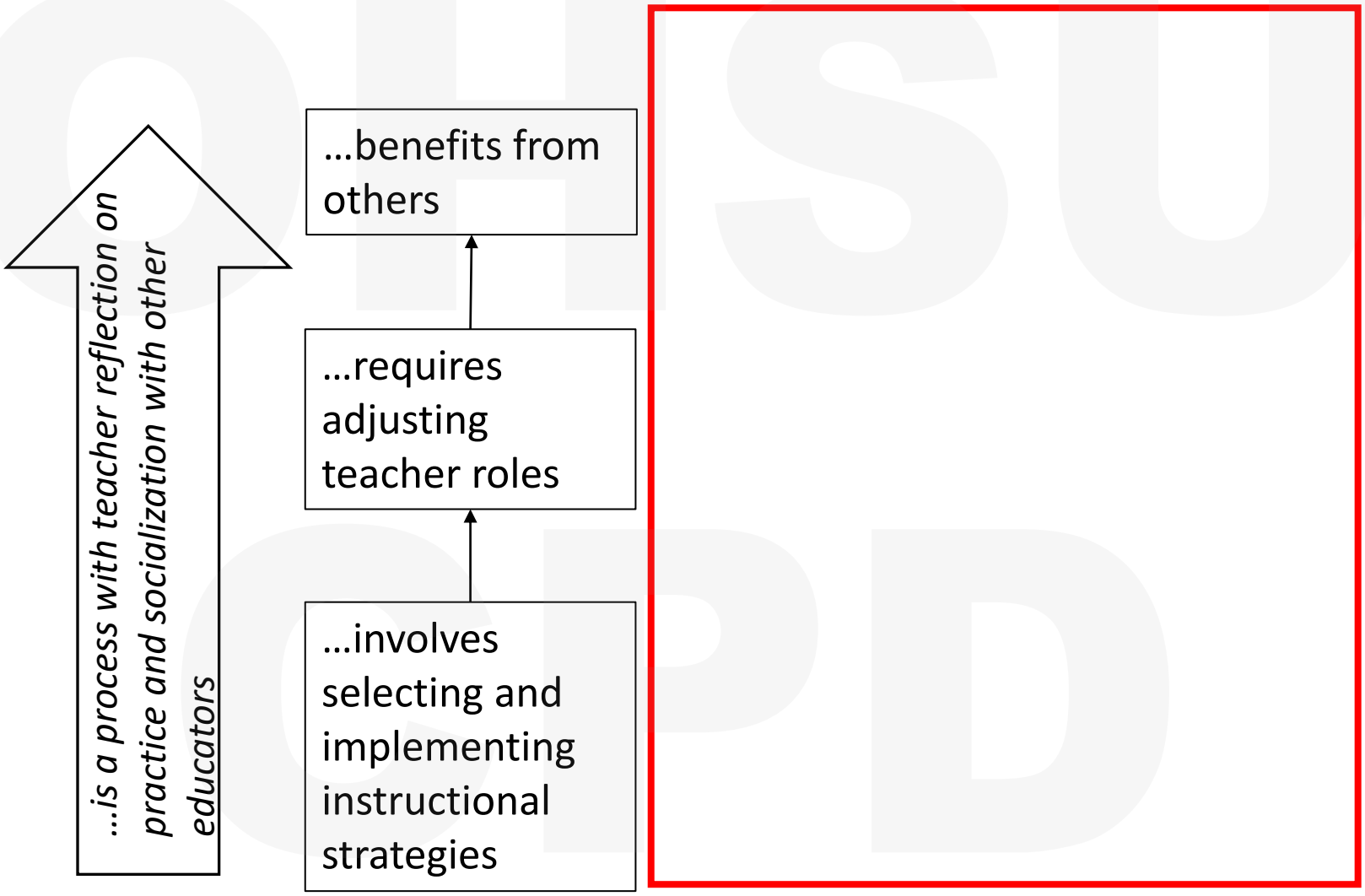
"[instructional designers] would set up a meeting, go over your objectives, make sure you're thinking from the top down; you know what are the objectives and then, how are you going to meet those objectives? That was very useful."

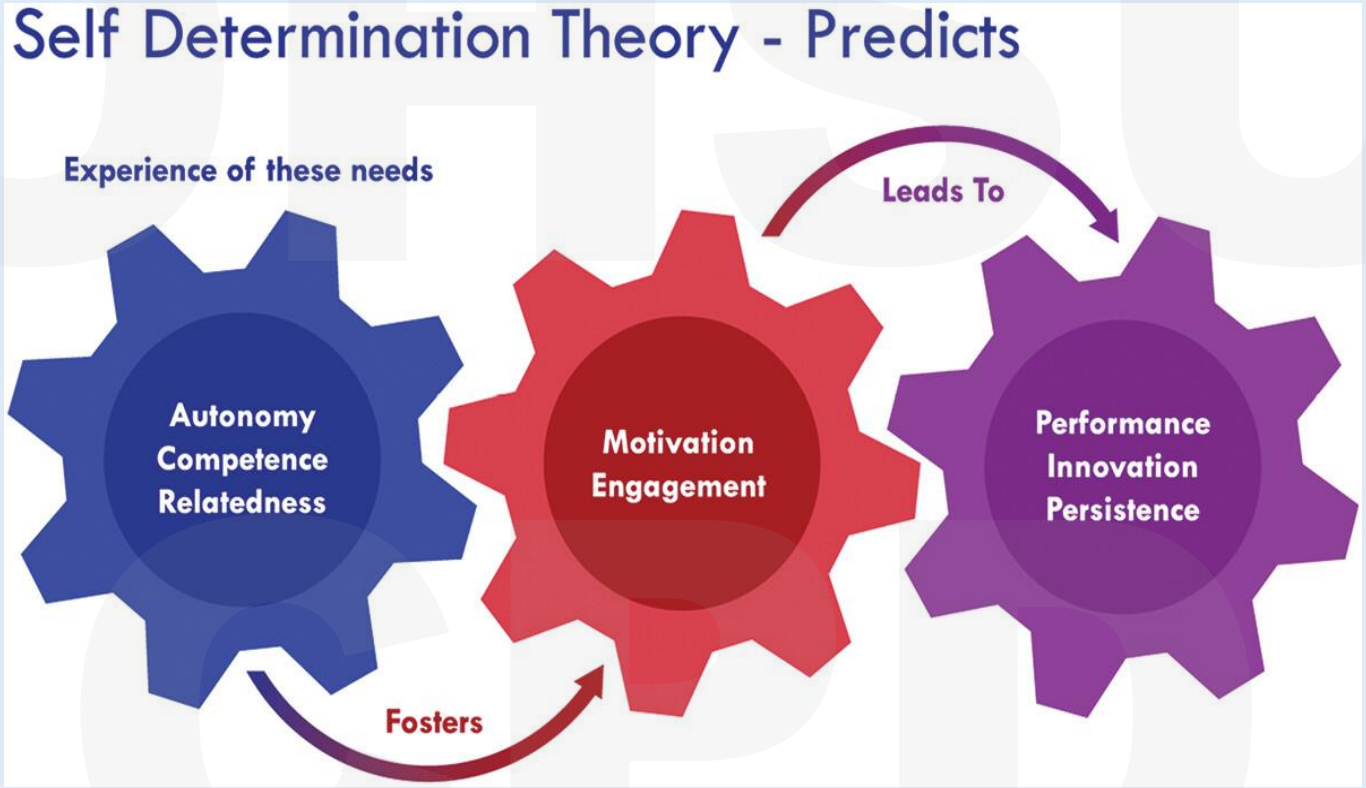
"So, if it was a case-based session that I wasn't comfortable with I sometimes would bring in a physician to work with me, for example, so there was a basic scientist and a physician working together in the session."

The change in instructional focus benefits from others

"[Faculty development staff] come to department meetings if you invite them to. They do schedule workshops, particularly early on in the transitions…So, it's mainly workshops, but they have all the printed material and so they're always welcoming to people that want to come in and learn more or understand better how we are trying to convey information now."

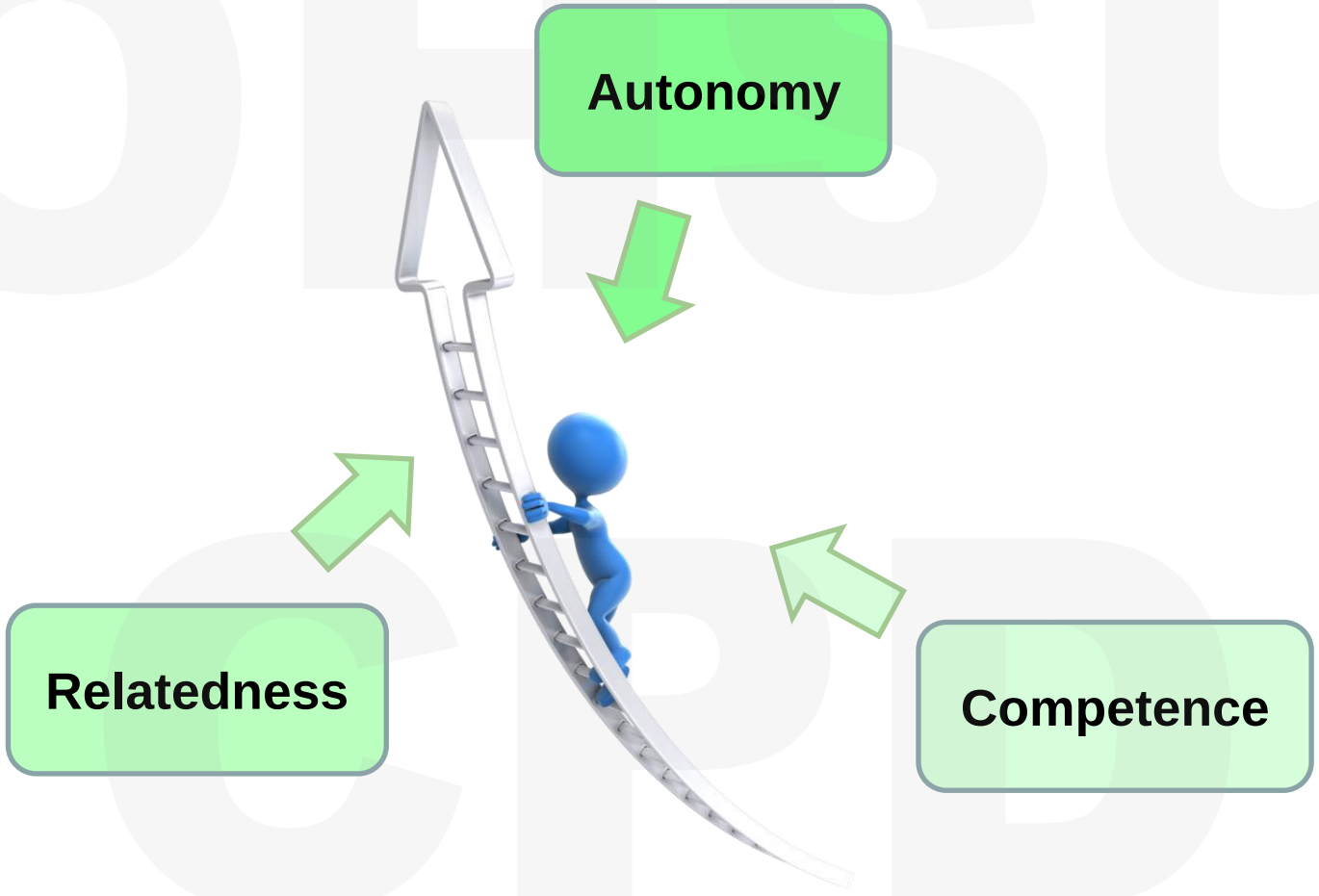
The change in instructional focus from lecture-based to active learning…





(Ross & Scanes, 2025)

Self-determination theory posits that well-being and motivation arise from three *basic psychological needs*



Participants experience extremes in basic psychological need support

Autonomy Supportive

Controlling

"Why I participated in the change? Because I'm committed to quality teaching."

"Why I participated in the change? Well. I was kind of forced to. There was an expectation that we move towards more active learning modalities and so I adjusted."

Participants experience extremes in basic psychological need support

Competency Supportive

Over-challenging

“For me, it hasn't been a hard transition, because I really like active learning. Students don’t need to listen to me be an expert in class. It's better for them to read, or watch a video, answer formative questions and then come to class to apply what they've learned.”

“Creating learning activities take time and practice and so it's very scary for a first-time faculty to do. It's also very disheartening; you put that much time and effort into creating something and it's like ‘Ugh, didn't go that great.’”

Participants experience extremes in basic psychological need support

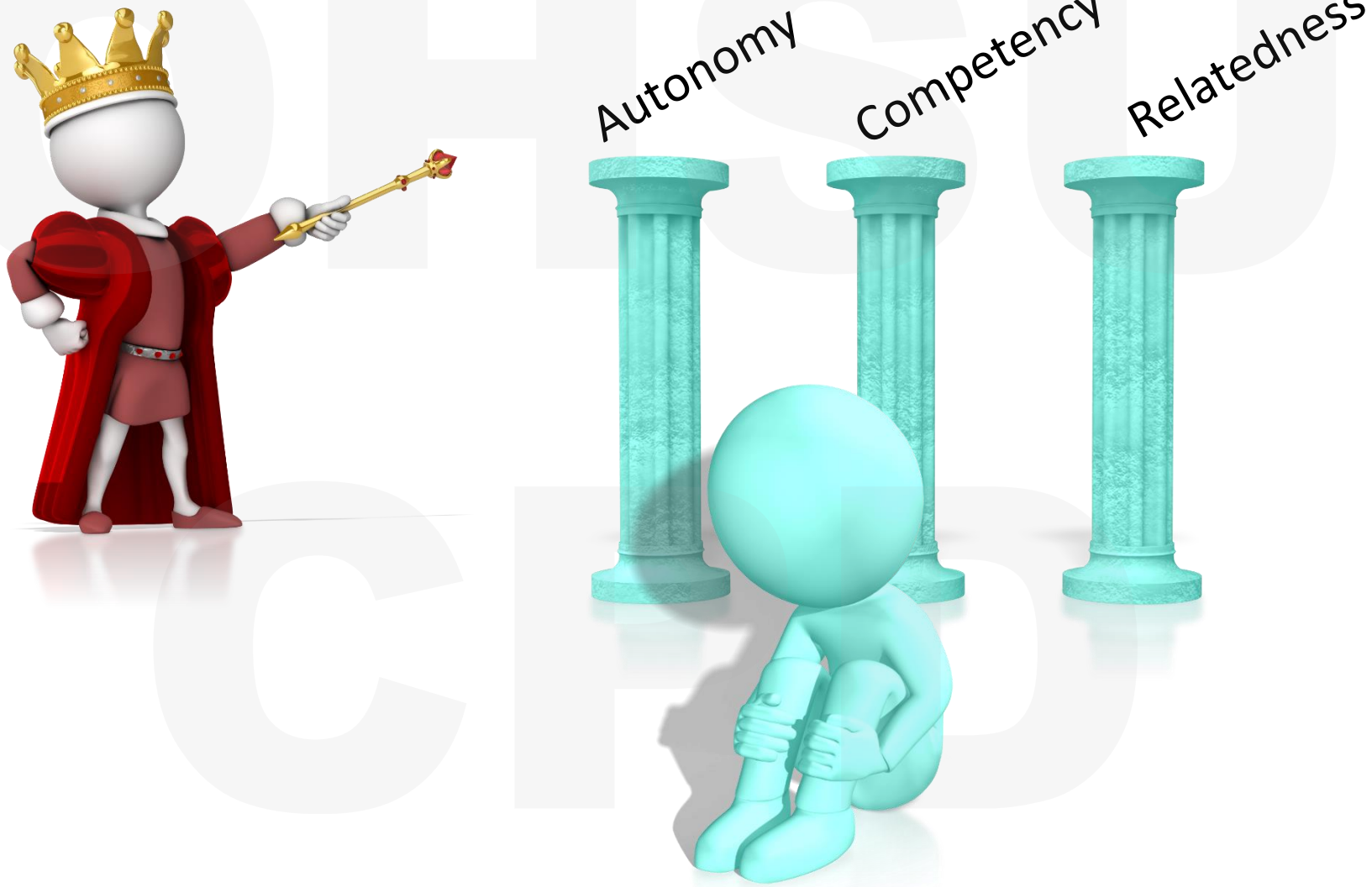
Relationship
Supportive

Rejection

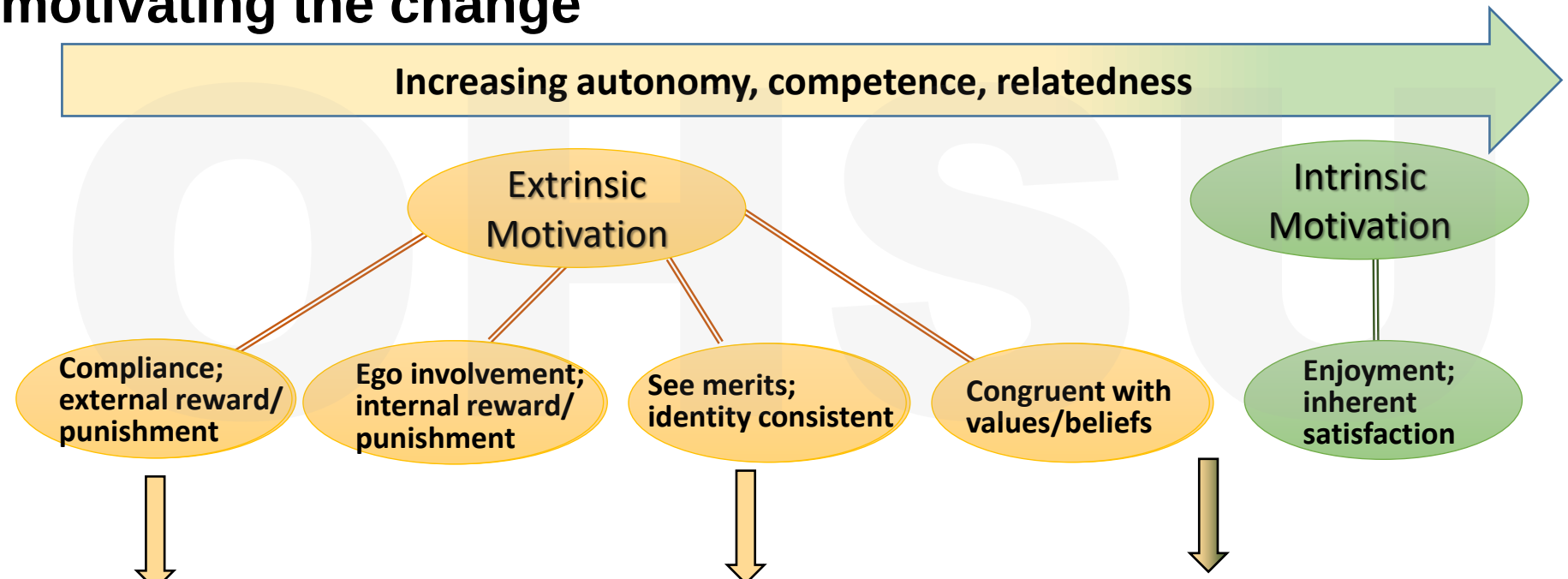
"The transition to active learning improved my value as a teacher because it gives me greater opportunity to interact with the students."

"So, the students are rough. It doesn't feel good when your lecture's getting 4.9 out of 5, and then you switch to active learning and all of a sudden, you're down at 3.5."

Result 1: Mandated change may assault the three basic psychological needs



Participants reflect a wide range of regulations motivating the change

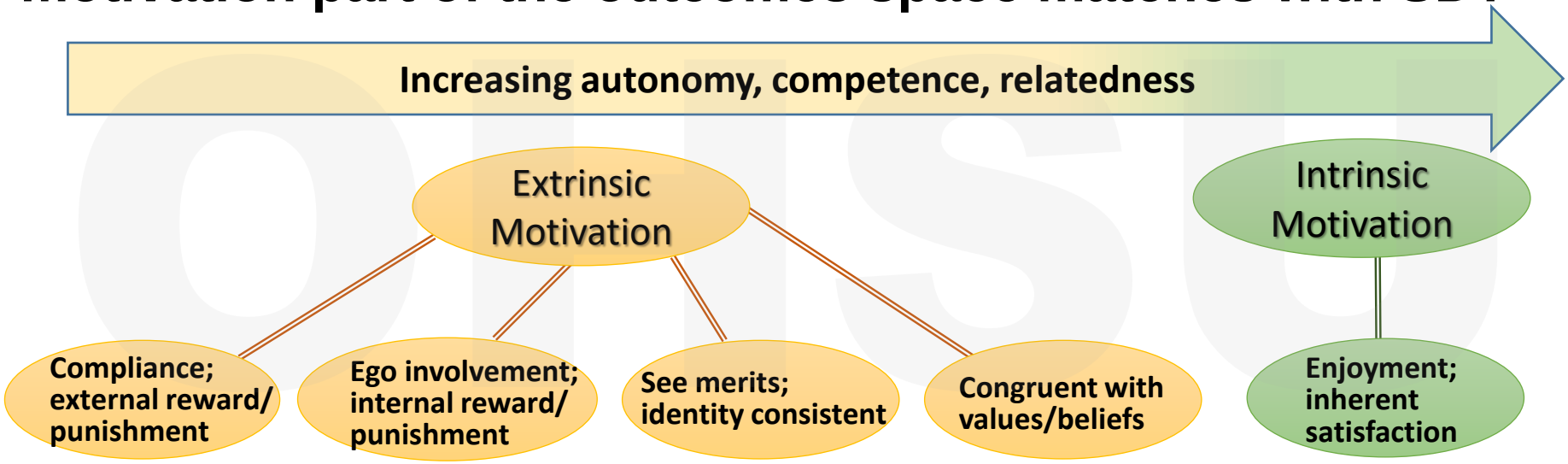


"I had a course co-director who went along kicking and screaming because he's still very old school. To this day I don't think he ever felt comfortable.."

"I feel that active learning is the way to go. There is no question about it. I think the evidence is overwhelmingly positive. I think it is beneficial to the student's learning and preparation for boards and clinical practice"

"The easiest part was getting up and doing it every day, again. I loved the way it made me present in class. I love the way it made me present with my faculty. I heard feedback from students in a way that I never was able to hear before because you're running around in the classroom and you're hearing things and people feel they know you better because you develop this relationship with them."

Result 2: The progression of regulations reflected in the motivation part of the outcomes space matches with SDT



The change in instructional focus from lecture-based to active learning…

…is externally driven

…is potentially demotivating

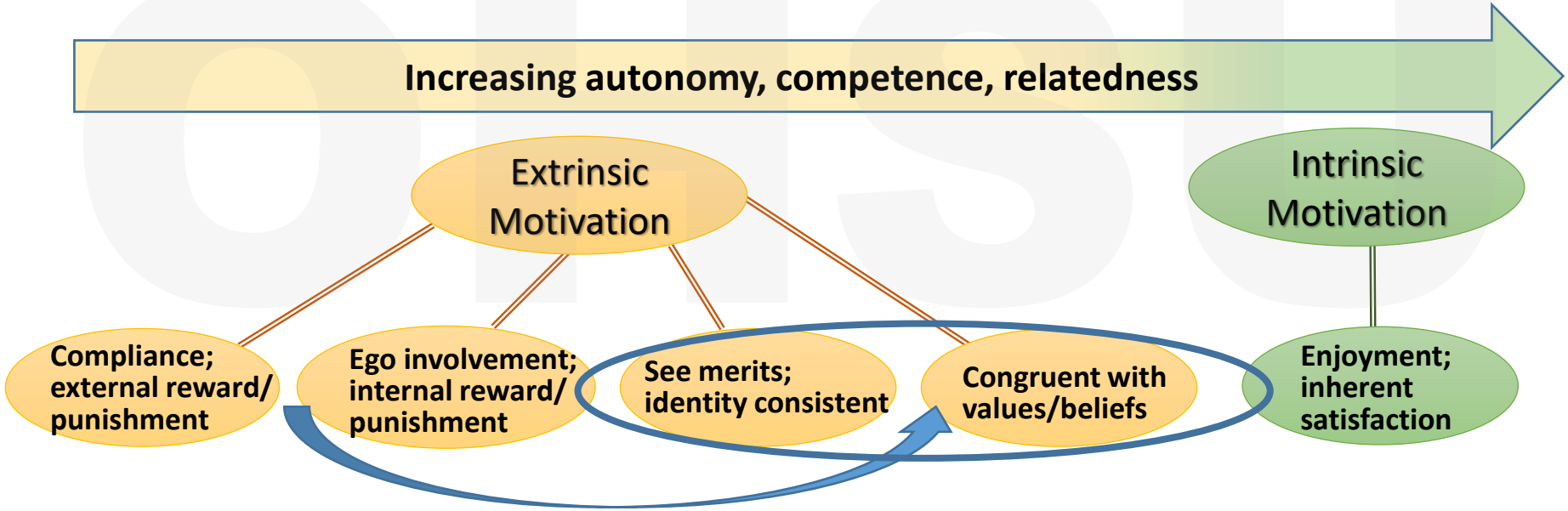
…matches teacher identity

…integrates with existing values and beliefs

…is motivated by external and internal regulations

Outcome space

Implications: Guide curriculum change with self-determination theory



Flexible incorporation of existing practice

Change in manageable steps

Support faculty needs, including time to change

What questions do you have?

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