Change and Adoption: Scaffolding Your New Faculty Workshop Experience

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AAPT Physics and Astronomy New Faculty Workshop
November 2, 2017

Before we jump in:
an after-dinner exercise

Learn a code representing digits 1 - 9

How did you do?

What happened?

- # Scaffolding

- # Transparency

**All session resources available:
http://tinyurl.com/scaffold2017**

Scaffolding: National Research Council 2015
Transparency: Winkelmes et al. 2016

Goal:

Build a useful scaffold for your NFW experience

Objectives:

Build a useful scaffold for your NFW experience

- <u>Appreciate</u> phases in the process of **developing teaching expertise**

- <u>Apply</u> a framework for **interpreting and evaluating** strategies in NFW sessions

- <u>Identify</u> aspects of **your context** that matter for instructional change and adoption

Plan:

1. Developing expertise
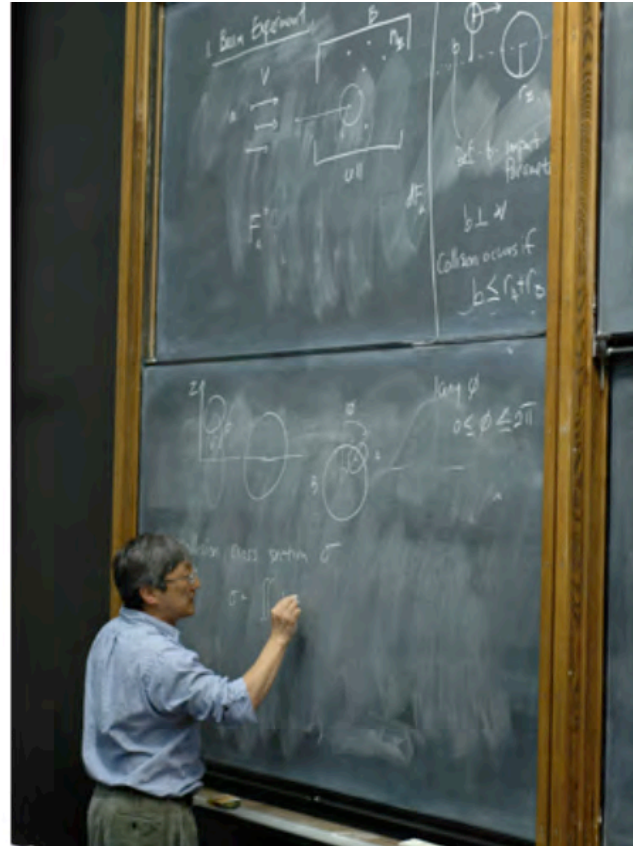2. Framework for NFW learning
3. Change and adoption in context

Part 1:

1. Developing expertise
2. Framework for NFW learning
3. Change and adoption in context

University science teaching is changing

University science teaching is changing
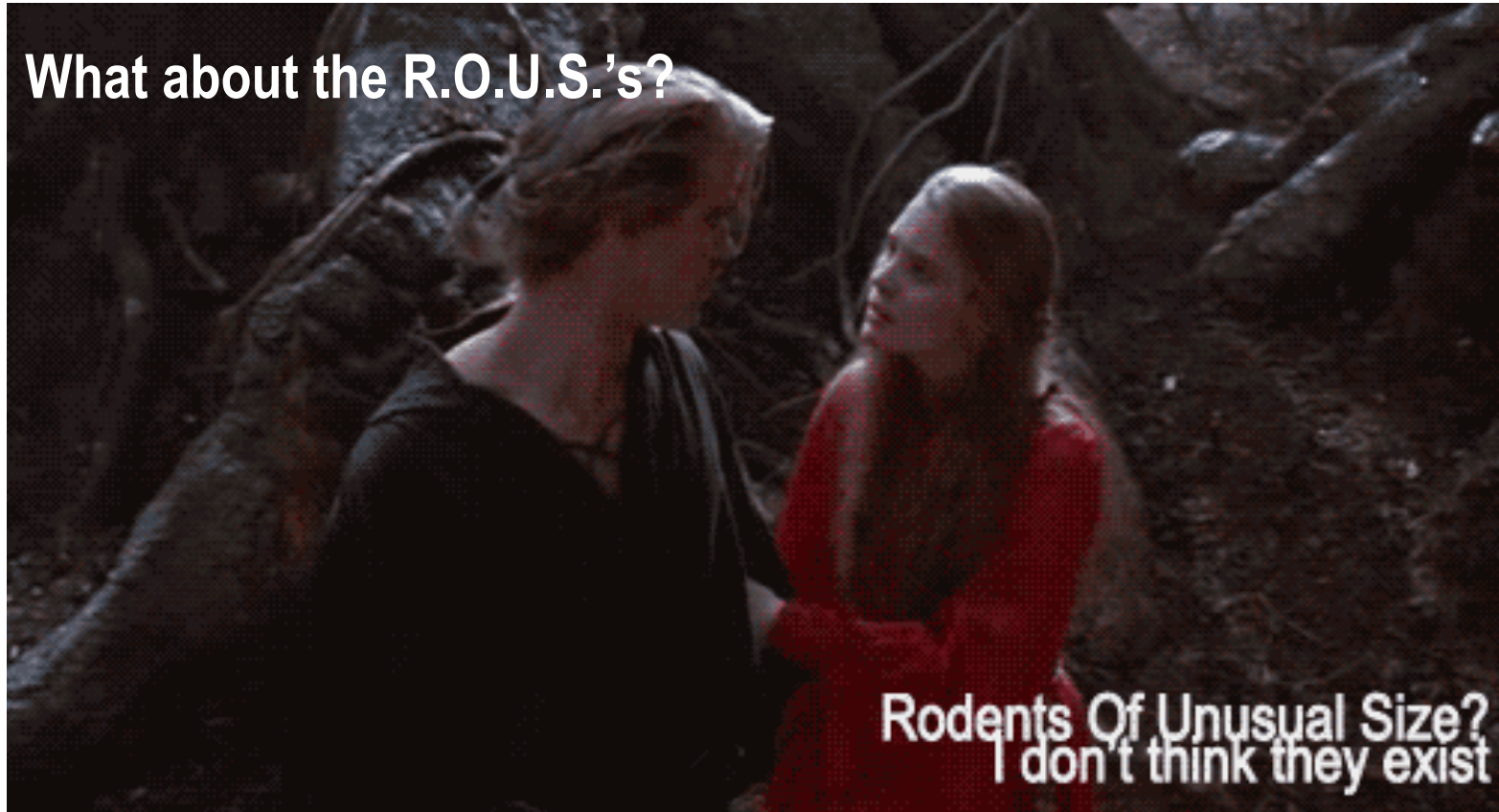

1. Developing Expertise

RBISs

Research Based Instructional Strategies

What about the R.O.U.S.'s?

Rodents Of Unusual Size? I don't think they exist

The Princess Bride, 1987

1. Developing Expertise

RBISs

Research

Based

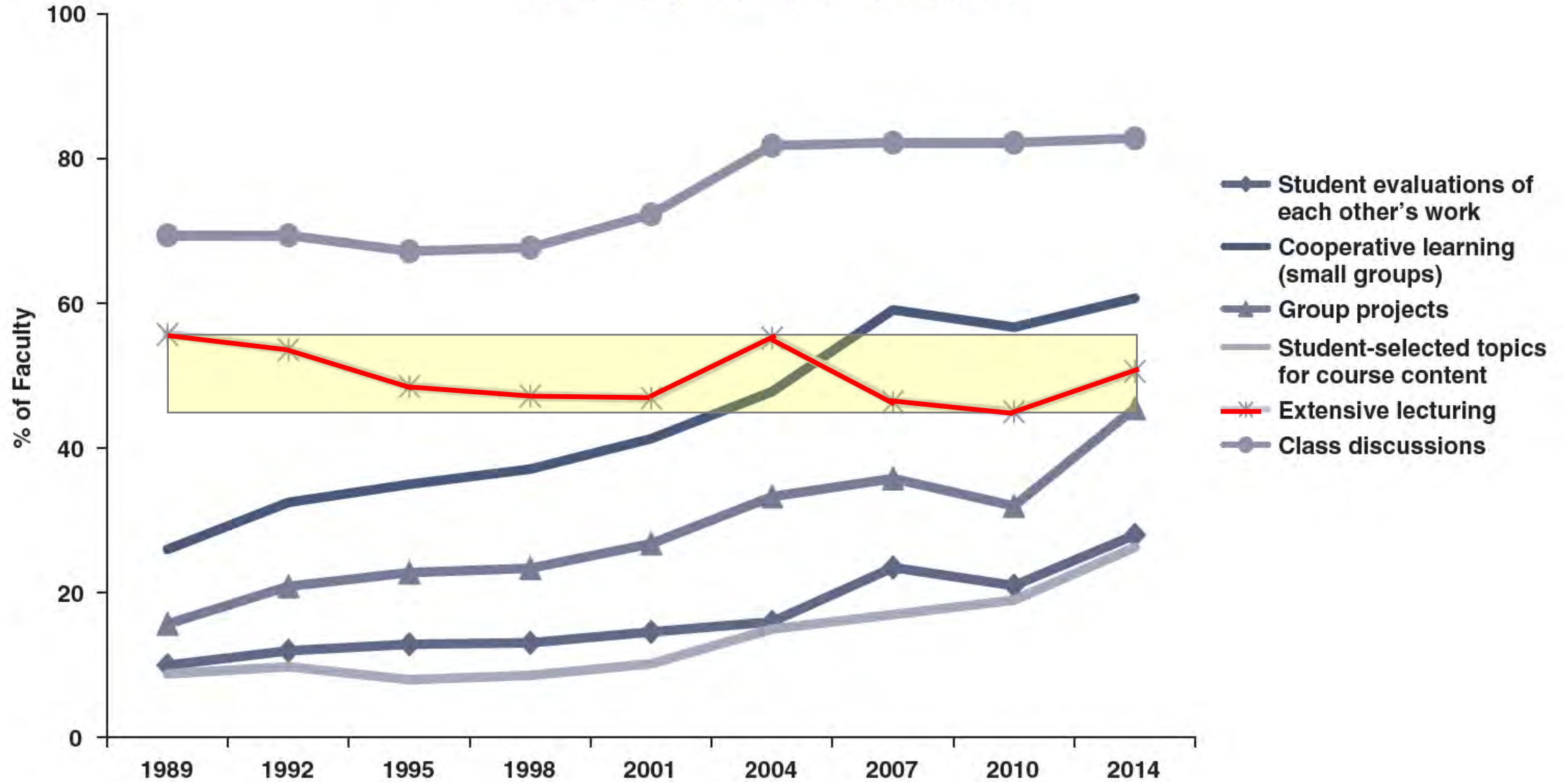Instructional

Strategies

Close relatives:

EBIPs
Evidence
Based
Instructional
Practices

All Disciplines: 2014 HERI Faculty Survey

Figure 5. Changes in Faculty Teaching Practices, 1989 to 2014
(% Marking "All" or "Most" Courses)

Legend:
- Student evaluations of each other's work
- Cooperative learning (small groups)
- Group projects
- Student-selected topics for course content
- Extensive lecturing
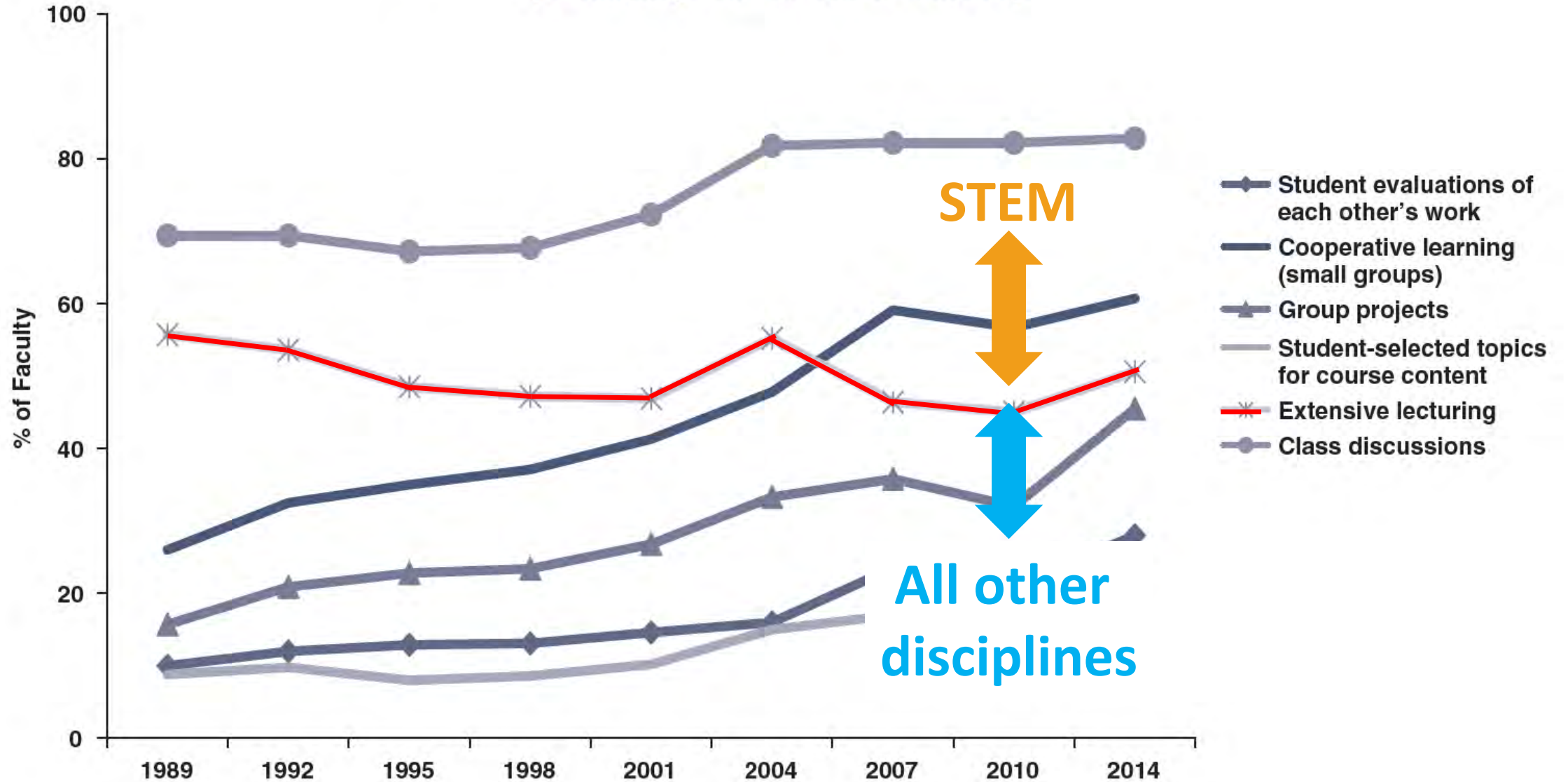- Class discussions

1. Developing Expertise

All Disciplines: 2014 HERI Faculty Survey

Figure 5. Changes in Faculty Teaching Practices, 1989 to 2014
(% Marking "All" or "Most" Courses)

STEM

All other disciplines

Legend:
- Student evaluations of each other's work
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- Student-selected topics for course content
- Extensive lecturing
- Class discussions

1. Developing Expertise

EPIC model of adoption

Exposure · Persuasion · Identification · Commitment

Aragón et al 2016; Cavanagh et al. 2016

1. Developing Expertise

EPIC model of adoption

87.1 %   Physics Faculty, 2009   48.1%

| Exposure | Persuasion | Identification | Commitment |

(Familiar with RBISs)   (Using RBISs)
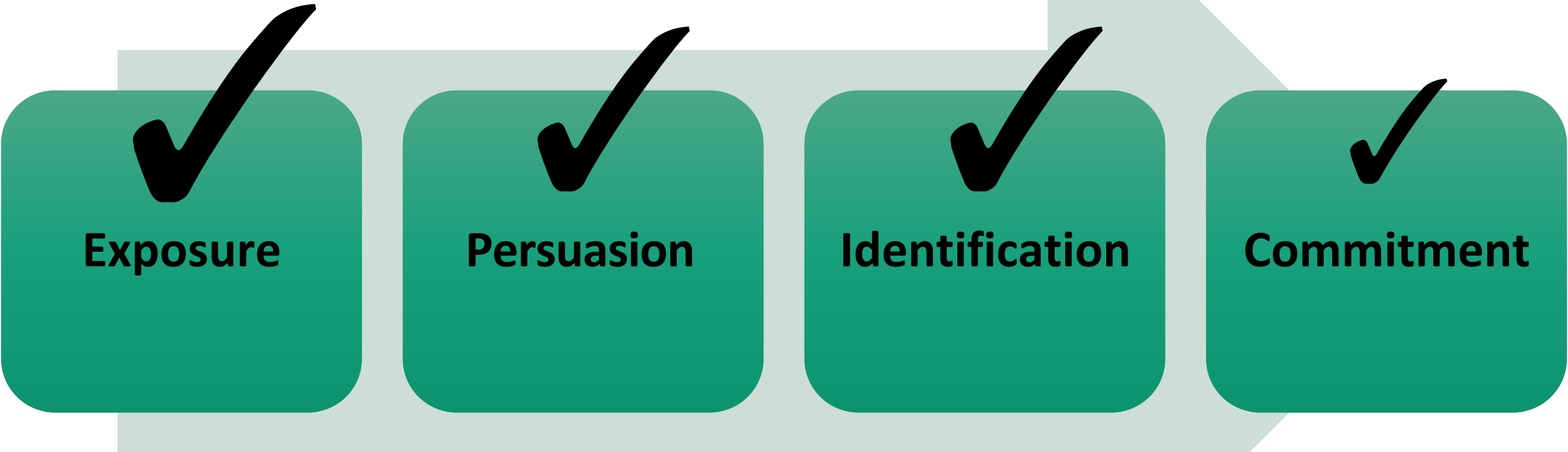
Henderson & Dancy, 2009   1. Developing Expertise

NFW Participants

Exposure ✓ Persuasion ✓ Identification ✓ Commitment ✓

1. Developing Expertise

On the way to expertise, you might…

- Struggle to organize new information effectively.

- Have fewer automated processes.

- Work harder & feel less efficient than usual.

- Notice yourself "doing school" vs "sense-making"

Part 1 Takeaways:

- Be aware of EPIC:
  Exposure, Persuasion, Identification, Commitment
- Rely on supports to help you develop expertise and build robust knowledge structures. E.g., scripts, templates, etc.
- Notice when you are "doing school" vs "sense-making"

Part 2:

1. Developing expertise
2. Framework for NFW learning
3. Change and adoption in context

On the way to expertise, you might…

- **Struggle to organize new information effectively.**
- Have fewer automated processes.
- Work harder & feel less efficient than usual.
- Notice yourself "doing school" vs "sense-making"

Day	Time	Event(s)				
		Hotel = Holiday Inn College Park				
		Participant Schedule for New Faculty Workshop Nov 2-5 2017				
2-Nov	1:30 - 3:00 pm	NSF CAREER Grant Strategies				
At hotel	3:00 - 4:30 pm	Grant Opportunities with NSF Program Directors				
Thursday	4:30 - 4:45 pm	Break				
	4:45 - 5:15 pm	Welcome and Introductions - Bob Hilborn				
	5:15 - 6:30 pm	Highlighting PER – The Journey from Traditional Instruction to Active Learning - McNiel				
	6:30 - 7:30 pm	Dinner				
	7:30 - 8:30 pm	Faculty Change and Research on Adoption - Horii				
3-Nov	7:45 AM	Bus to ACP				
At ACP	8:20 - 8:30 am	Introduction and FOLC announcment				
Friday	8:30 - 9:45 am	Learner-Centered Teaching in Physics and Astronomy - Prather				
	9:45 - 10:00 am	Break				
	10:00 - 11:00 am	JITT	LABS	Phys Tutorials	Interactive Lecture Demo	Choose Three
	11:00 - 12:00	JITT	LABS	Phys Tutorials	Interactive Lecture Demo	
	12:00 - 1:00 pm	Photo and Lunch				
	1:00 - 2:00 pm	JITT	LABS	Phys Tutorials	Interactive Lecture Demo	
	2:00 -2:45 pm	PhET	Open Source Physics	Lecture Tutorials	PhysPort/comPADRE	Choose Three
	2:45 - 3:00pm	Break				
	3:00 - 3:45 pm	PhET	Open Source Physics	Lecture Tutorials	PhysPort/comPADRE	
	3:45 - 4:30 pm	PhET	Open Source Physics	Lecture Tutorials	PhysPort/comPADRE	
	4:30 - 5:45 pm	Designing TPS (Peer Instruction) Questions - Prather				
	5:50 PM	Bus to Hotel				
At hotel	6:30 - 7:30 pm	Dinner				
	7:30 PM	FOLC meeting				
4-Nov	7:45 AM	Bus to ACP				
Saturday	8:20 - 9:30 am	Group Implementations of TPS (Peer Instruction) Questions (A, B, C)			Participants go to appropriate room	
At ACP	9:30 - 10:45 am	Interactive Engagement in Upper Level Courses, and Problem Solving - Manogue				
	10:45 - 11:00 am	Break				
	11:00 - 11:45 am	PS in Intro Phys	PS using TPS format	PS in Upper Division	Choose Two	
	11:45 - 12:30 pm	PS in Intro Phys	PS using TPS format	PS in Upper Division		
	12:30 - 1:30 pm	Lunch				
	1:30 - 2:45 pm	Thinking about Changing Instruction - Holmes and Price				
	2:45 - 3:45 pm	The Importance of Diversity in Astronomy and Physics - Turpin & Sawtelle				
	3:45 - 4:00 pm	Break				
	4:00 - 5:00pm	Primarily Undergrad		PHD Granting		
	5:00 - 6:00 pm	Tenure Matters	Tenure Matters	Tenure Matters		
	6:10 PM	Bus to Hotel				
At hotel	6:30-7:30 pm	Dinner				
5-Nov	8:30 -9:45 am	...al Ecosystems: Recruitment, Retention, Mentoring, Diversity, Leadership, and More - Hodapp				
Sunday	9:45-10:00	Break				
At hotel	10:00-11:15 am	What Will I Do When I Get Back to the Office? - Hilborn				
	11:15:11:30	Final Words, Evaluation Procedures and Adjourn				

DRAFT 9-15-17

2. Framework for NFW Learning

Learner-Centered Teaching in Physics and Astronomy - Prather				
Break				
JITT	LABS	Phys Tutorials	Interactive Lecture Demo	Choose Three
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Photo and Lunch				
JITT	LABS	Phys Tutorials	Interactive Lecture Demo	
PhET	Open Source Physics	Lecture Tutorials	PhysPort/comPADRE	Choose Three
Break				
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PhET	Open Source Physics	Lecture Tutorials	PhysPort/comPADRE	
Designing TPS (Peer Instruction) Questions - Prather				

2. Framework for NFW Learning

Having a framework will help:

RBISs:
Just In Time Teaching (JITT)
Labs
Tutorials
Interactive Lecture Demo
Think-Pair-Share/ **Peer Instruction**
Open Source Physics
PhysPort/comPADRE

You're likely to encounter:

- Evidence of effectiveness
- Use:
  - Sample(s)
  - Demo(s)
  - Case(s)
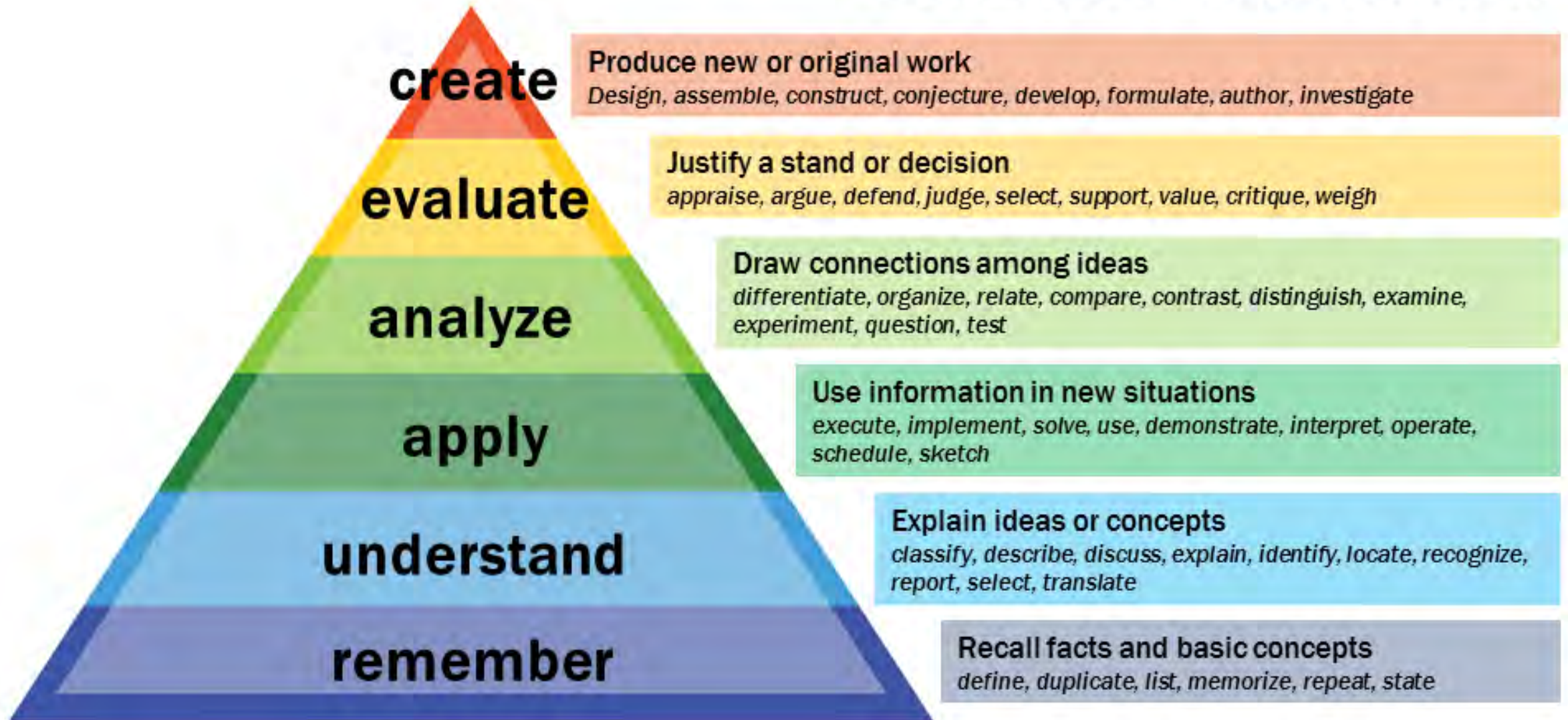- Implementation advice
- Discussion/application

Crucial questions to ask about RBISs
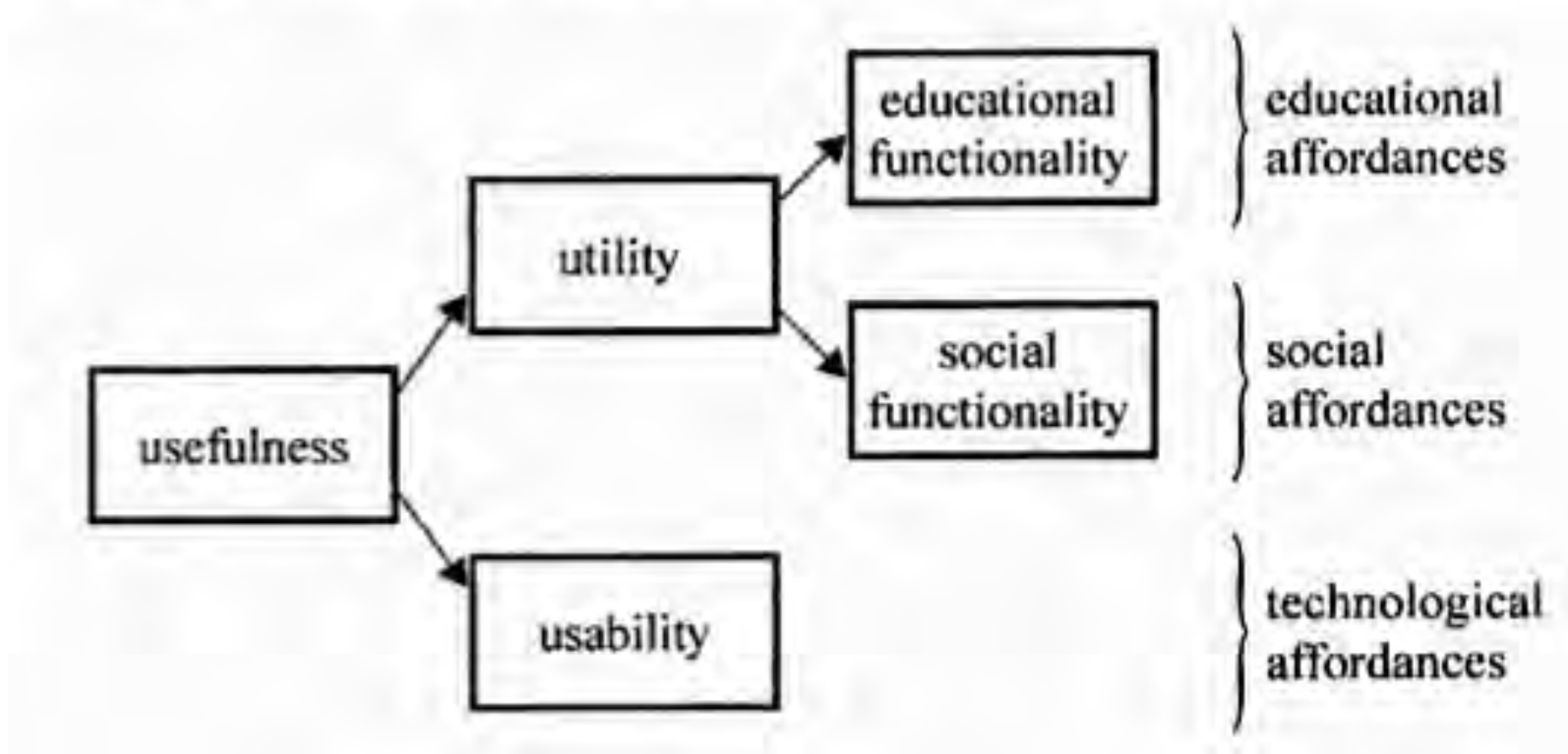
- **Why use this?**
  What kinds of learning outcomes is it good for?

Bloom's Taxonomy

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
define, duplicate, list, memorize, repeat, state

Vanderbilt University Center for Teaching

2. Framework for NFW Learning

Affordances

Figure 2 ☐ Usefulness is determined by various types of affordances.

Affordances: Chalk

Students see multiple panes/phases of thinking; editable
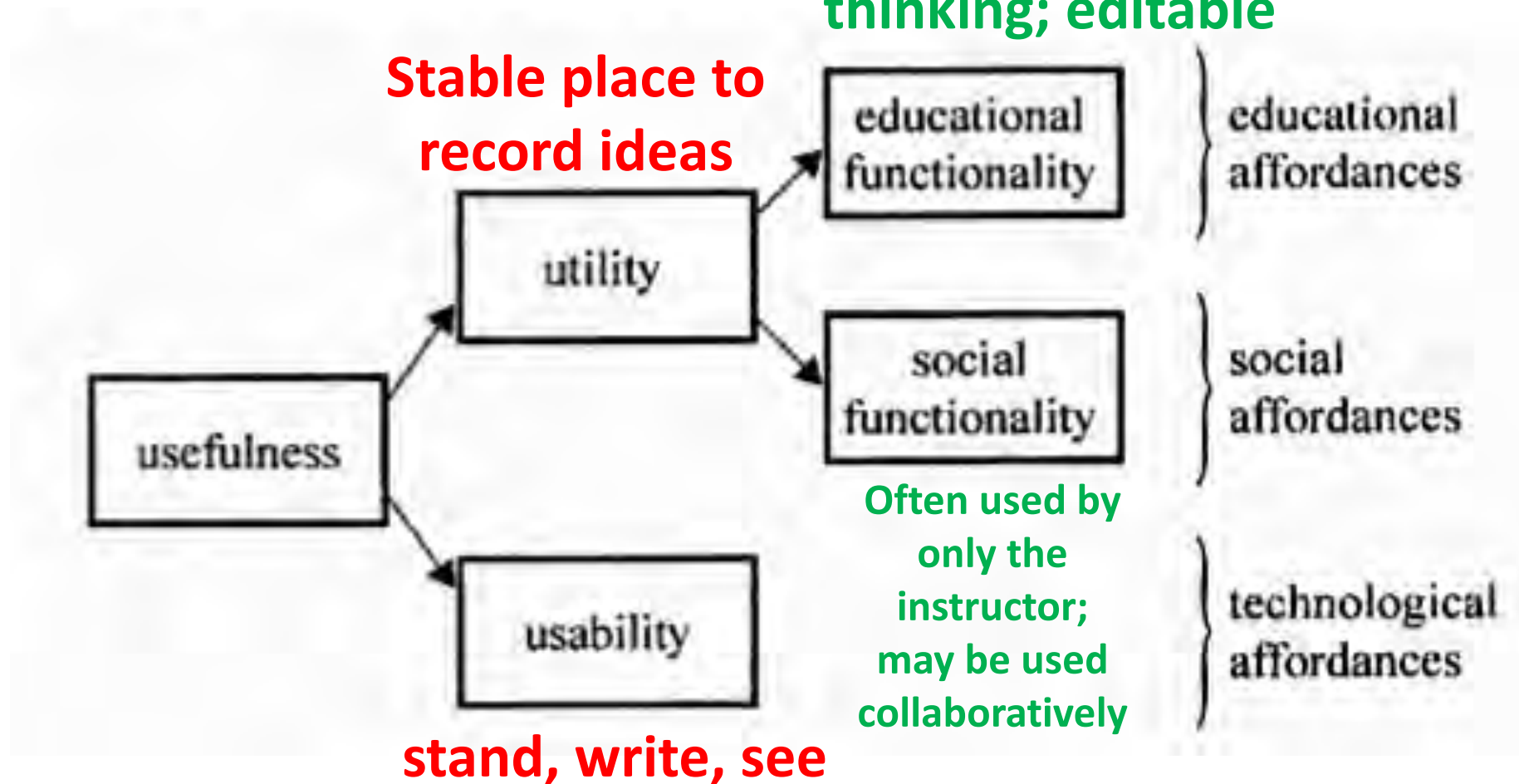
Stable place to record ideas

educational functionality — educational affordances

social functionality — social affordances

Often used by only the instructor; may be used collaboratively

usefulness → utility, usability

usability → technological affordances

stand, write, see

2. Framework for NFW Learning

Crucial questions to ask about RBISs

- **Why use this?**
  What kinds of learning outcomes is it good for?
  What are its key affordances?

- **What are the essential aspects of implementation?**

Fidelity of adoption

High Quality Reproduction

What's essential? What's adaptable?

2. Framework for NFW Learning

Image: Jordanhill School D&T Dept, CC BY 2.0

Minimum increment

Crucial questions to ask about RBISs

- **Why use this?**
  What kinds of learning outcomes is it good for?
  What are its key affordances?

- **What are the essential aspects of implementation?**
  Fidelity of adoption?
  Minimum increment?

- **What are the potential pitfalls?**
  Common "mistakes" (non-optimal implementations)?
  Ways to avoid them?

Physics and Astronomy New Faculty Workshop: RBIS Scaffolding Template

Use or adapt this framework to help organize and evaluate the strategies you encounter this week.

What is the RBIS (Research Based Instructional Strategy)?

Why use this RBIS? • For what kinds of learning goals and objectives is it well suited? • What are its key affordances?	
What are the essential aspects? • What do you need to do to maintain fidelity? • What's the minimum increment?	
What are the potential pitfalls? • Common "mistakes" (non-optimal implementations)? • Ways to avoid them?	

Part 3:

1. Developing expertise
2. Framework for NFW learning
3. **Change and adoption in context**

RBIS Decision-making

✓ RBISs – Exposure, Persuasion, Identification, Commitment

Institutional context & faculty work
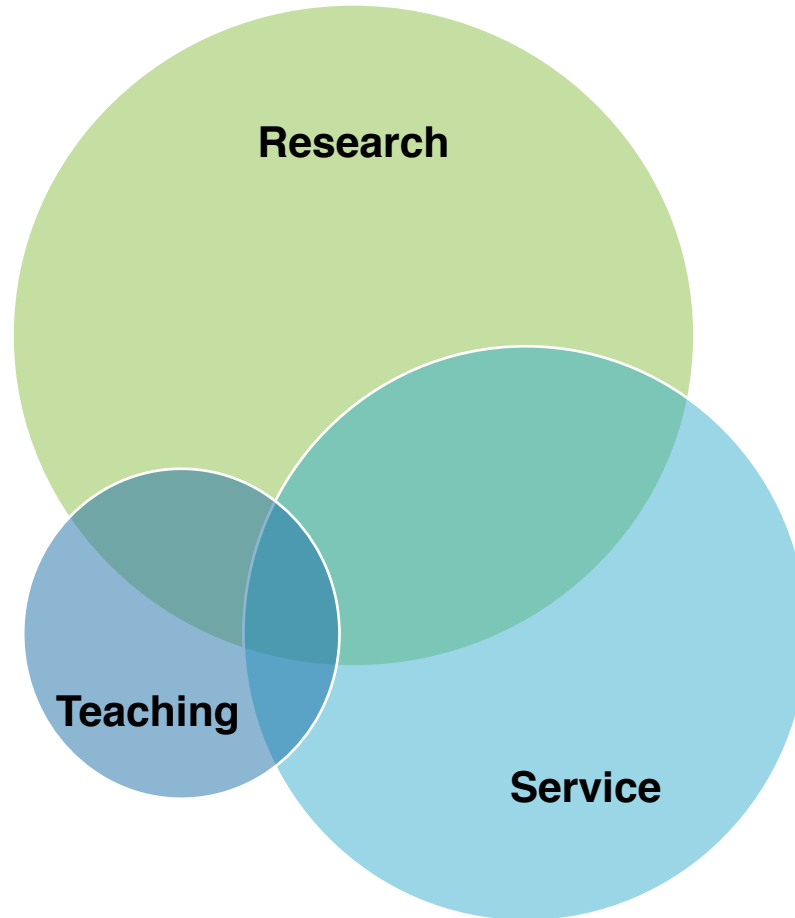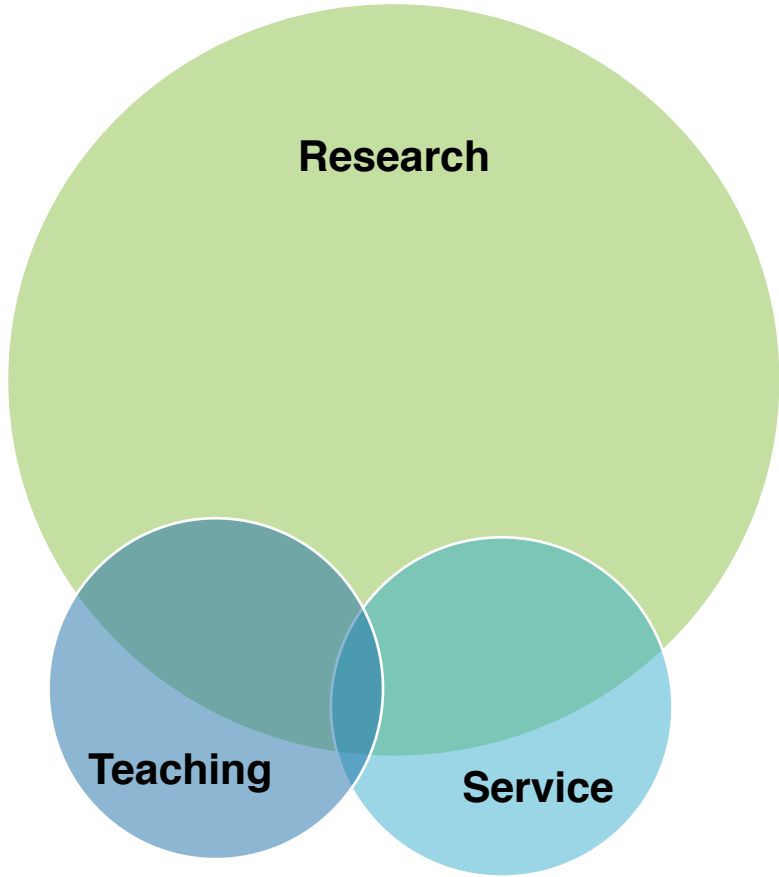
You – an authentic individual human
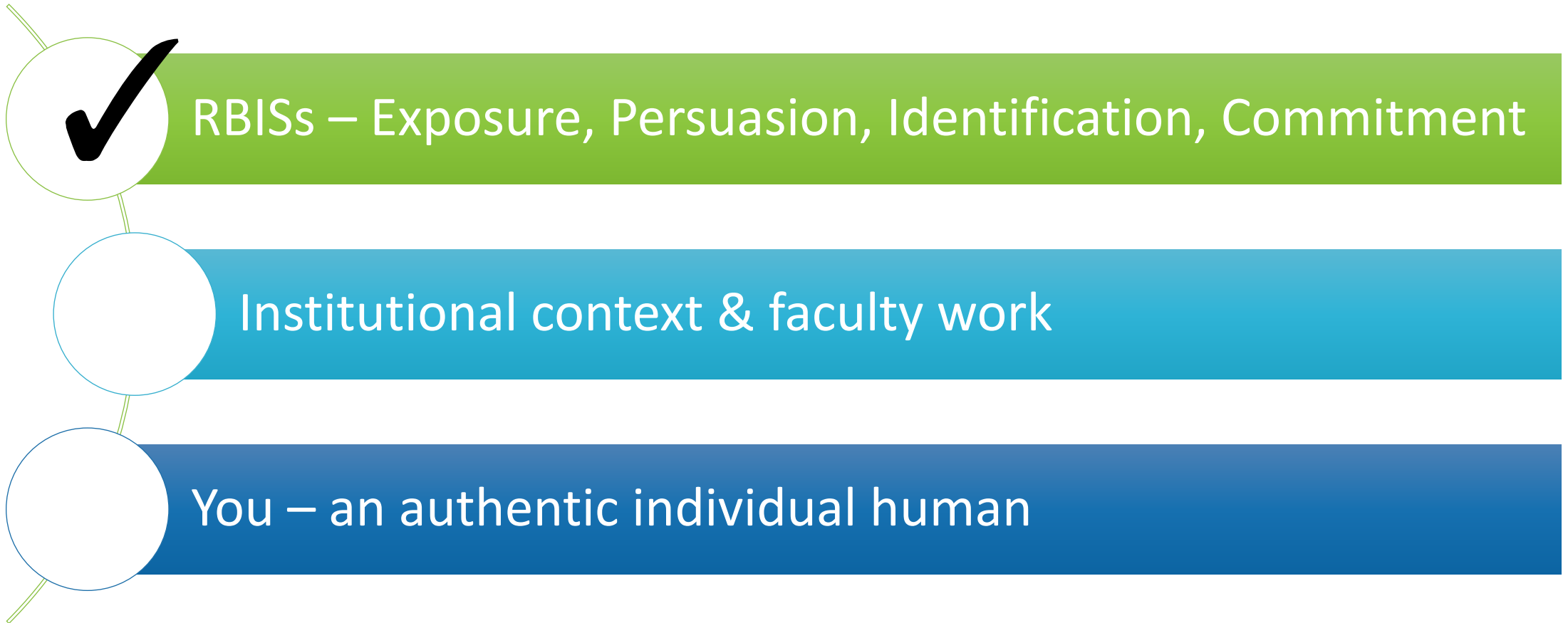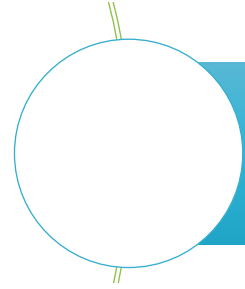
Institutional context & faculty work
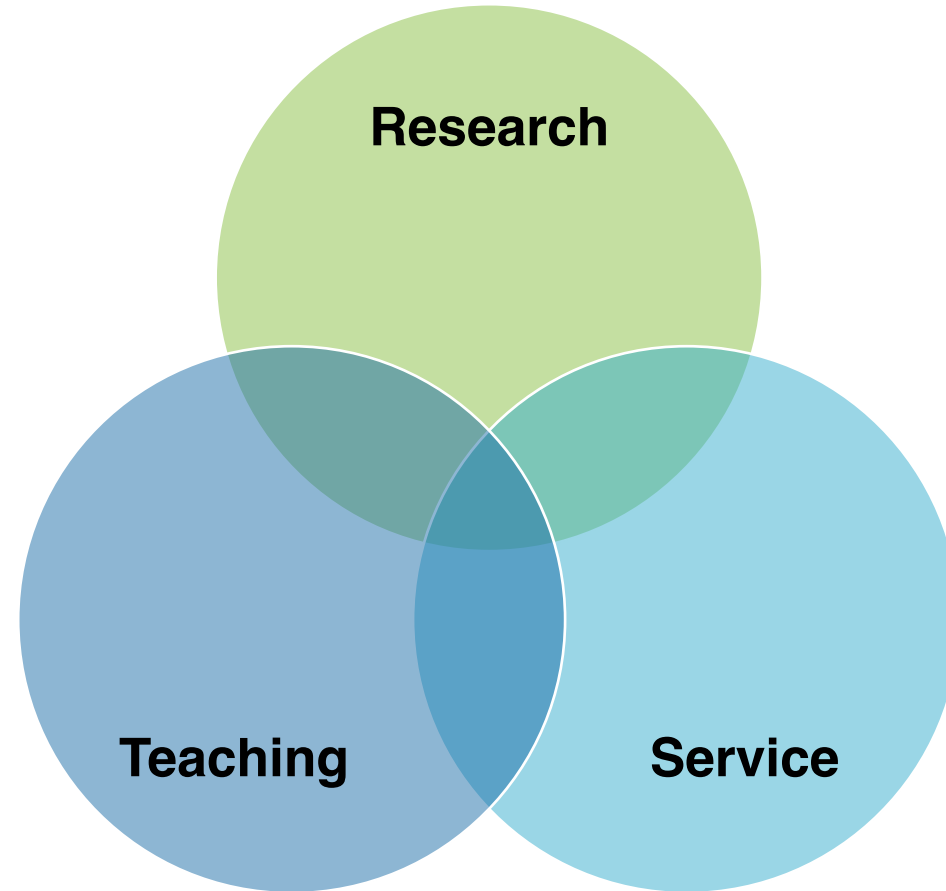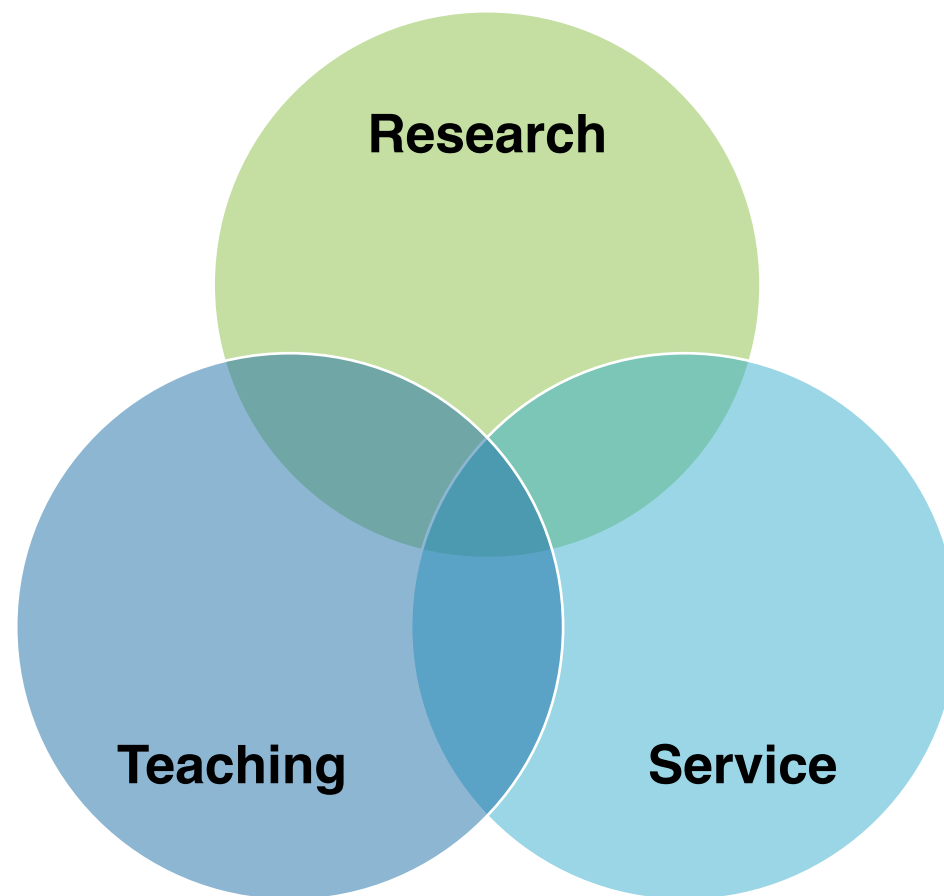

3. Change and Adoption in Context

Context:
Institutional
Differences

Research

Teaching

Service

Research

Teaching

Service

Research

Teaching

Service

3. Change and Adoption in Context
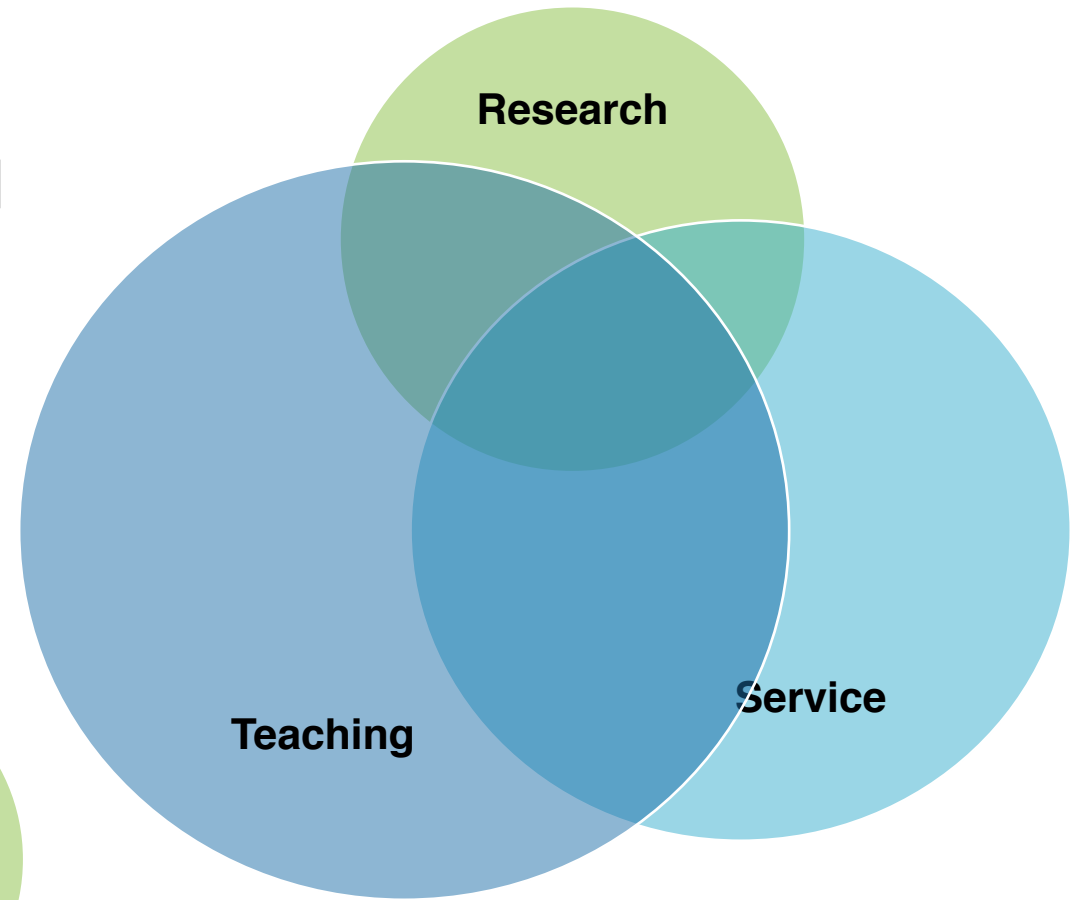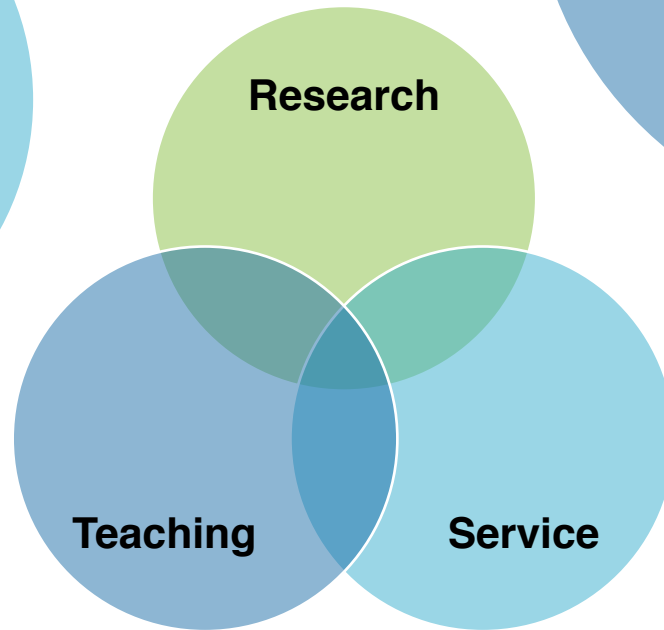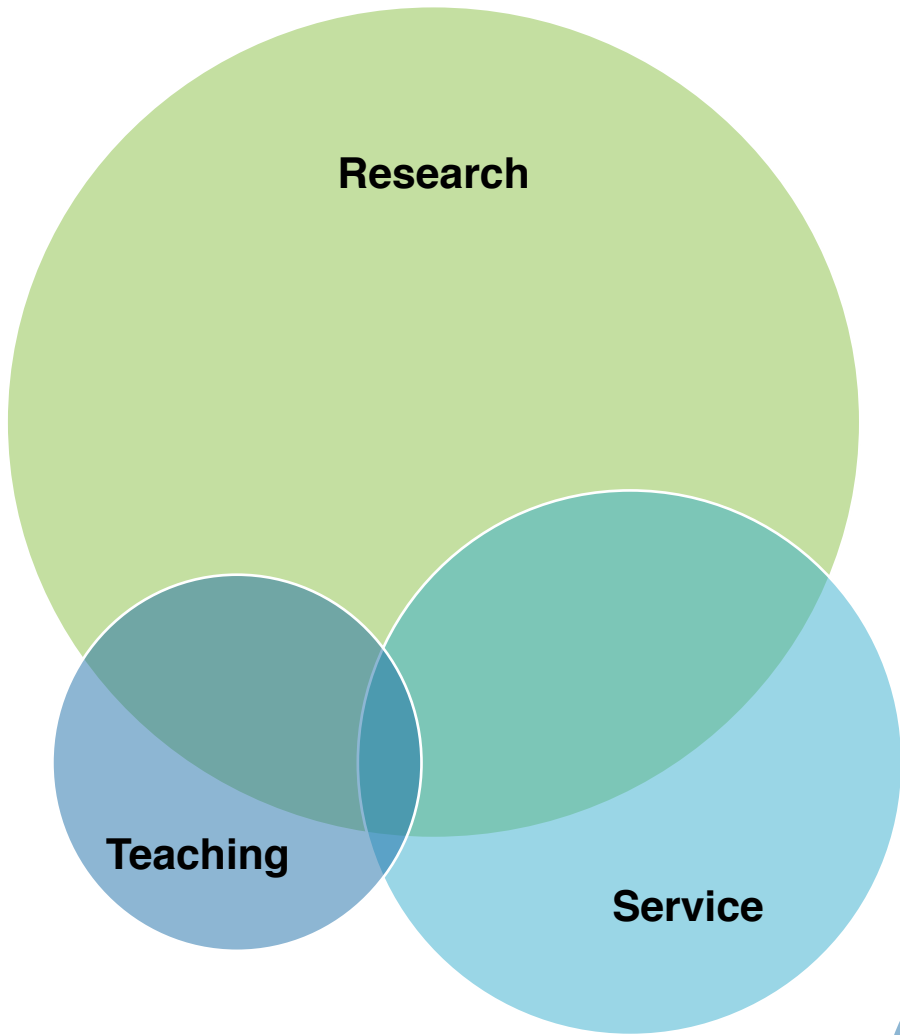
Context:
Career Stage Differences
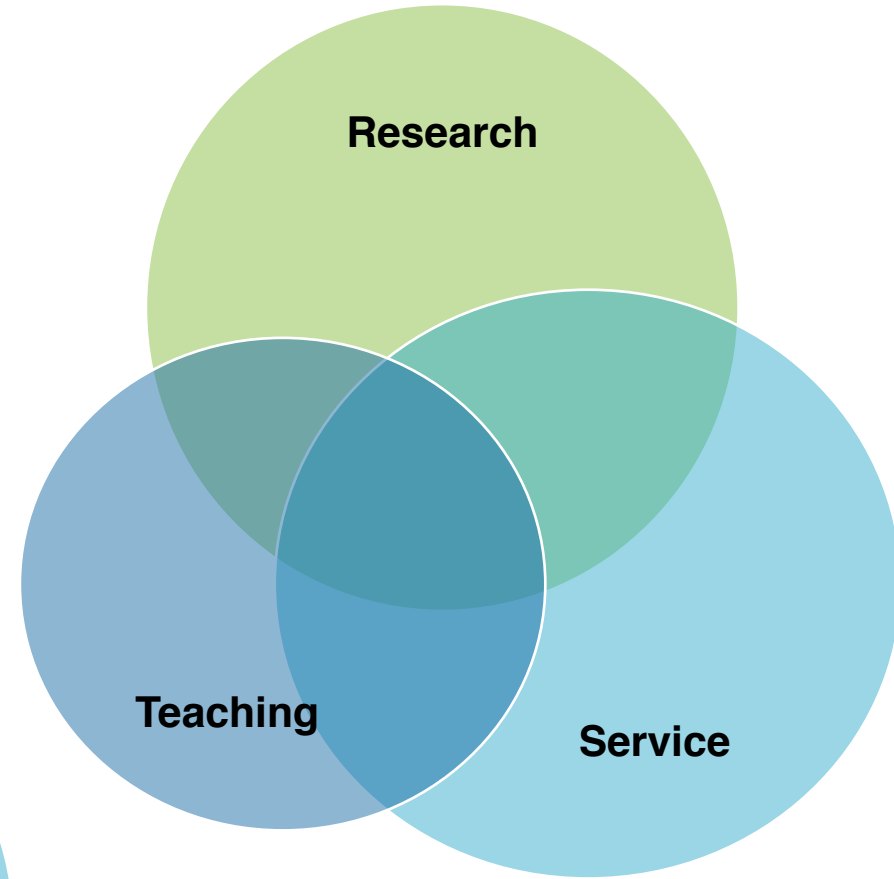
Evaluation Criteria (Promotion/Tenure)

3. Change and Adoption in Context

What does your context look like?
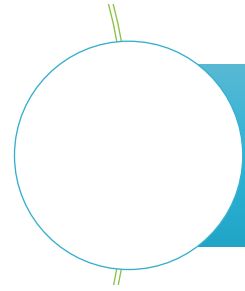
Sketch your research, teaching, service diagram

Consider/Note:

- Institutional Factors
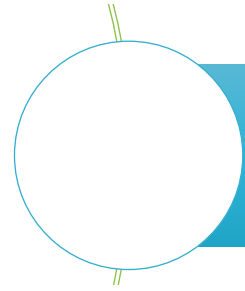
- Your Career stage

- Evaluation Criteria

On your own, then compare at tables

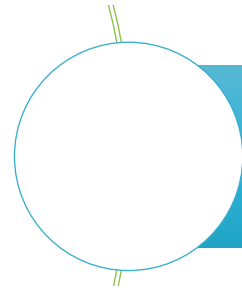# Institutional context & faculty work

- Narrative of Constraint:
  - Barriers
  - Limited resources/time
  - Survival; "treading water"
  - Isolation

How faculty work has been often been framed and discussed…

O'Meara, Terosky, Neumann 2008

Institutional context & faculty work

- **Narrative of Constraint:**
  - Barriers
  - Limited resources/time
  - Survival; "treading water"
  - Isolation

- **Faculty Growth & Learning:**
  - Choice, commitment, agency
  - Personal meaning
  - Change and development
  - Professional Networks

How faculty work has been often been framed and discussed…

…also a common underlying experience: meaning, connection, and collegiality.

O'Meara, Terosky, Neumann 2008

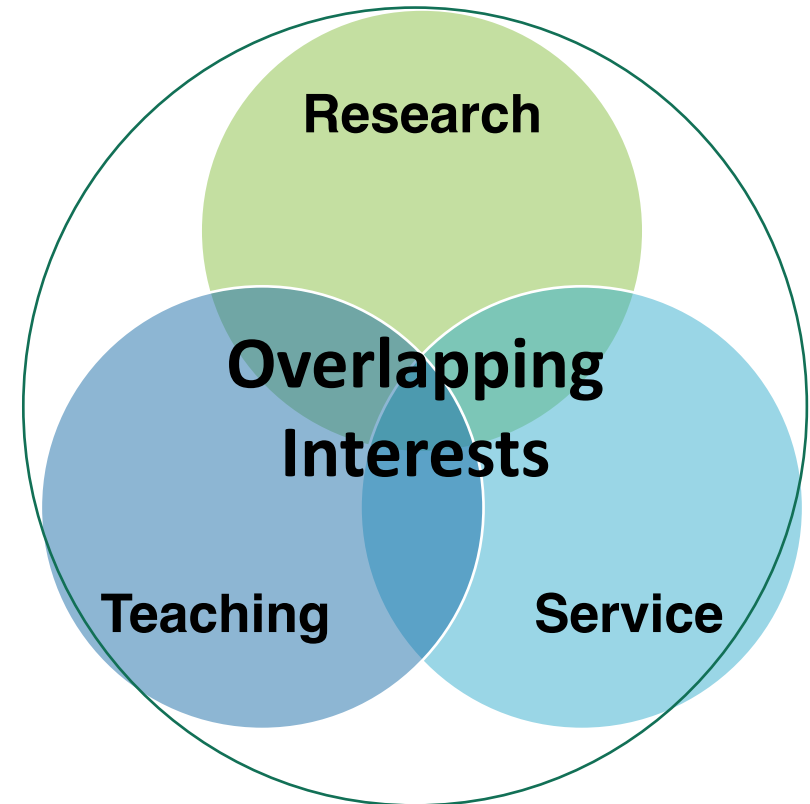# Institutional context & faculty work
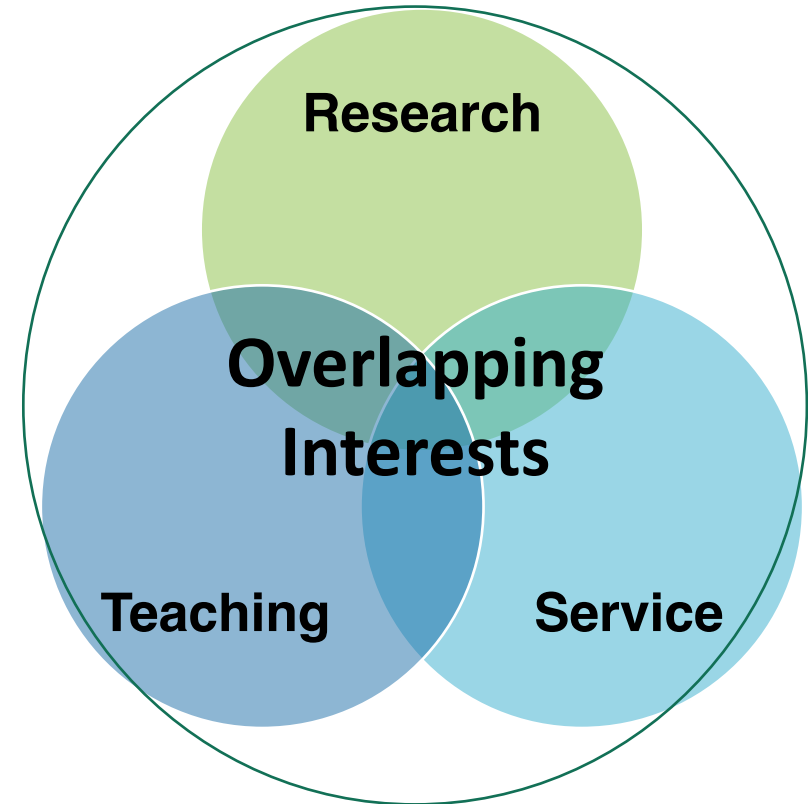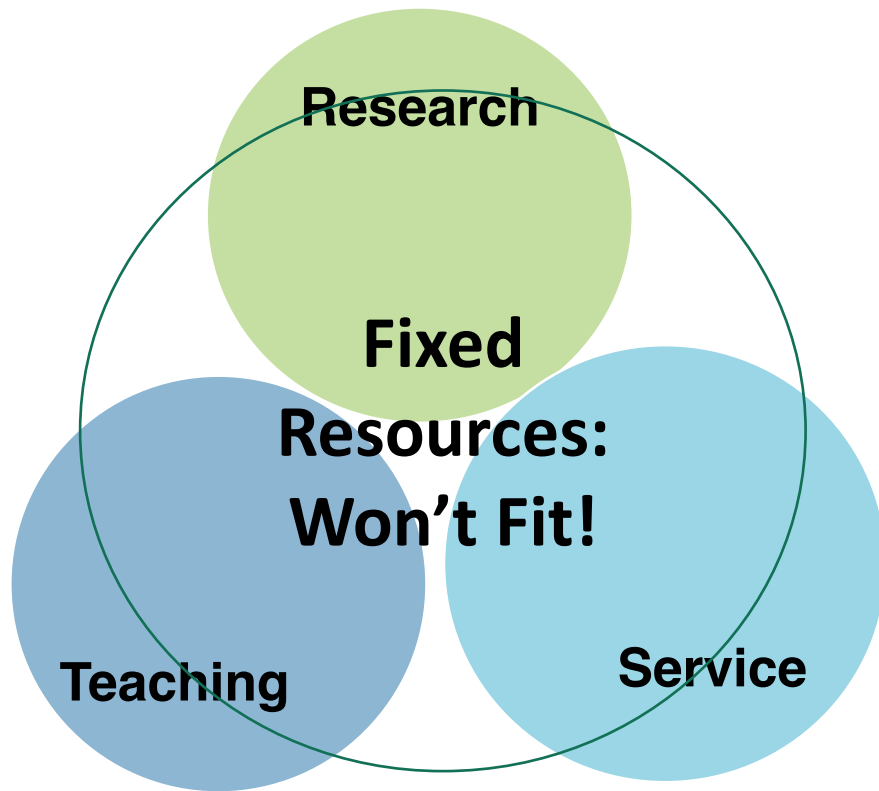
Strategic + Meaningful Overlap:

- Choice of service/committees
- Teaching & Research
- Mentoring

➢Commitments that fuel your
  sense of mission and purpose

You – an authentic individual human

Professional & Personal Identity Matters

- Who do you want to be as a scientist, educator, mentor, colleague…?

- Under what circumstances do you best express your enthusiasm and passion?

RBIS Decision-making

NFW:

Which RBISs align with your context?

✔ RBISs – Exposure, Persuasion, Identification, Commitment

✔ Institutional context & faculty work

✔ You – an authentic individual human

With your personality, values, & goals?

3. Change and Adoption in Context

How does this RBIS align with your context? • Time, effort, support, resources…	
How does it align with your personality, values, and goals? • How does it seem like a fit? • What might be challenging? • Are the challenges worth it now?	

Reflection: What are your ideas right now about this RBIS? What questions remain?

3. Change and Adoption in Context

Additional Supports:

Colleagues

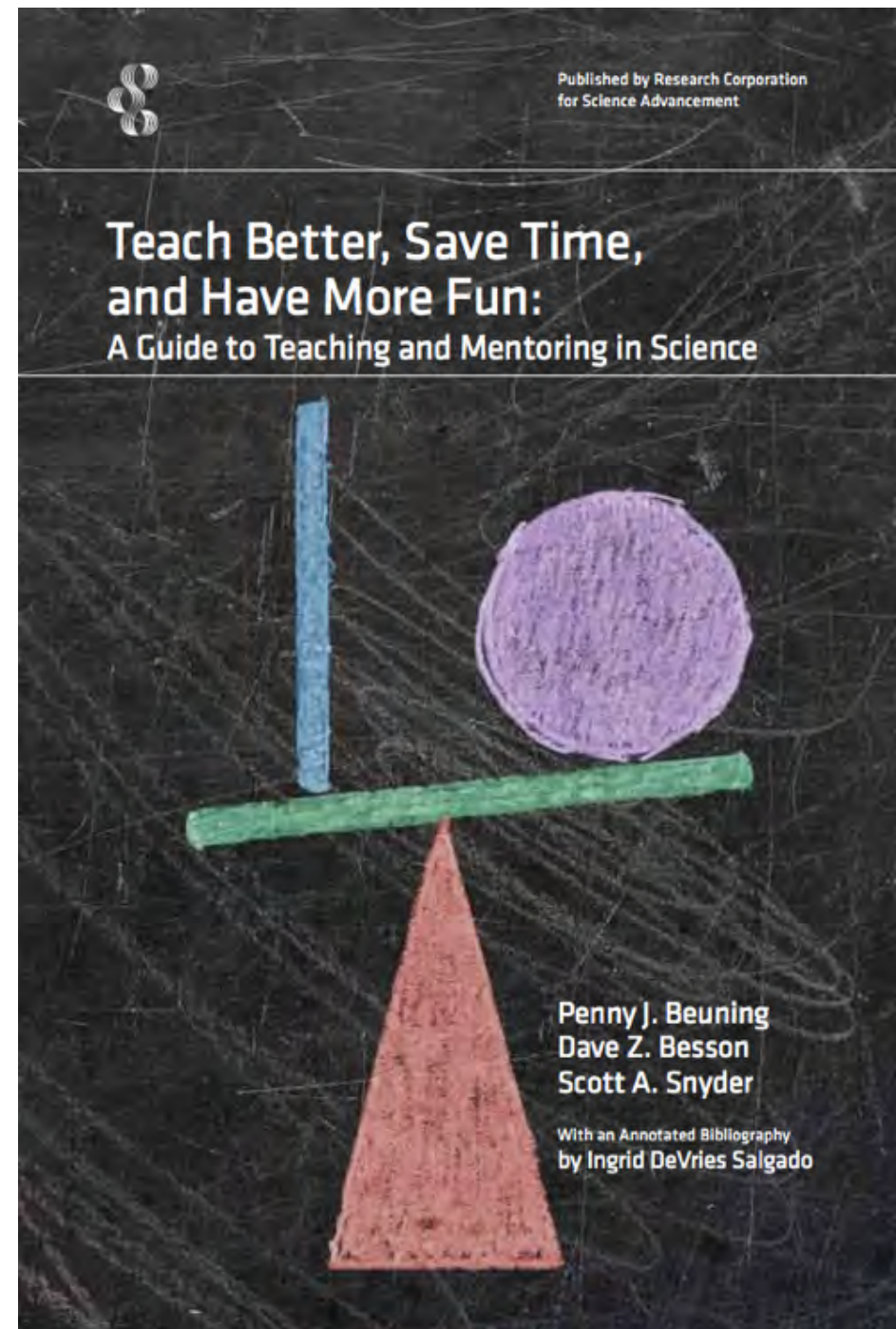Observe! Borrow! Steal!

Mentoring Networks

Teaching/Instruction/STEM Education Centers

Feedback:

- Learn from student work
- Early, informal surveys
- Non-evaluative visit (teaching center; colleague)
  - Observation + consultation
  - Focus group
  - Quantitative tools

Sorcinelli & Yun 2007

Closing thoughts:

"Your students are most likely not like you, but then again, you may not have been who you remember."

Physics and Astronomy New Faculty Workshop: RBIS Scaffolding Template
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Reflection: What are your ideas right now about this RBIS? What questions remain?

http://tinyurl.com/scaffold2017

I'll be here until Saturday afternoon!

Available to help make sense of RBISs, think with you about implementation, etc.

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References & Resources: **In bold are several especially useful and free resources for faculty, with free full-text available online:**

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- facilitation makes the difference. *Phy Rev Phys Ed Res* 13, 020123.
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