A Transformation to Learning Engineering

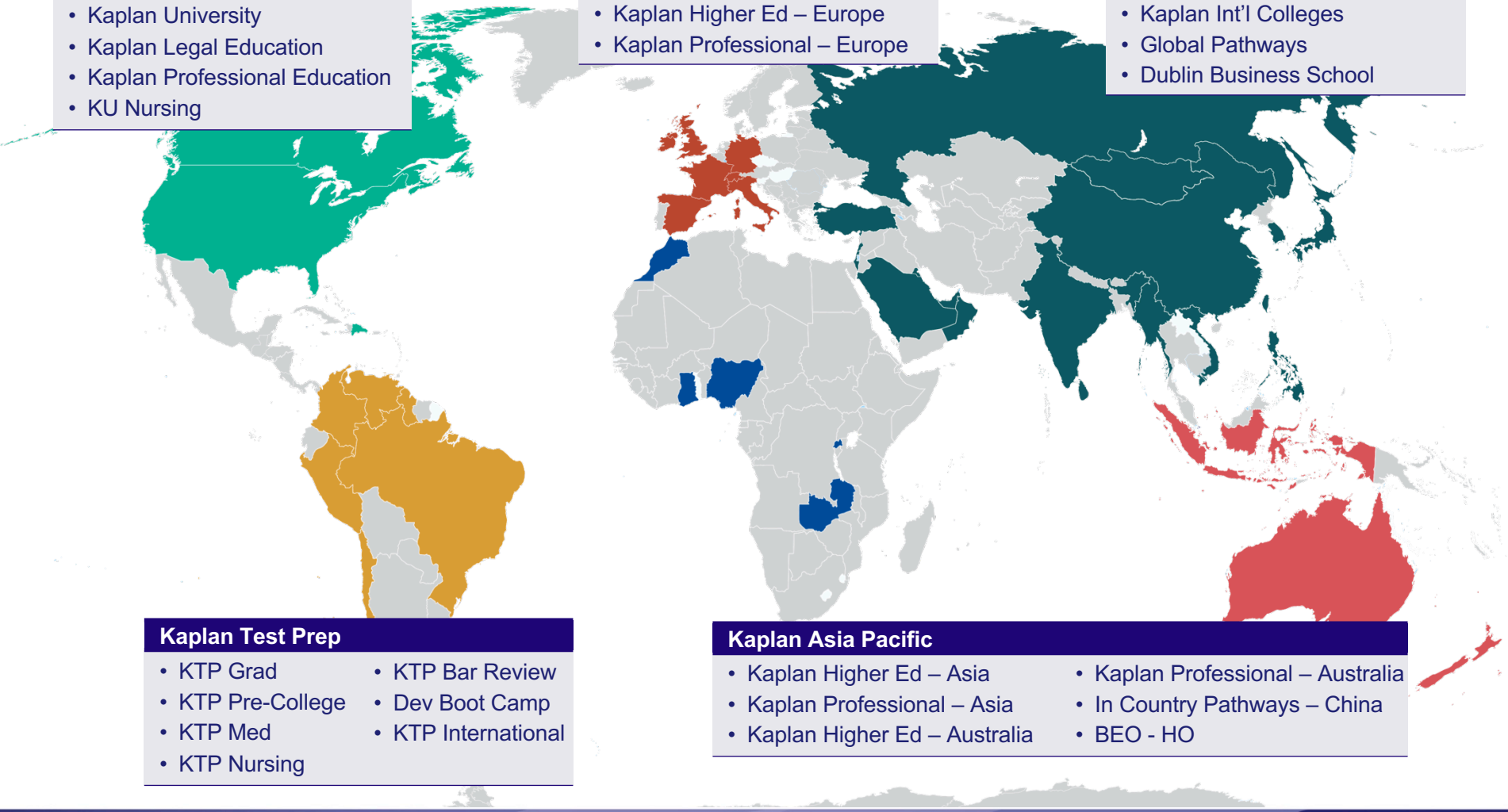
November 2016

Kaplan spans domains and geography

Kaplan University Group
- Kaplan University
- Kaplan Legal Education
- Kaplan Professional Education
- KU Nursing

Kaplan United Kingdom
- Kaplan Higher Ed – Europe
- Kaplan Professional – Europe

Kaplan International Colleges
- Kaplan Int'l Colleges
- Global Pathways
- Dublin Business School



Kaplan Test Prep
- KTP Grad
- KTP Pre-College
- KTP Med
- KTP Nursing
- KTP Bar Review
- Dev Boot Camp
- KTP International

Kaplan Asia Pacific
- Kaplan Higher Ed – Asia
- Kaplan Professional – Asia
- Kaplan Higher Ed – Australia
- Kaplan Professional – Australia
- In Country Pathways – China
- BEO - HO

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Putting evidence to work

- Start from how learning actually works
- Use technology to implement and enhance *good* solutions
- Use evidence to make progress
- Change practices at scale

Learning Engineering

“Learning engineering” at scale requires work

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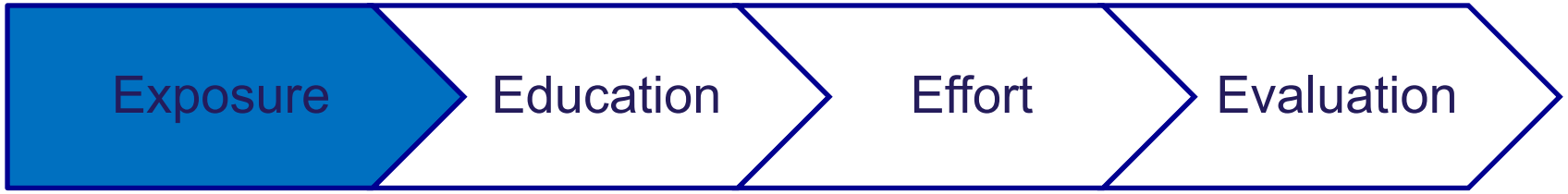
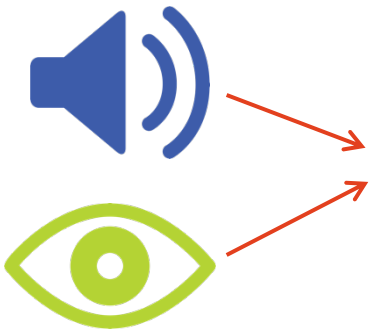
Exposure first



- Show the science
- Show a process
- Make examples

We know a lot about how expertise works



Audio & Visuals aid memory

Working Memory	Long-Term Memory
Short retention	Long retention
Audio + video = benefits	Auto-connect to WM
Verbal/conscious	Non-verbal/Non-conscious
3-5 things at once	Highly parallel
Slow processing	Rapid processing
Error-prone	Error-free (with proper training)
Highly flexible	Rigid – decisions and tasks must “fit”
Can generate new insights/knowledge	

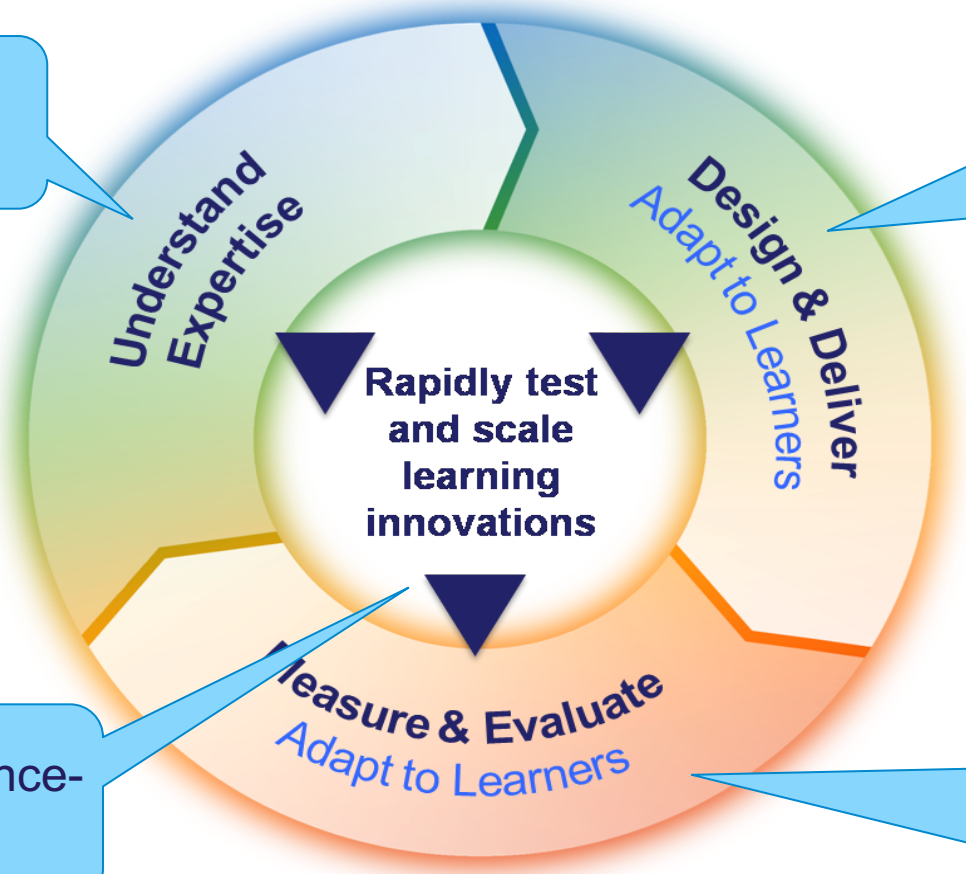
We also know quite a lot about motivation

Motivation Beliefs	Motivation Actions	Learning/Results
• Value • Self-Efficacy • Attribution • Mood	• Starting • Persisting • Mental Effort	• Practice results • Test results • Fluency/ease • Work results

This allows for a "learning engineering" process

Cognitive task analysis

Evidence-based instructional design



Pilot new evidence-based methods

Valid and reliable learning measures

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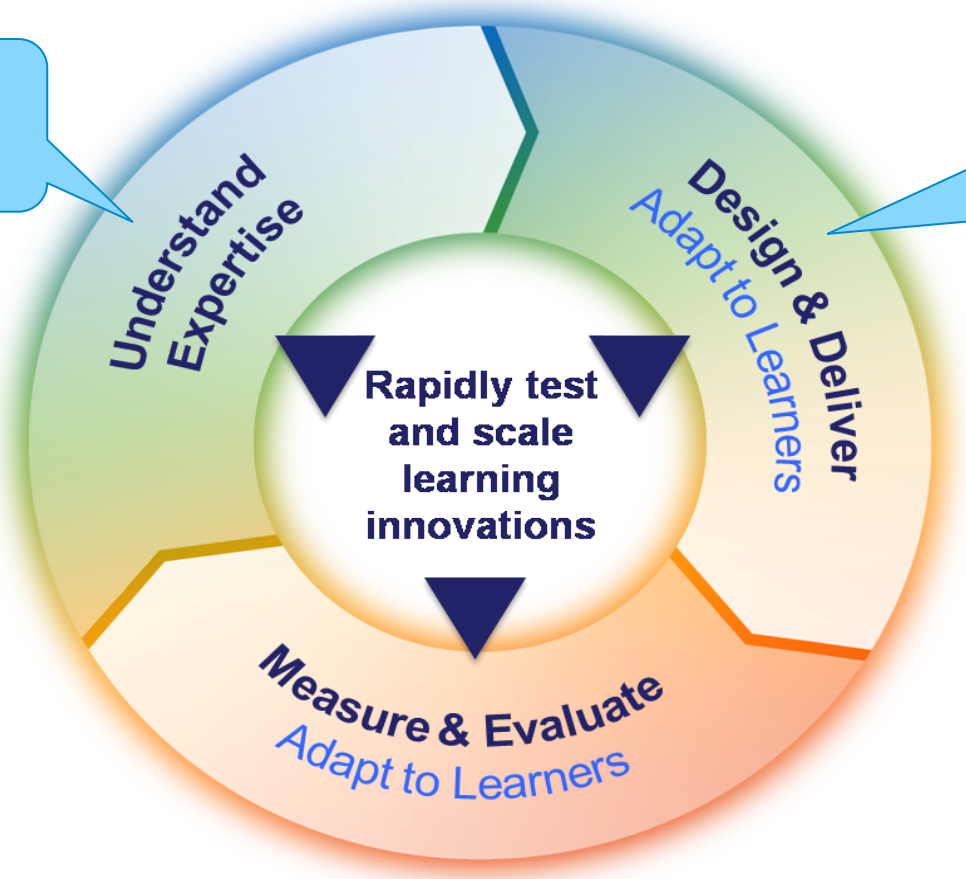
Evidence-based instructional design matters

Cognitive task analysis

Evidence-based instructional design



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Design starts from how expertise gets acquired

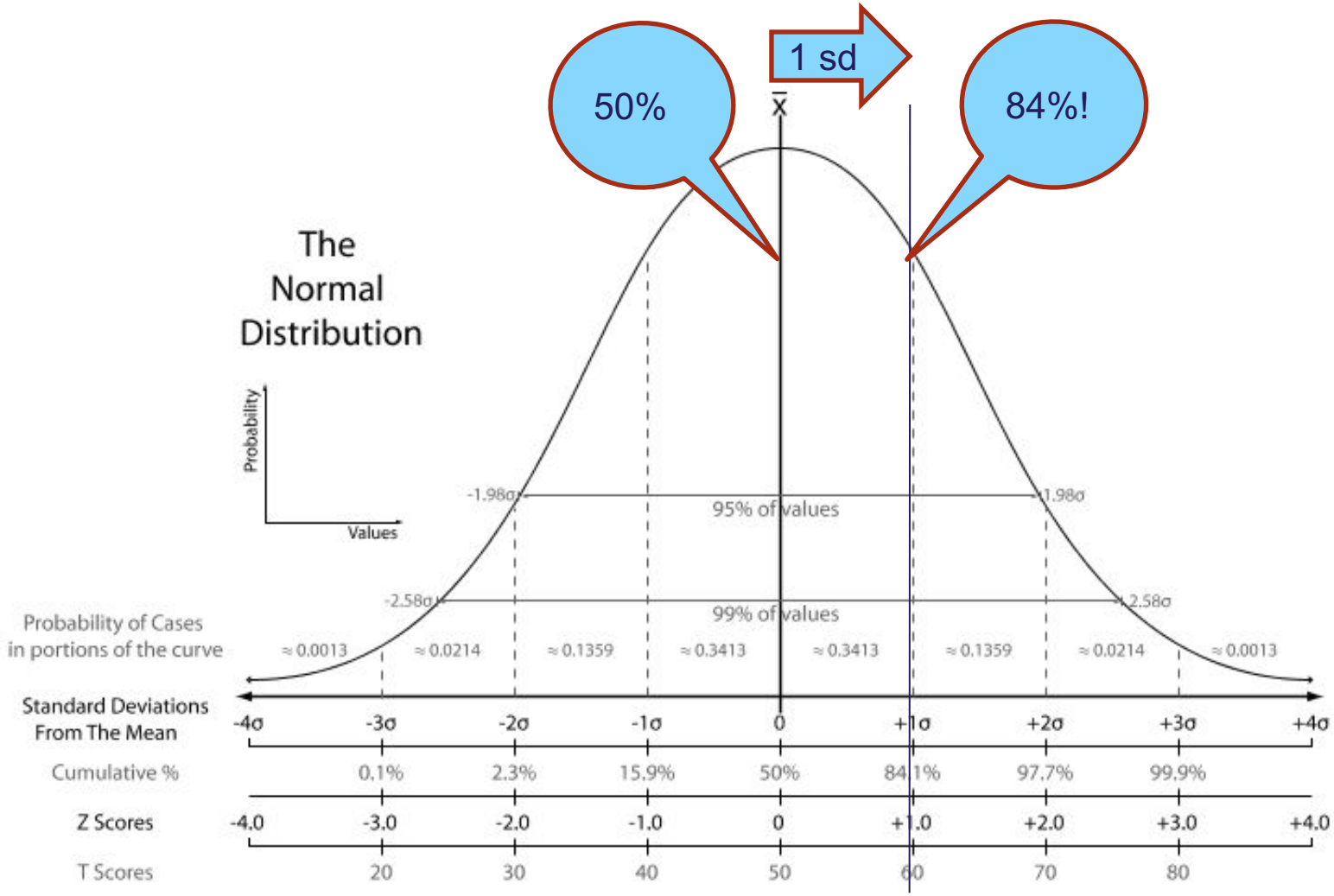
Stage	Implications for Instructional Design
Declarative	Clear **information** displays, e.g., job aids, examples, reference material
Procedural	Build varied **Practice tasks,** and **rich feedback/coaching**
Automated	**Repeated frequent practice** to build speed and accuracy

There's specific guidance to make screens/lessons work better

Principle	Description	Effect size (s.d. units)
Multimedia	Use relevant graphics and text to communicate content	1.4
Contiguity	Integrate the text nearby the graphics on the screen – avoid covering or separating integrated information	1.1
Coherence	Avoid irrelevant graphics, stories, videos, media, and lengthy text	0.9
Modality	Include audio narration where possible to explain graphic presentation	0.8
Redundancy	Do not present words as both on-screen text and narration when graphics are present	0.9
Personalization	Script audio in a conversational style using first and second person	0.8
Segmenting	Break content down into small topic chunks that can be accessed at the learner's preferred rate	0.8
Pre-training	Teach important concepts and facts prior to procedures or processes	0.8
Etc.	Worked examples, self-explanation questions, varied-context examples and comparisons, etc.	??

Source: E-learning and the Science of Instruction, Clark and Mayer, 4th ed., 2016

The impact is not small!



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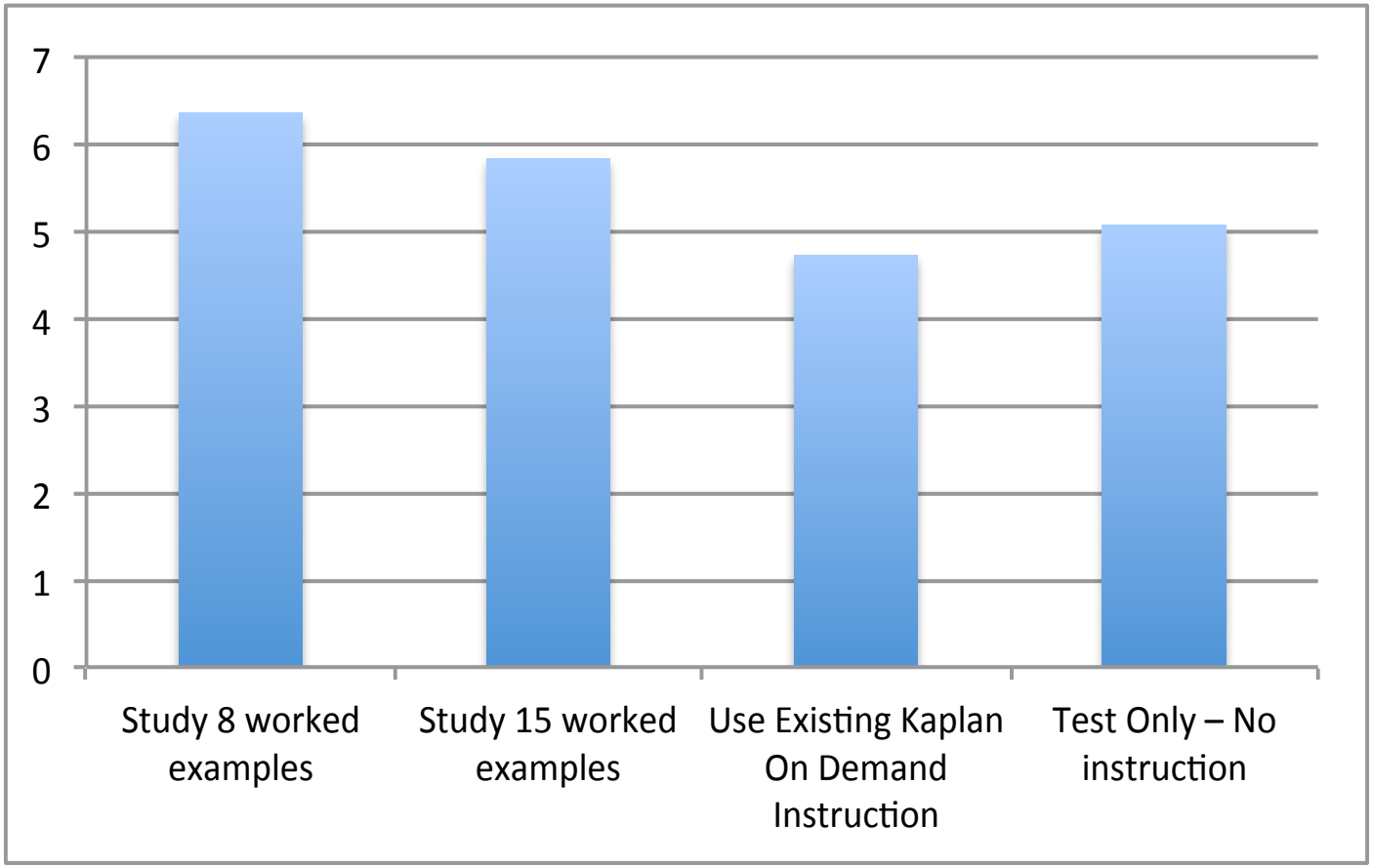
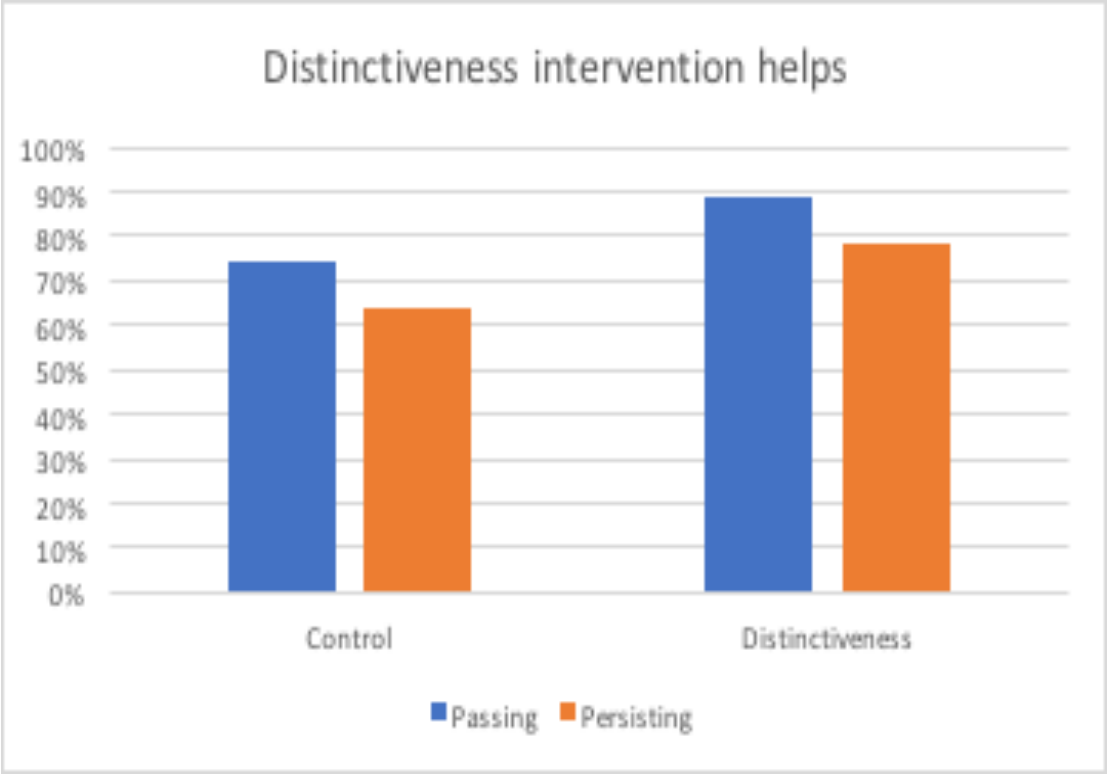
Evidence shows our intuitions aren't the best guides: LSAT Logical Reasoning example



N	**153***	**148***	**107**	**84**
Time (mins)	**8.2**	**12.8**	**99.3**	**NA**

* Significant difference from "No Instruction"

Motivation/meaning interventions work too



N = 446 N = 302

- Students received initial surveys on their "uniqueness" needs
- Intervention students wrote on "what it means to be distinct" and strategies for them to achieve this
- A few weeks later, asked to share how to be distinctive through scholastic achievement
- Passing, grades, and persisting to next course all significantly improved

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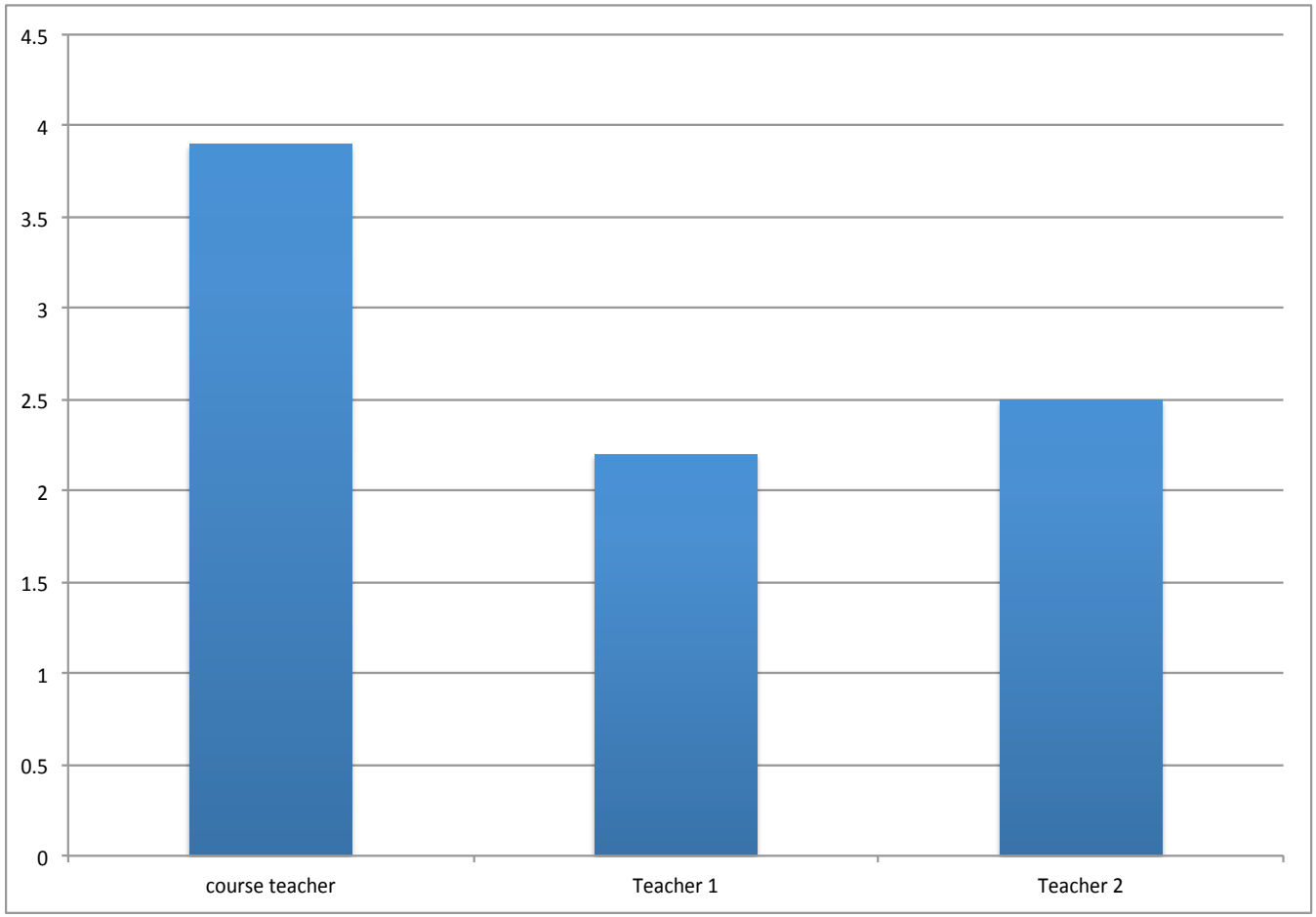
Have to be careful – what we think is "good" may not be

- Comparison of course teacher view vs. independent teachers' markings



Based on 10 randomly selected papers from a writing course

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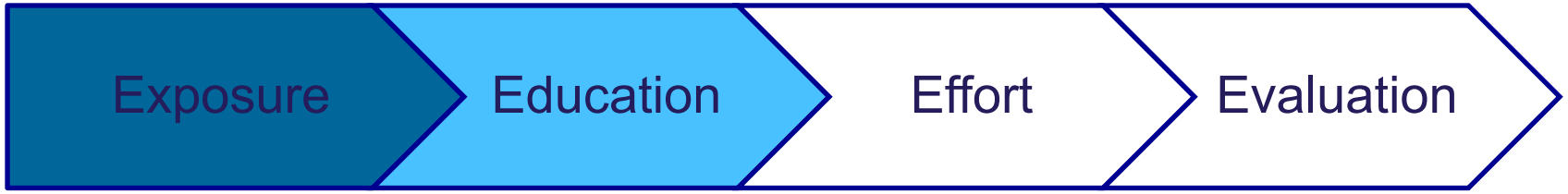
Education of key personnel is next



- Show the science
- Show a process
- Make examples

- Refine process
- Train IDs
- Market exposure

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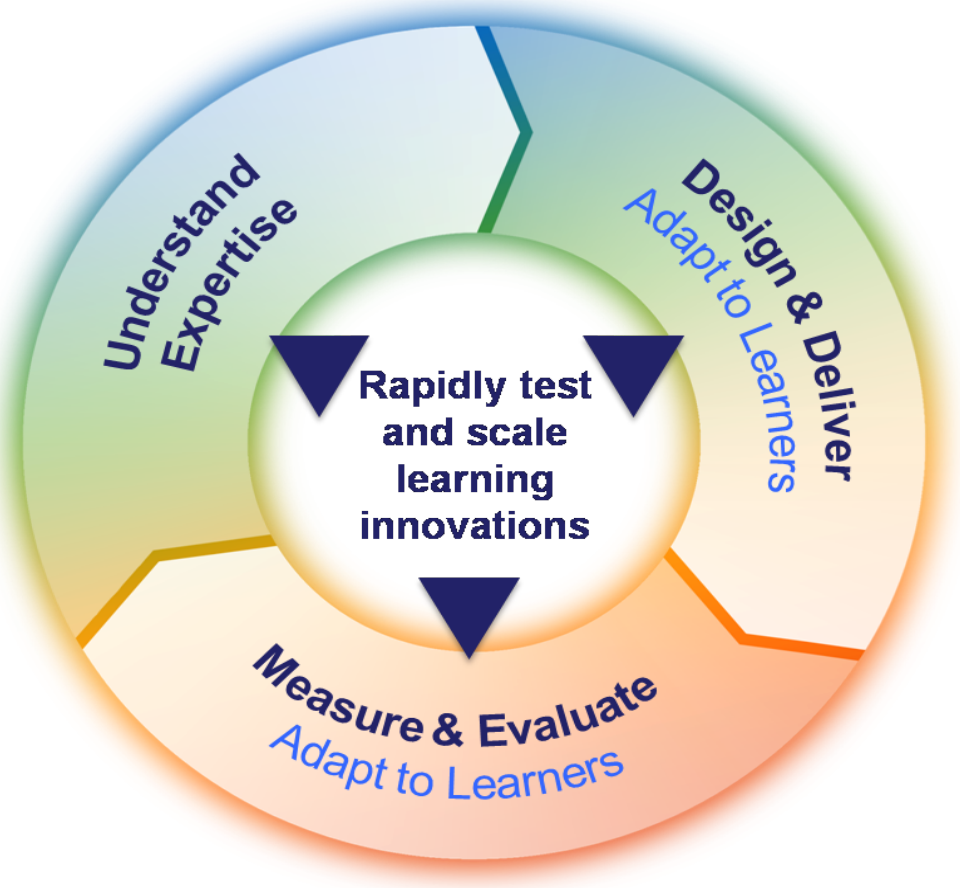
Need to train for different components of Learning Engineering



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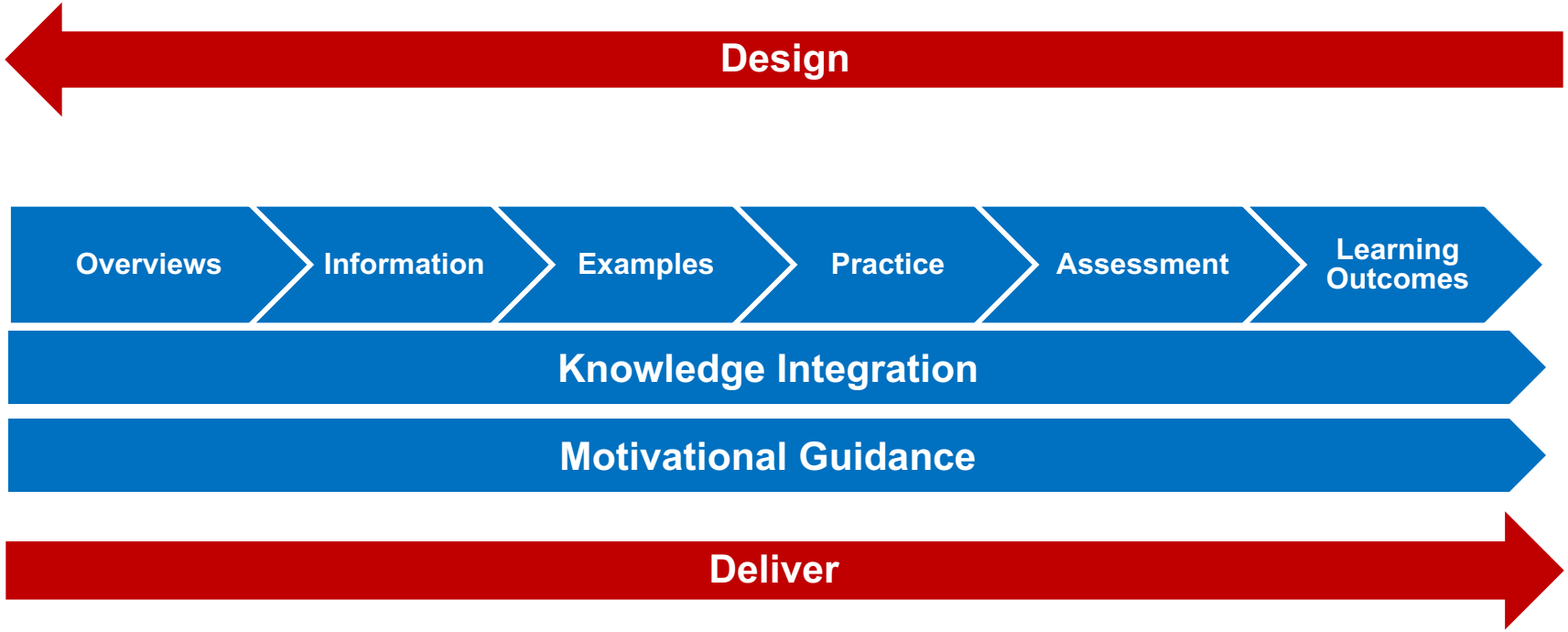
Learning science pushes us to backwards design



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Research gives us clearer guides to help with hard outcomes

Knowledge Component		Practice/Assessment
Procedure		Decide when to use; perform the steps
Supportive Knowledge	Fact	Recall fact in task context; spaced repetition
	Concept	Classify, identify or generate examples and non-examples
	Process	Identify causes of faults in a process; predict events in a process
	Principle	Decide if principle applies; predict an effect; apply principle to solve a problem, explain a phenomenon or make a decision

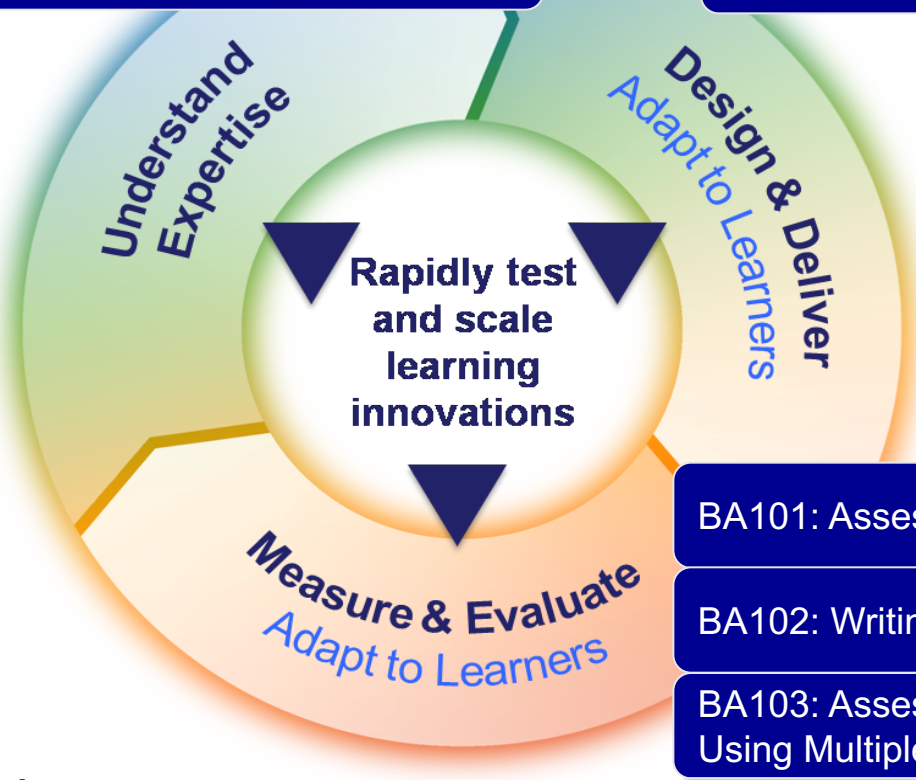
Building valid and reliable assessments “the Kaplan Way”

Purpose	Objectives	Tasks	Rubrics	Reporting	Validation
Identify assessment purpose(s)	Analyze knowledge and skills and define assessment objectives	Design tasks to cover objectives	Design scoring or marking guides	Create reporting plan	Develop and Implement validation strategy for purpose(s)

Training for developers is key

BE201: Cognitive Task Analysis

BE101: Instructional Design



BA101: Assessment Blueprint Development

BA102: Writing Effective Multiple Choice Items (BETA)

BA103: Assessing Complex Knowledge and Skills Using Multiple Choice Questions (BETA)

Building Valid Short Answer and Performance Tasks

Assessment Validation

Launched

In development

In the queue for 2017

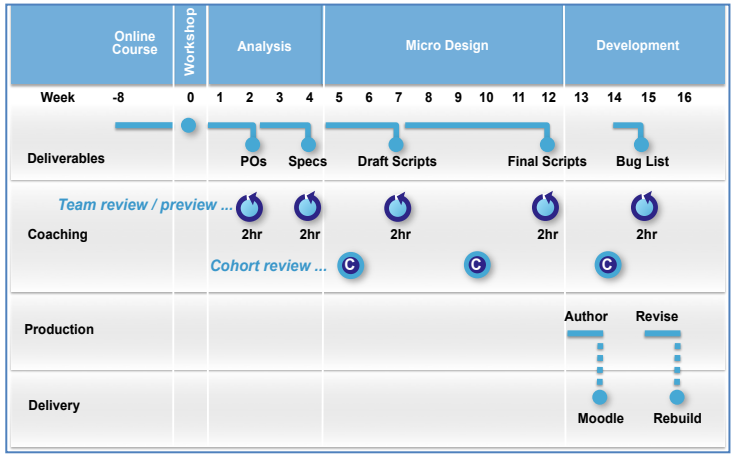
It's real work to alter how a large number of IDs build. . .

2-month online self-study (40 hours)

2-day workshop

Team Projects 4 months coaching

Transfer to products



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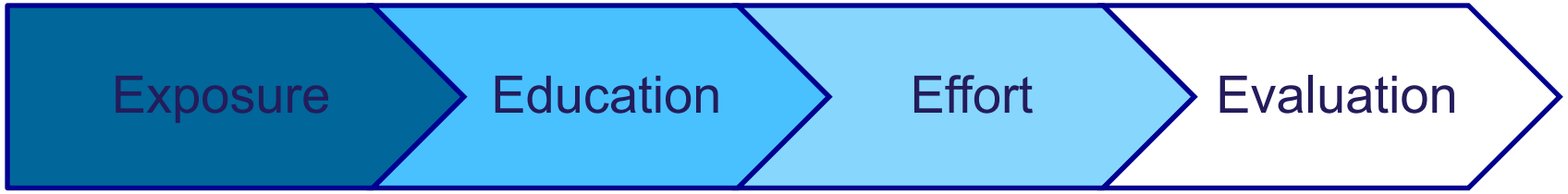
Serious effort to expand across organization



- Show the science
- Show a process
- Make examples

- Refine process
- Train IDs
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- Wider use
- Community
- Set GM goals

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We knew there was (is) much potential to improve*

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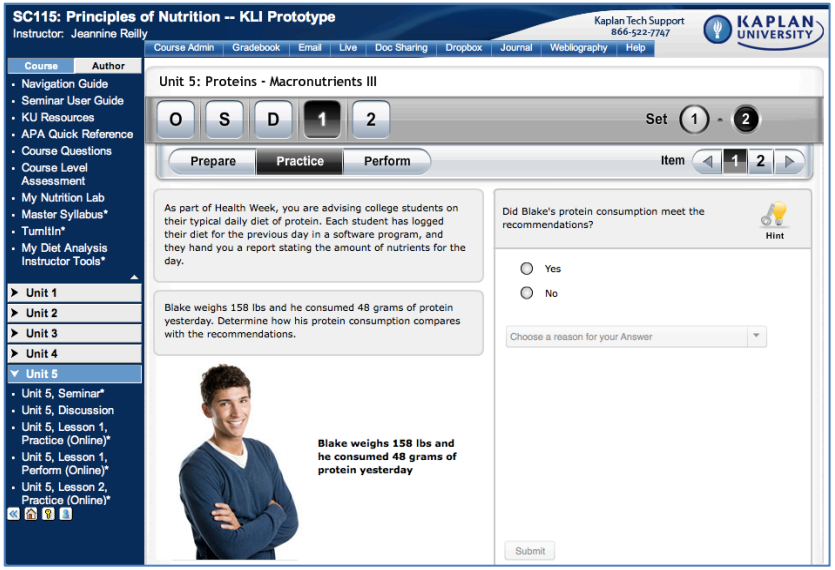
*Example: Ratings from Kaplan Way for Learning checklist, applied to 9 Kaplan products

More use of learning science principles does help

Existing courses

Redesigned courses



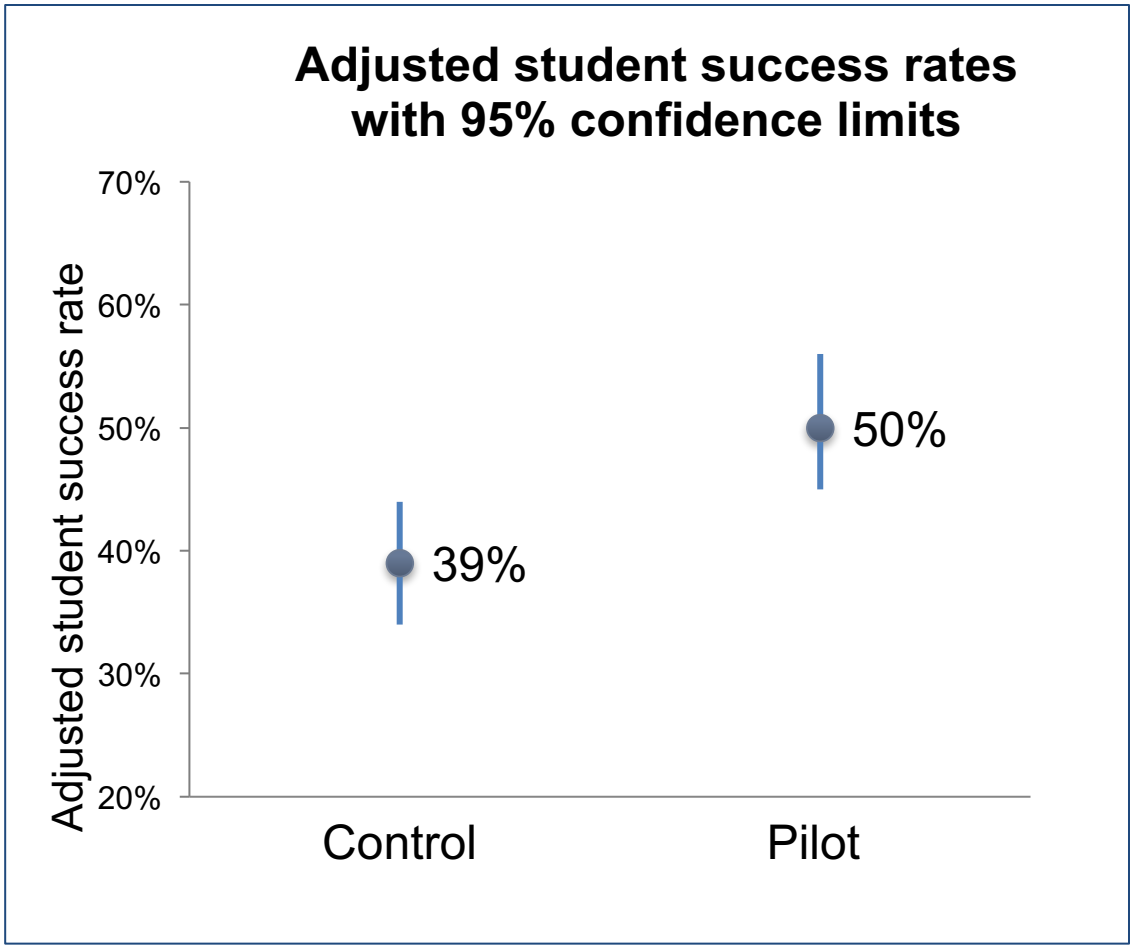
Read, Write, Discuss

- Outcomes and content not precisely aligned
- Limited demonstrations, worked examples, and practice
- General assessment rubrics
- High reliance on discussion boards

Prepare, Practice, Perform

- Outcomes and content aligned
- One lesson per objective
- Demonstrations and worked examples
- Practice, feedback before assessment
- Detailed scoring guides
- Less discussion/more practice
- Standard instructor materials
- Monitoring and support for motivation

Result: much greater student success

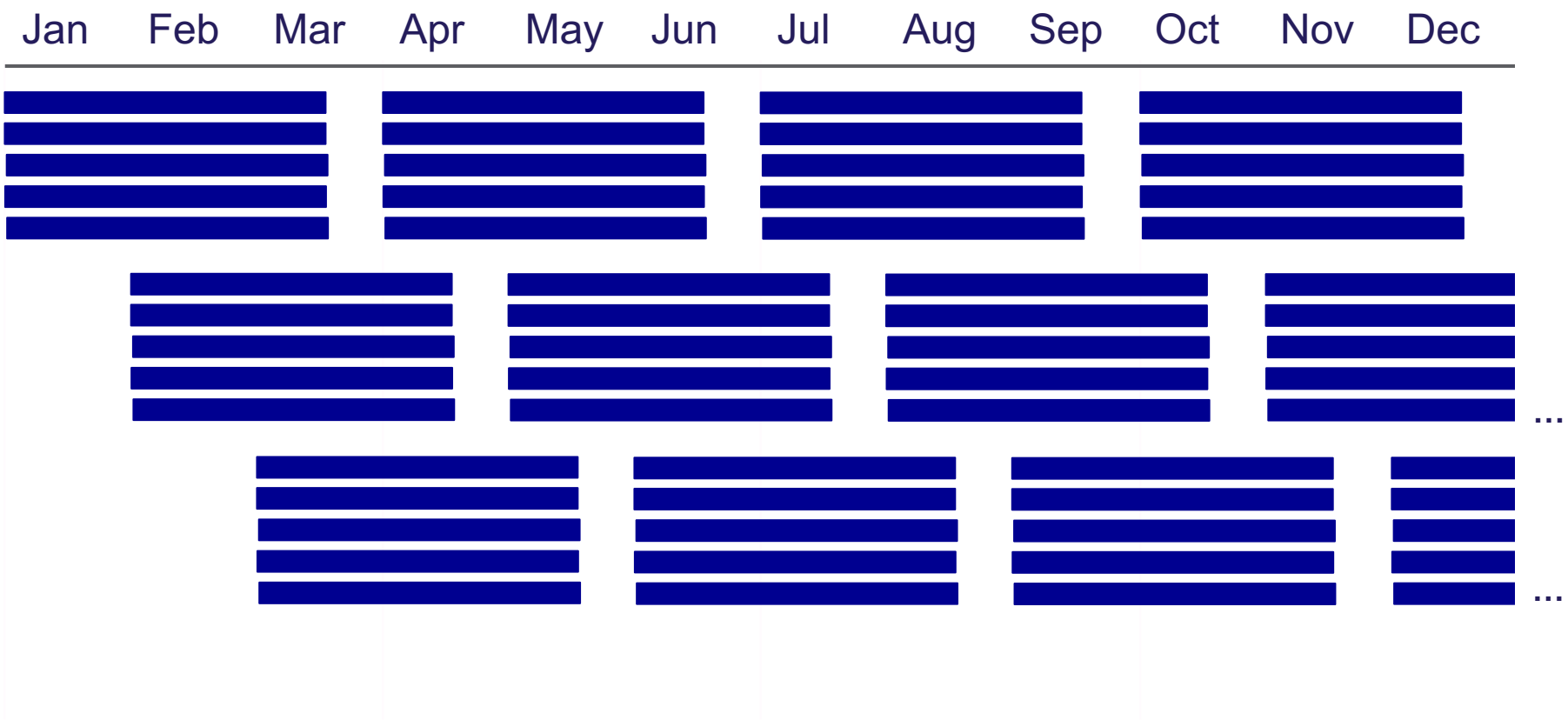


Wald Chi-Square: 10.42, df=1, n=895, Sig<.001.

- **11%** higher success rate
- **28%** increase
- Students in redesigned courses were **1.6** times more likely to be successful

With scale, we can run many tests

ILLUSTRATIVE



For illustration purposes: Based on CM 107 (College Composition)
Each band represents 8 sections, each with 25 students (a total of 200 students)

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With scale, we have the option to continue to improve further

Adaptive	Assessment & CLA	Learning Strategies	Media Principles	Motivation & Self Efficacy	Social Norming	Worked Examples	Others	Open Courses
SmartBook	CLA Re-Scoring	Self-Explanation	Advanced Organizers	Judgments of Learning	Badging	Early	Section Size	Challenge Exams
MyLab	Assessment	Self Summary	Coherence	Motivational Priming	Iconographs	Later	Orientation	
		Self Test	Continuity	Self Efficacy			Faculty Dashboard	
			Modality					
			Multimedia					
			Redundancy					

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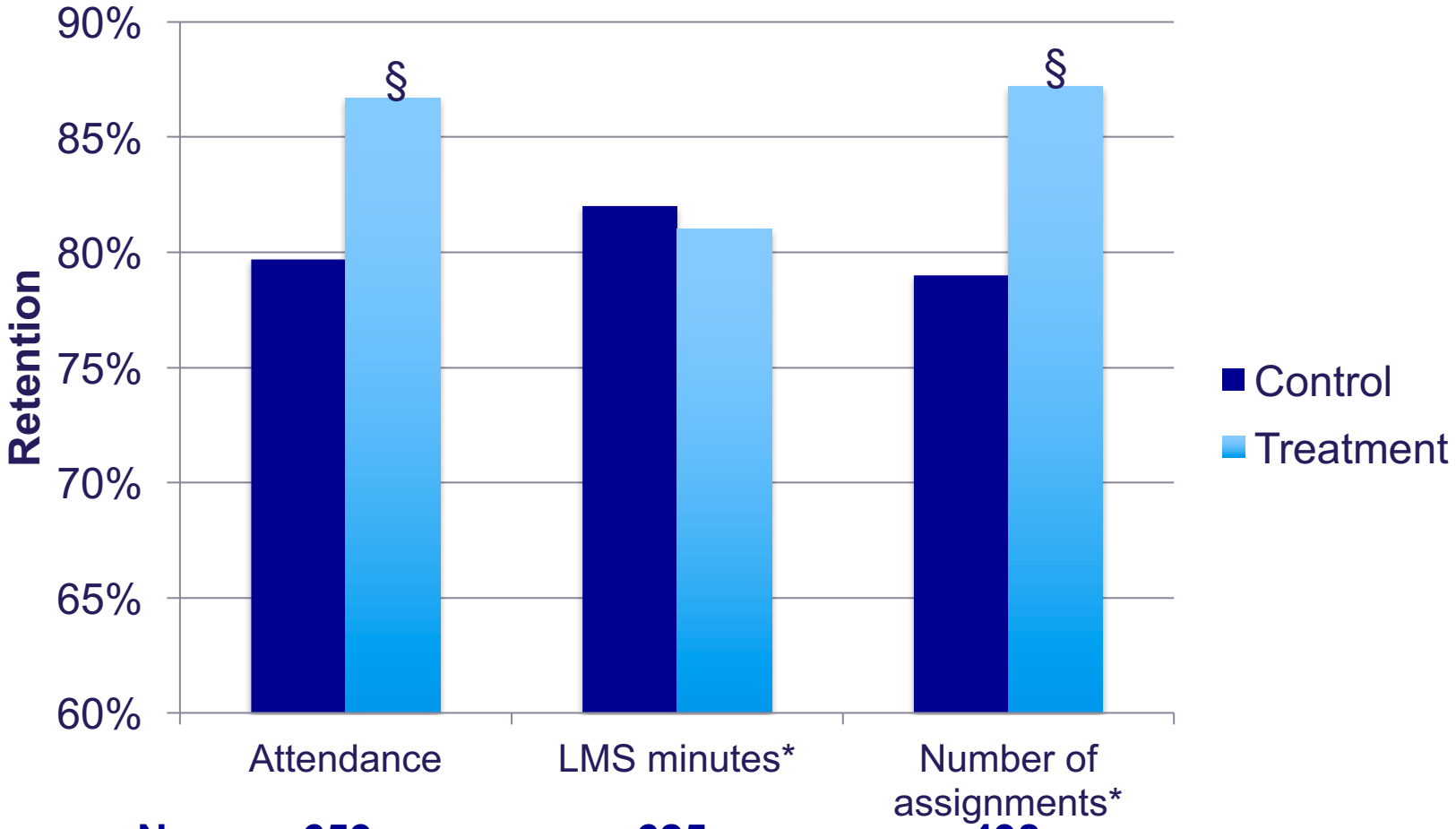
Need to check:

Impact of faculty dashboards on first year college social studies course



N: 653 625 498

* Improved learning outcomes

§ Improved retention

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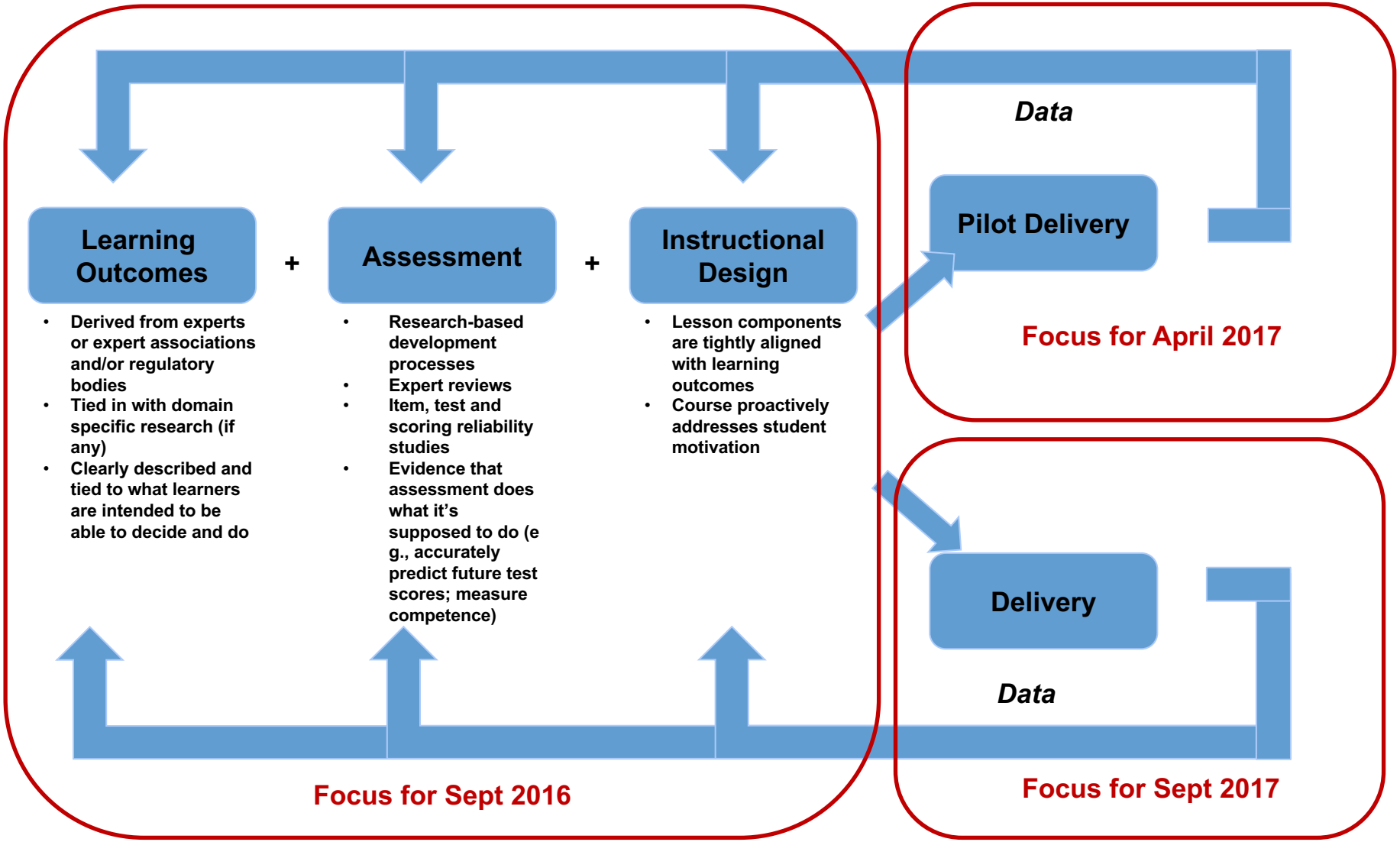
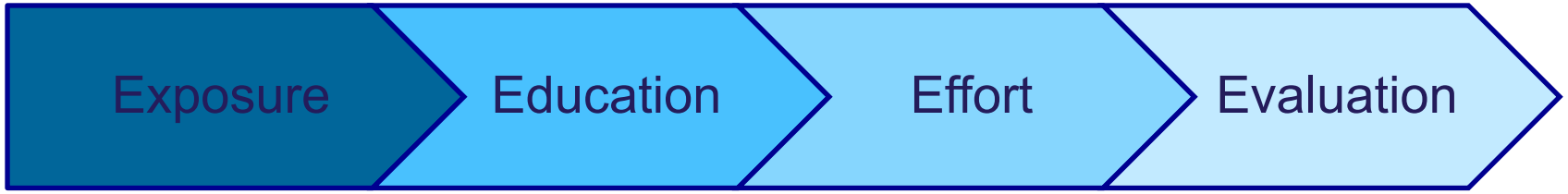
Established a Learning Architect Community: E.g., to look in detail at learning measurement issues

- **Learning Architect Community** — Anyone connected with learning at Kaplan
  - **Measurement Council** — Anyone interested in learning measurement at Kaplan
    - **Steering Committee** — Key leaders who drive learning measurement within their business units
      - **Working groups** — Small groups focused on specific measurement issues and challenges
        - Data mining
        - Learning analytics
        - Others TBD

Established a General Manager review process to focus on learning tradeoffs and essential ingredients for quality



Over time, need to continue evaluation



- Show the science
- Show a process
- Make examples

- Refine process
- Train IDs
- Market exposure

- Wider use
- Community
- Set GM goals

- Initial tools/rubric
- Evidence review
- Detailed measures

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We put in place a “Kaplan Way” checklist:

Category	Rating	Rank
1. Objectives		
2. Assessment		
3. Practice		
4. Examples		
5. Information		
6. Multimedia		
7. Overviews		
8. Integration		
9. Motivation		
10. Organization		
11. Usability		
12. Personalization		
TOTAL SCORE (1 - 12)		

This means systematic attention from teams

Product Quality Report: Product Overview

<Course Number>:

<Narrative descript
including format (o
based, blended, etc
prerequisites, gene
goals, and other fe

Product Quality Report: Ratings Summary

Category
1. Objectives
2. Assessment
3. Practice
4. Examples
5. Information
6. Multimedia
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10. Organization
11. Usability
12. Personalization
TOTAL SCORE (

Product Quality Report: Comments Summary

Category	
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7. Overviews	
8. Integration	
9. Motivation	
10. Organization	
11. Usability	
12. Personalization	
OVERALL	

Product Quality Report: Appendix

CATEGORY: <e.g., Overviews>

STRENGTH (or OPPORTUNITY): <short description here>

<Add one screen capture per slide to illustrate strengths or opportunities of the product>

4

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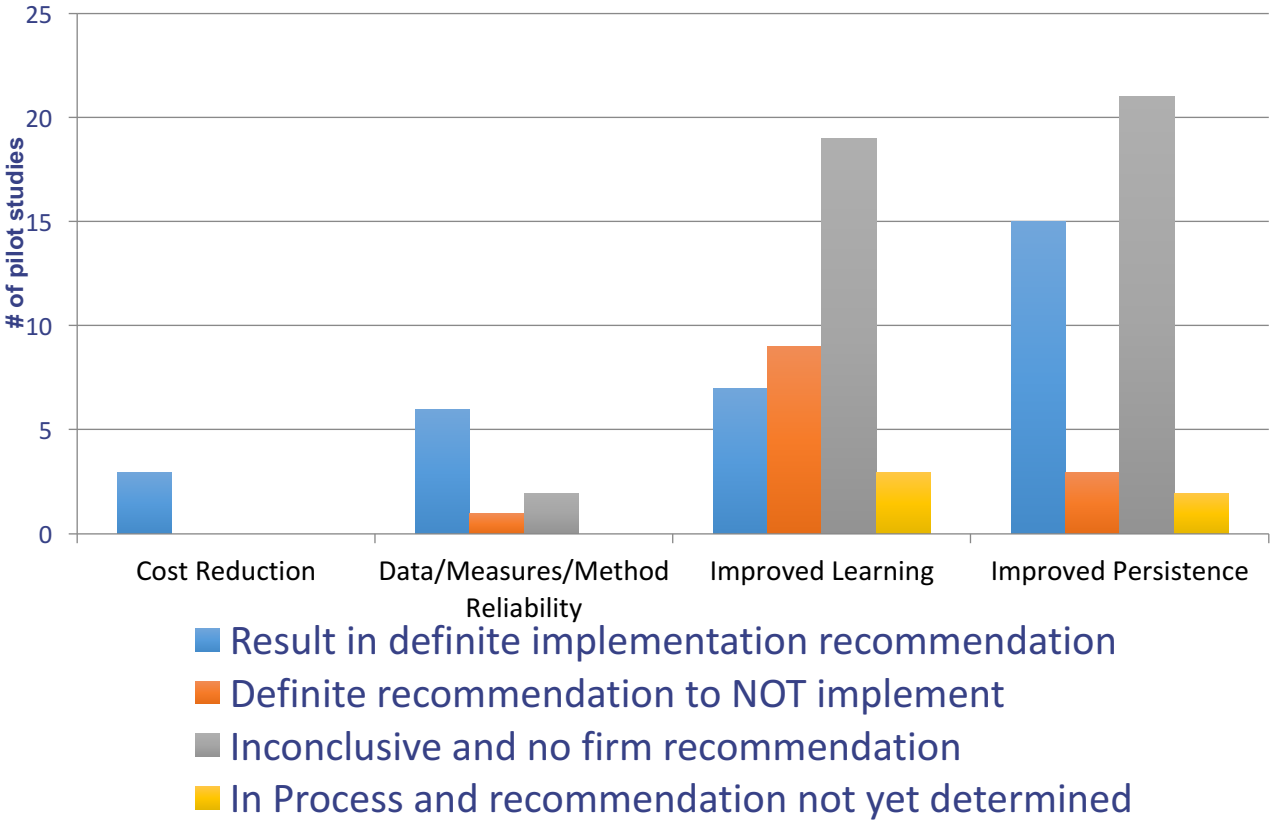
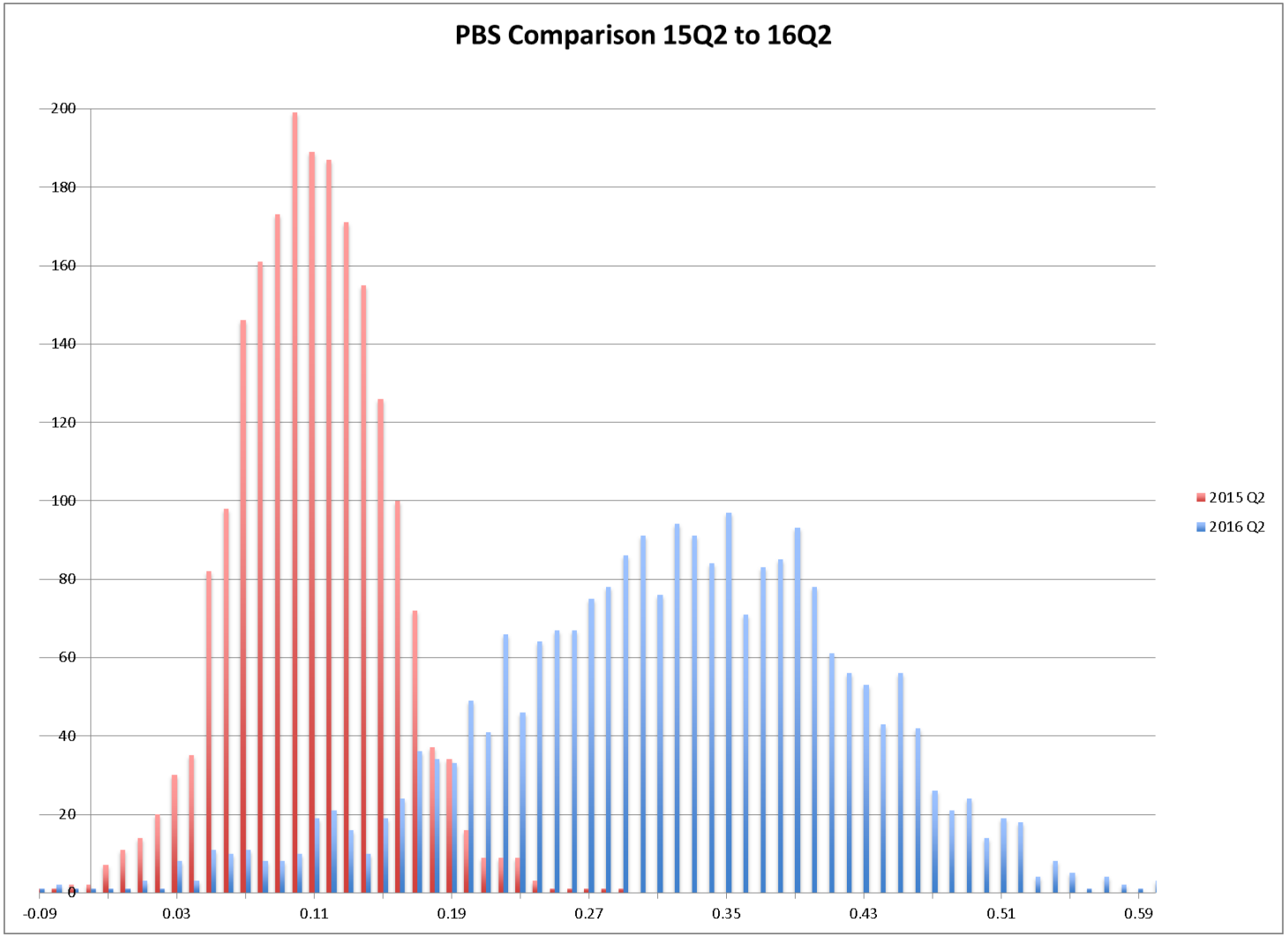
At scale, we can look at the overall outcome of many pilots

Kaplan University Research Pipeline Focus and Progress (11/2015)



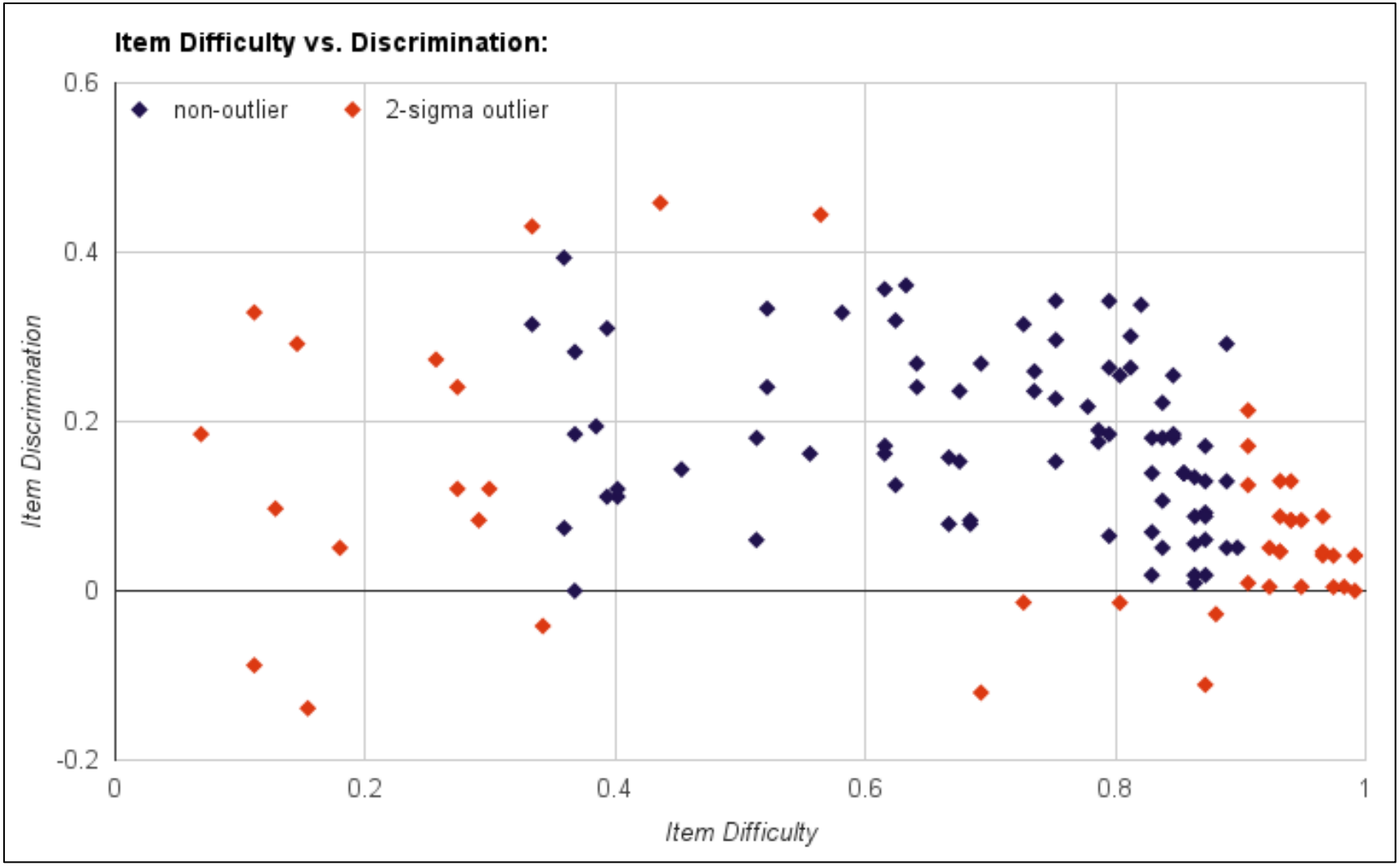
- Four key focus areas; Dozens of randomized control trials over past two years.
- Several early studies proved inconclusive – led to more structured pilot design process.
- Yielding several “go / “no go” decisions based on evidence of improved outcomes.

Can look in detail at specifics: Health Care QBank Question Analysis Results

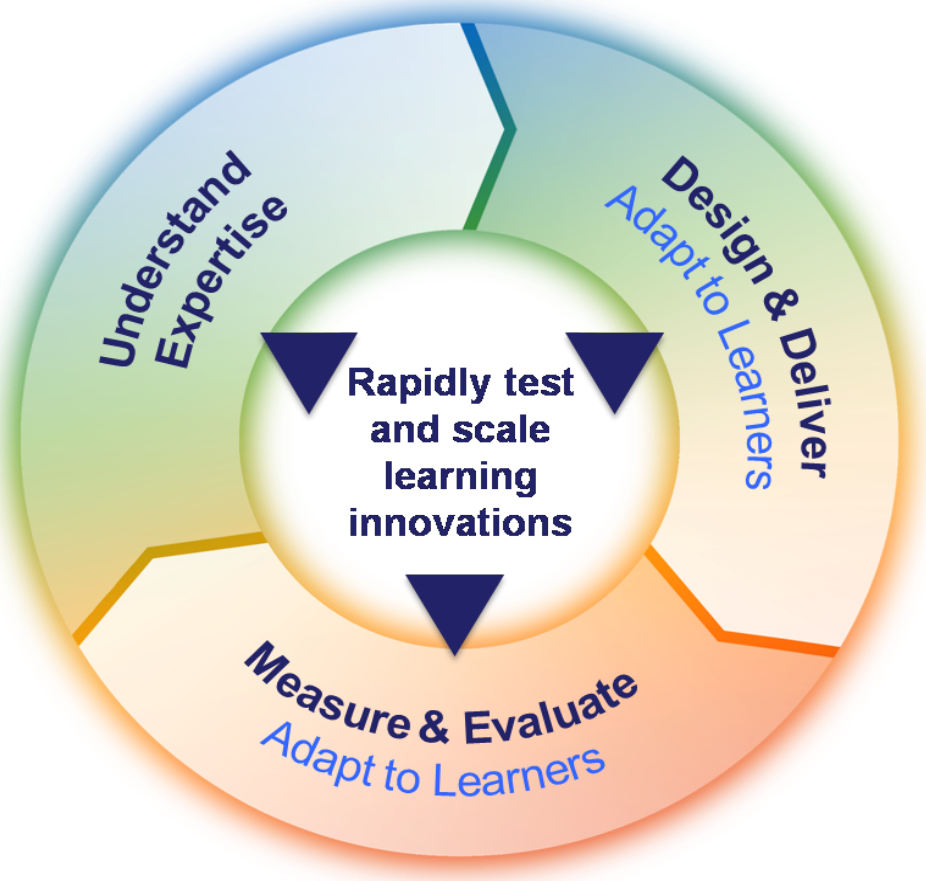


Measurement & Evaluation – Kaplan Professional US

Tactical Work, Financial Svcs. - Used CTT to identify a way to improve testing for a client



All this matters if you're after good "learning engineering"



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Where to find out more?

- Location of course on using (and downloading) a learning science checklist:

  http://goo.gl/f1RCAu

- Bror's Blog for more on "learning engineering":

  http://www.kaplan.com/brorsblog

- Recent Ithaka article on applying learning engineering at KU:

  https://goo.gl/lIhRZM

- Contact me:

  bror.saxberg@kaplan.com

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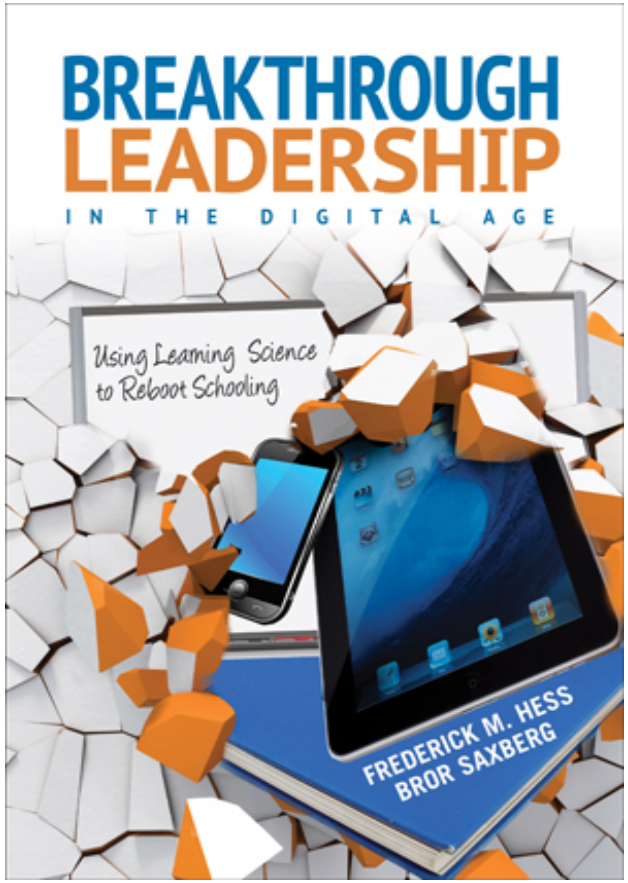

April 20, 2015

Why We Need Learning Engineers

Chronicle of Higher Education

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