Designing for Student Success: Adaptive / Active Learning

Peter van Leusen, Ph.D.

Adaptive / Active Learning

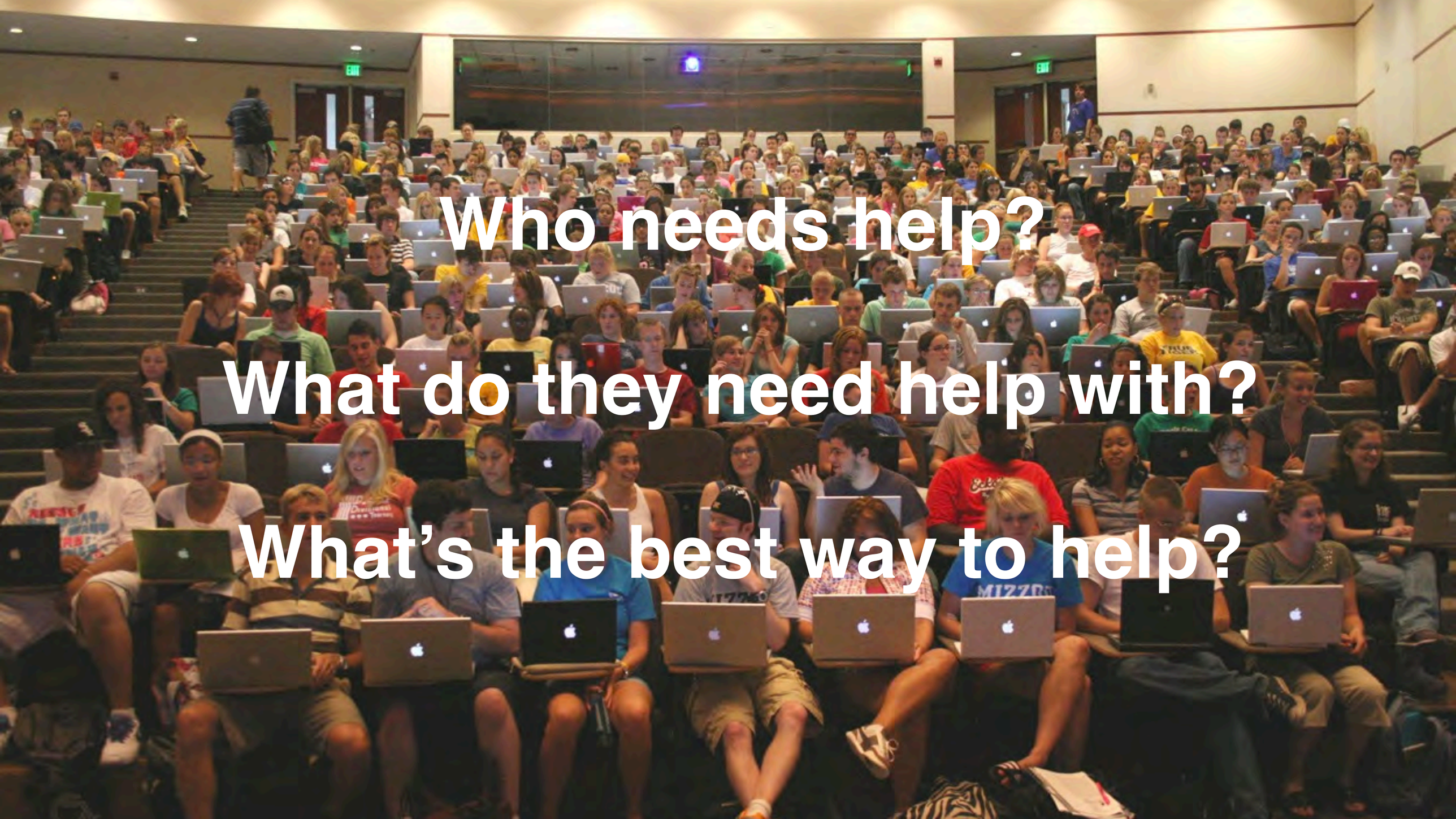
- Background
- Goals
- Outcomes
- Implementation
- Strategies
- Evaluation
- Future

“Necessity is the mother of all inventions!”

Plato

ASU Charter

ASU is a comprehensive public research university, measured not by whom it excludes, but by whom it includes and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.


Who needs help?
What do they need help with?
What's the best way to help?

Goal

achieve 90% retention

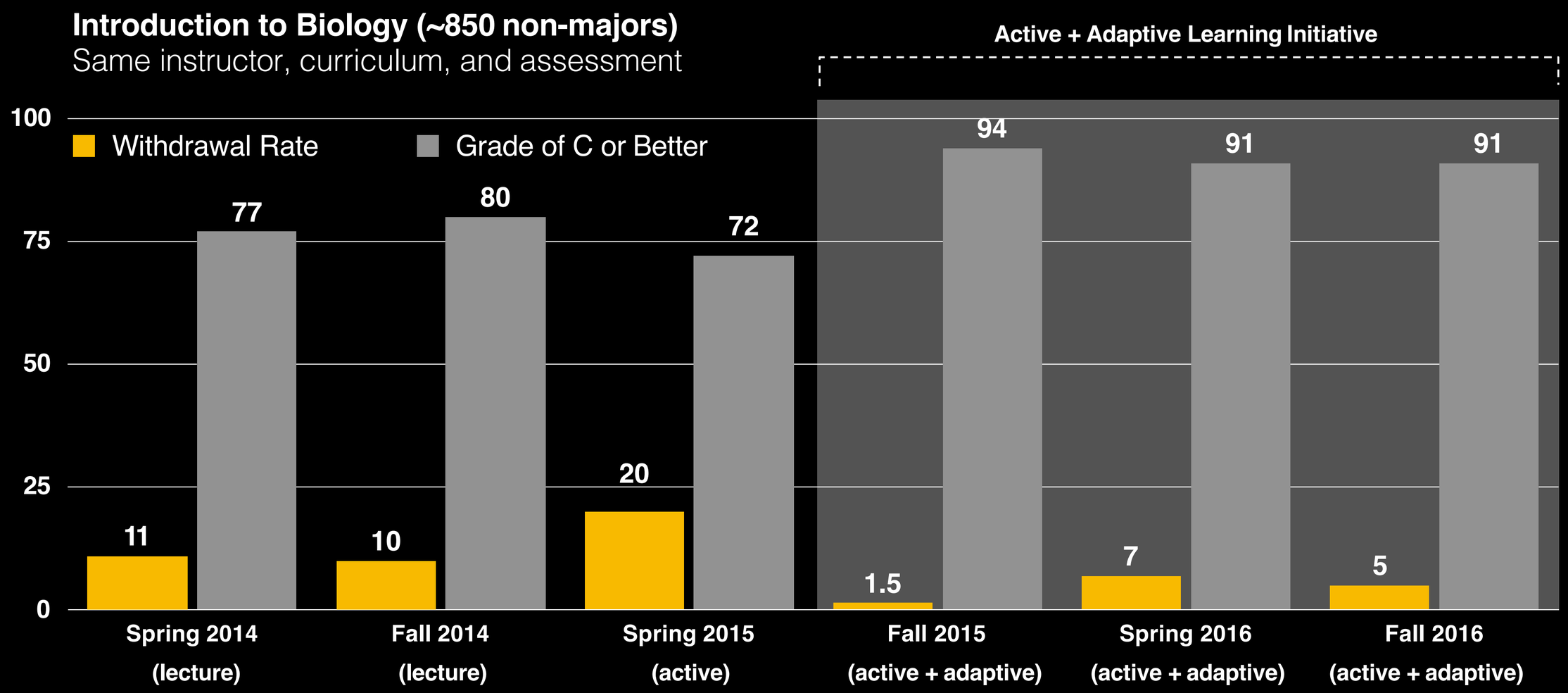
Goal

90% Retention

- Do active learning in every class
- Help 90% of students get C or better
- Reduce withdrawal rate to under 5%
- Identify struggling students by week 2

Outcomes

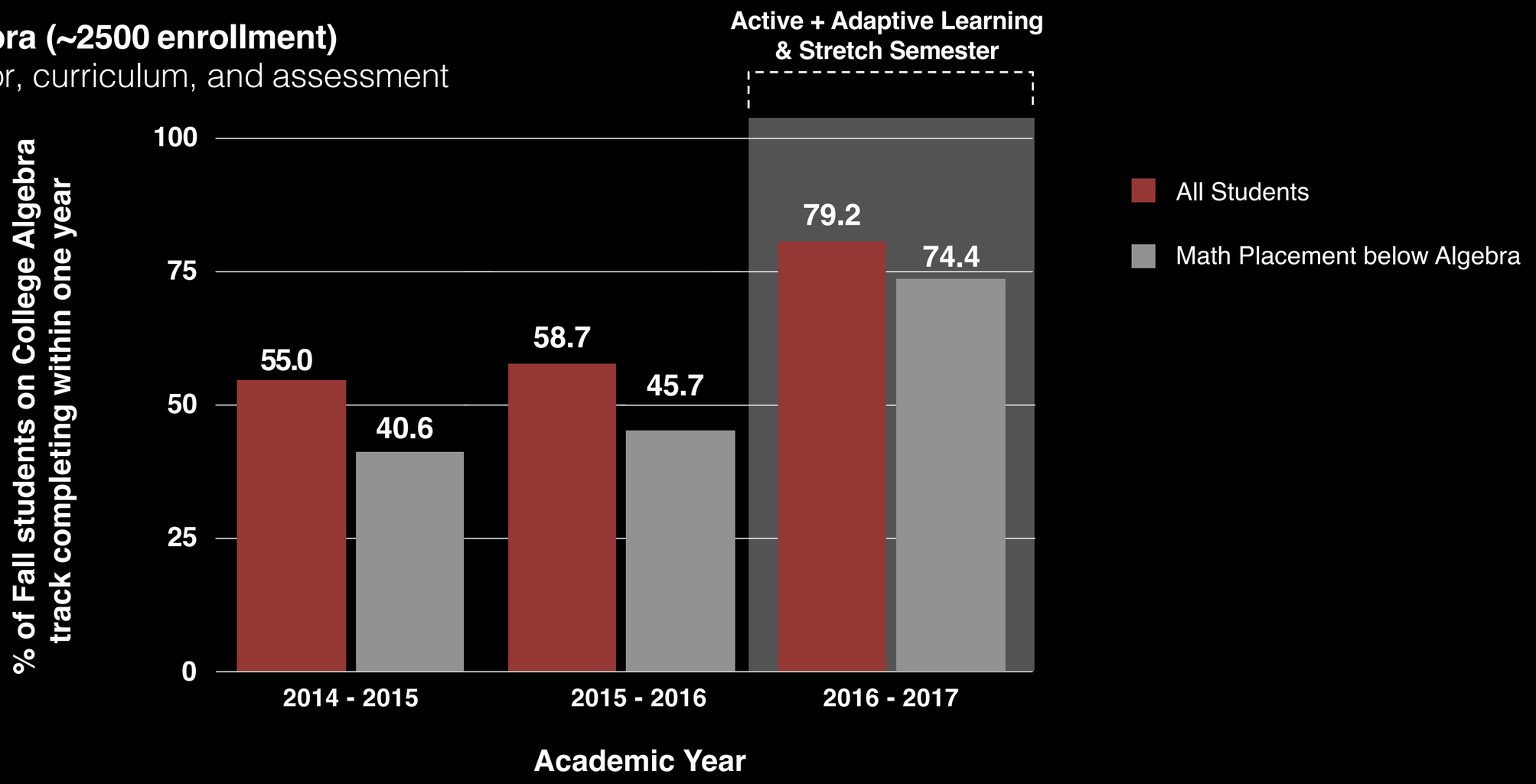
Adaptive / Active Learning



Outcomes

Adaptive / Active Learning

College Algebra (~2500 enrollment)
Same instructor, curriculum, and assessment



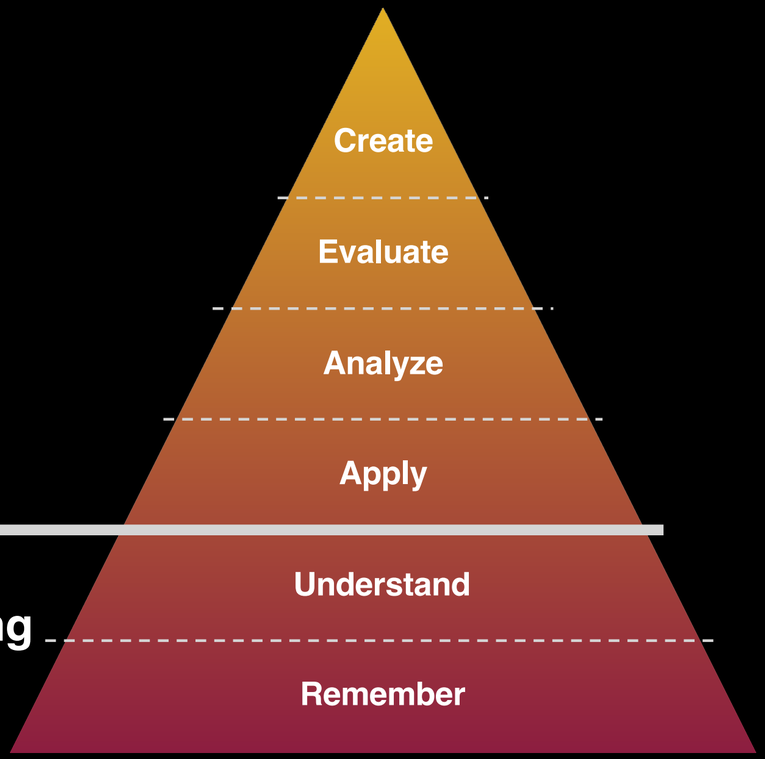
Implementation

Implementation

Adaptive / Active Learning

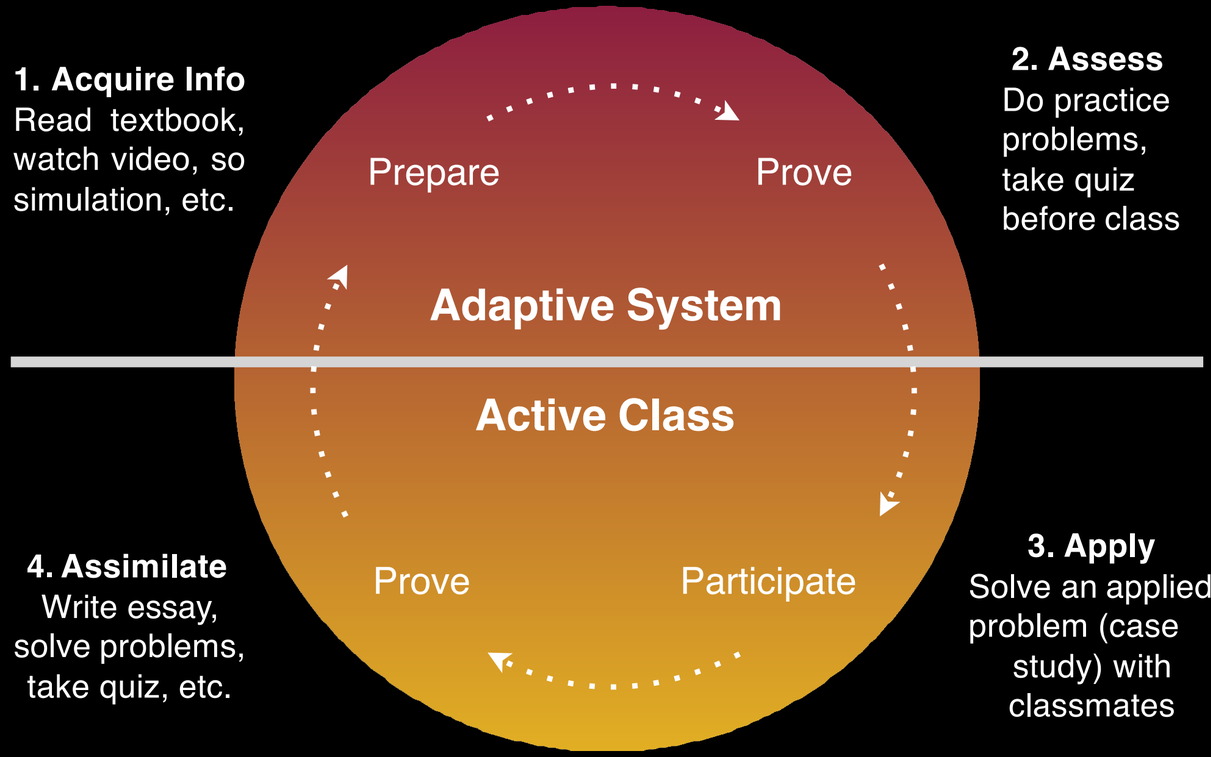
Active Learning in Class / LMS

Adaptive Learning Before Class



Bloom's Taxonomy

1. Acquire Info
Read textbook, watch video, so simulation, etc.



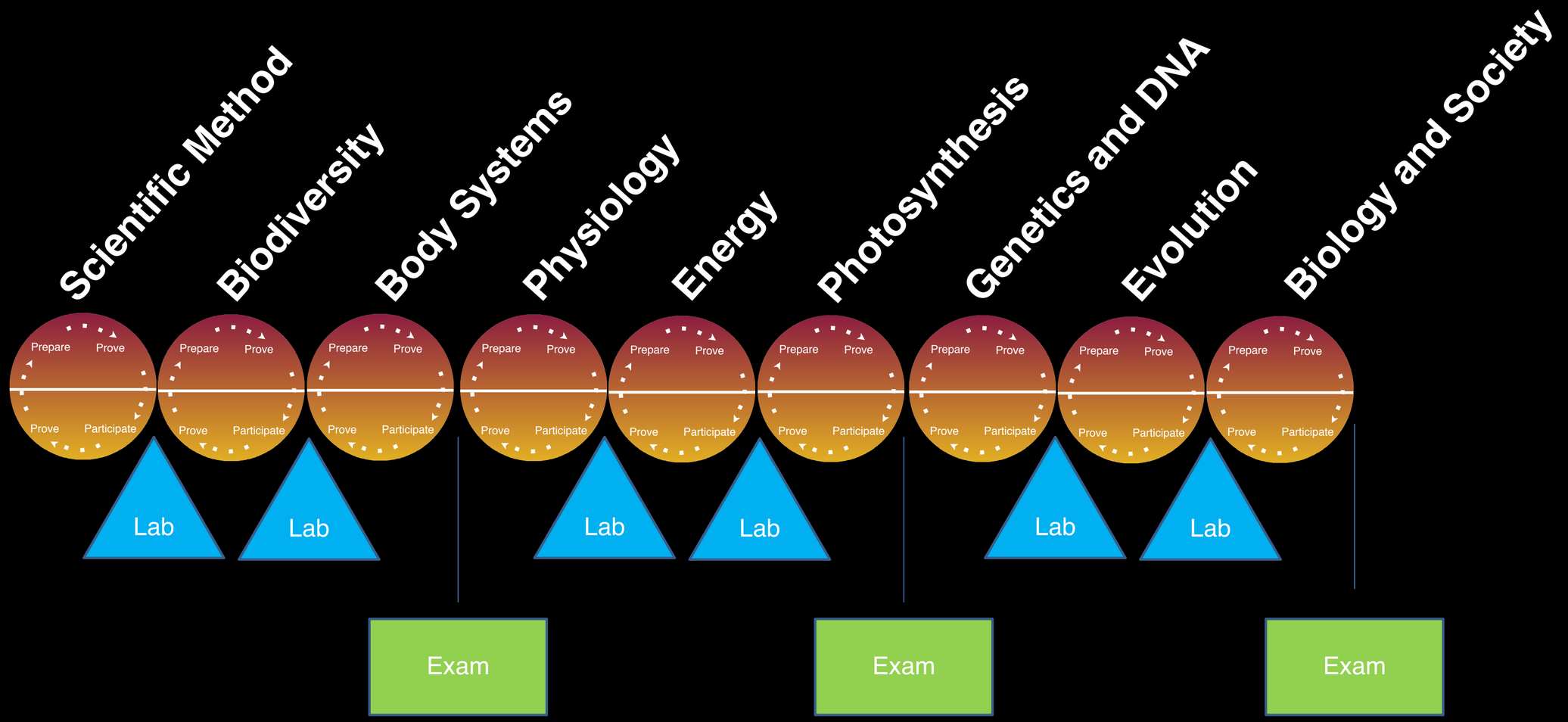
2. Assess
Do practice problems, take quiz before class

3. Apply
Solve an applied problem (case study) with classmates

4. Assimilate
Write essay, solve problems, take quiz, etc.

Implementation

Adaptive / Active Course



Implementation

Adaptive Courseware

The goal of adaptive courseware is to provide the **right lesson** to the **right student** at the **right time.**

Since 2011

Adaptive Courseware

Cengage (Learning Objects)
Psychology and Economics

CogBooks
Biology and US History

Khan Academy
Remedial math

Knewton
Remedial math

McGraw Hill ALEKS
College Algebra

McGraw Hill (LearnSmart Master)
Remedial math

McGraw Hill (LearnSmart Connect)
Chemistry

Pearson MyMathLab with Knewton
College algebra

Pearson Mastering with Knewton
Physics

SmartSparrow
Habitable Worlds custom science course

Definition

What is adapting to the learner?

- **Lesson sequence**
- **Content selection**

What is guiding the adaptivity?

- **Assessment** – rapid remediation
- **Association** – lesson relationships
- **Agency** – student chooses
- **Algorithm** (analytics) – recommendations

Adaptivity

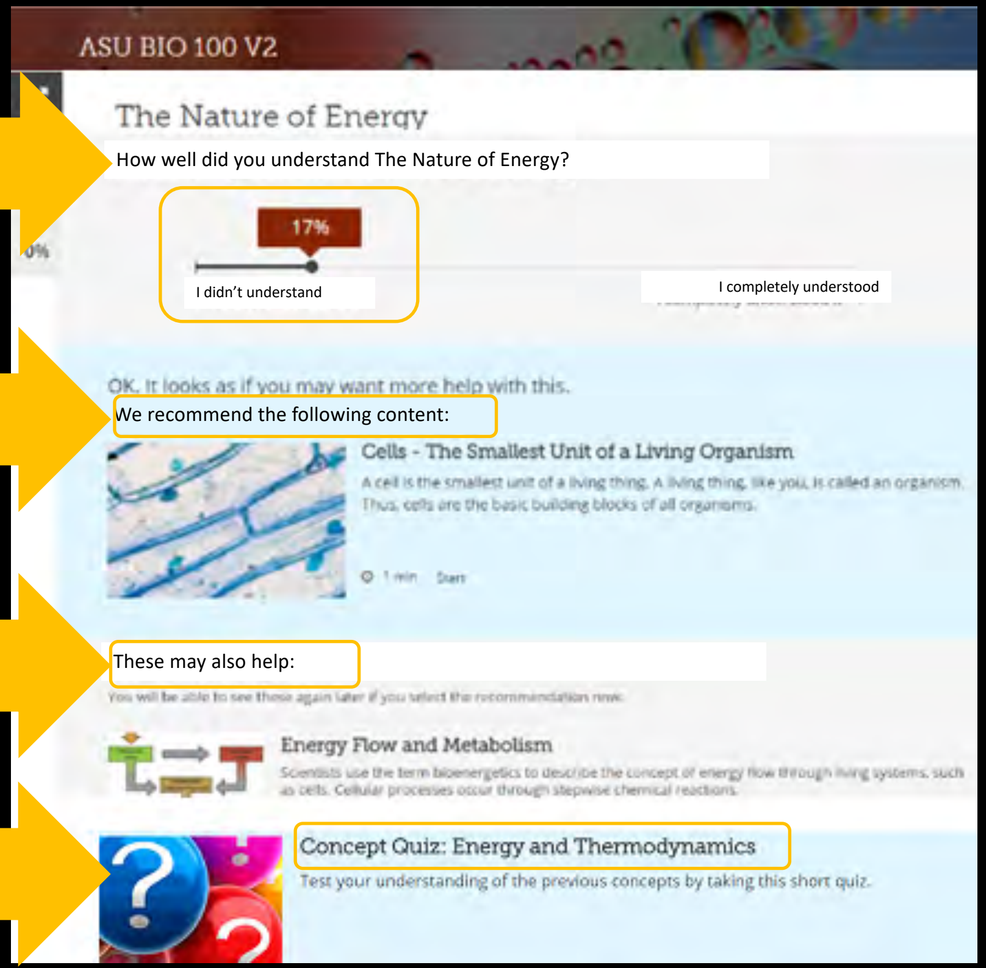
What does adaptivity look like to the learner?

Agency

Algorithm

Association

Assessment



Implementation

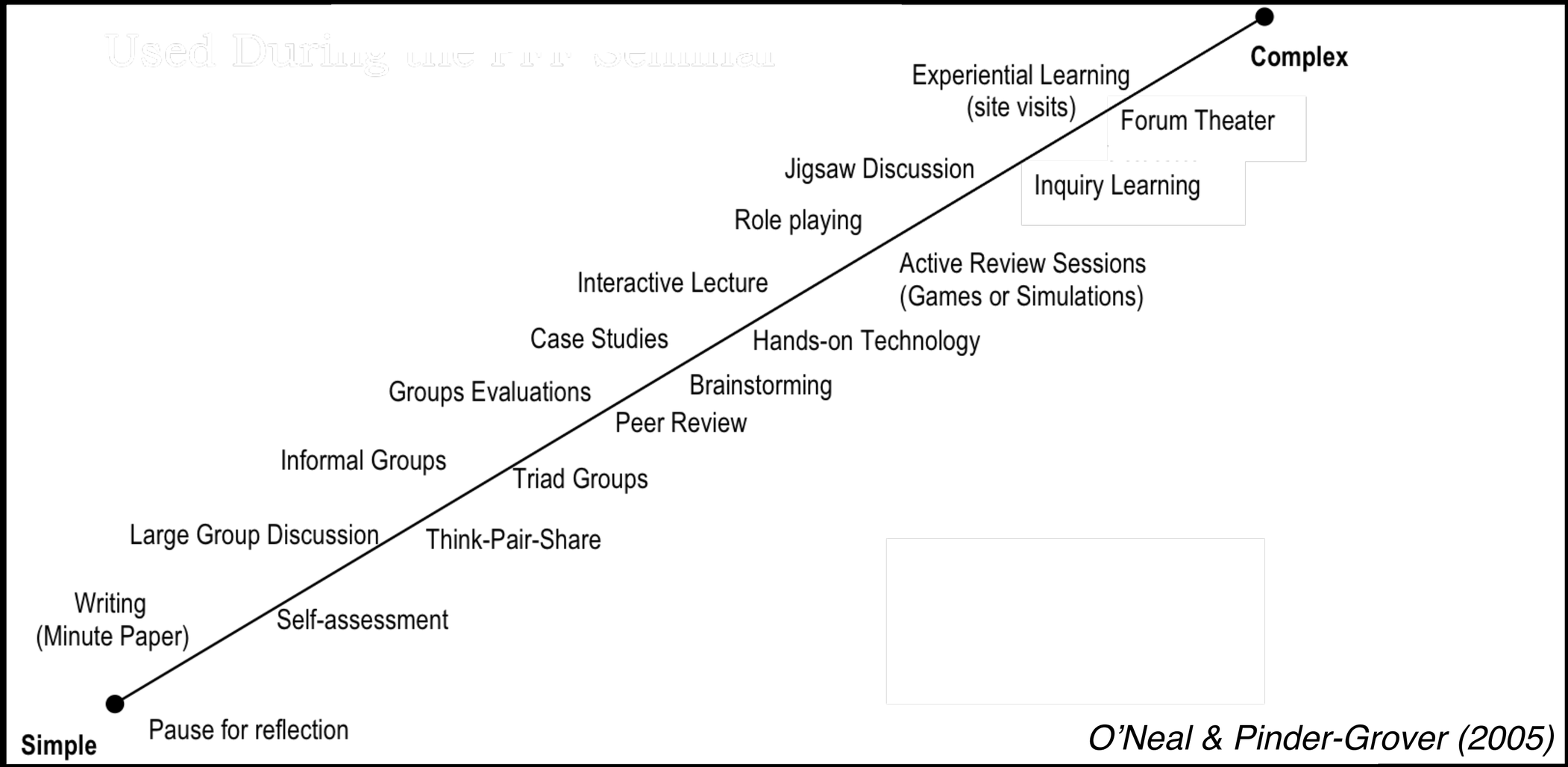
Active Learning

- constructs knowledge
- fosters higher order thinking
- includes metacognition

(Brame, 2016)

Examples

Active Learning

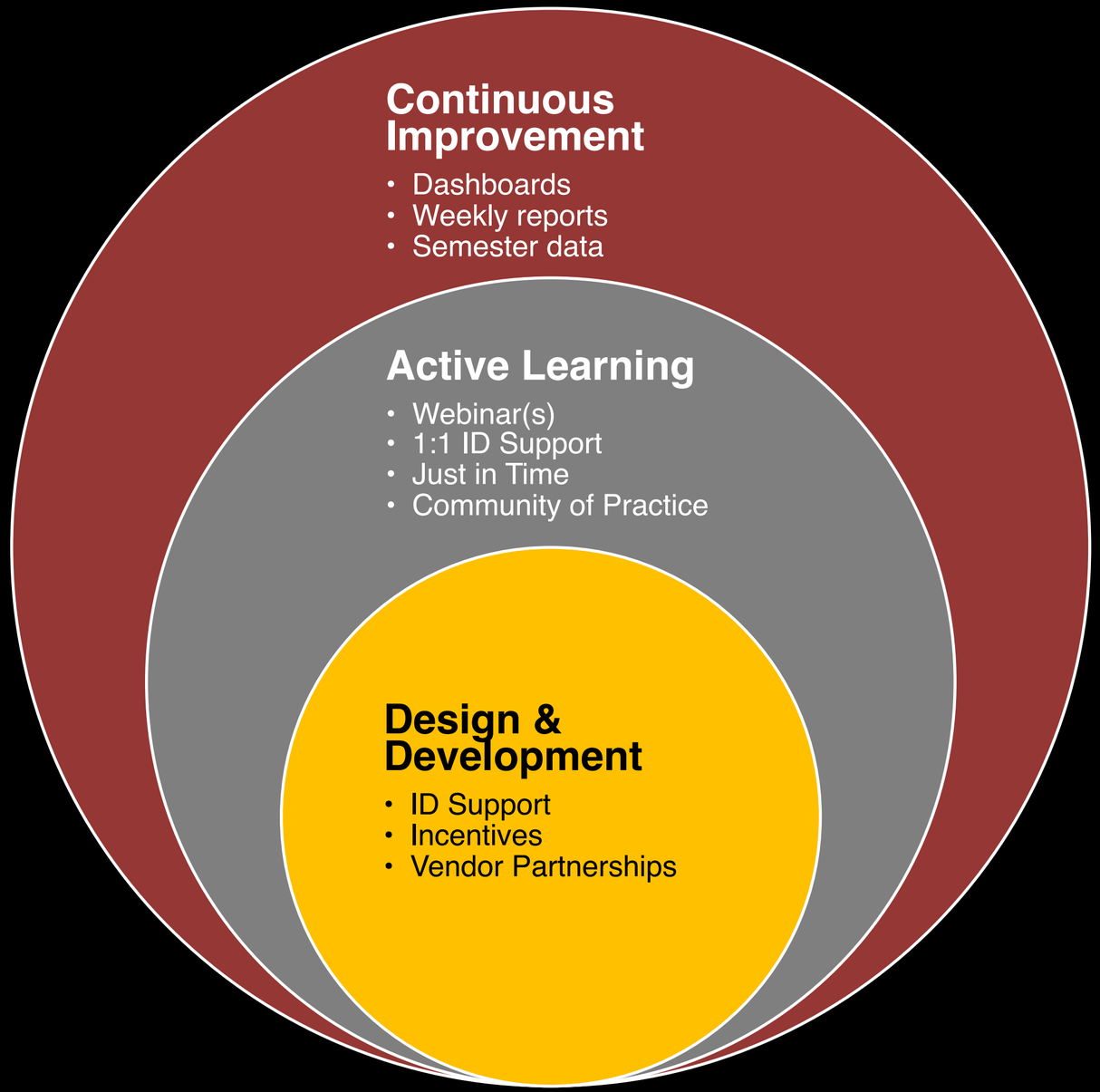


O'Neal & Pinder-Grover (2005)

Strategies

Strategies

Faculty-Focused



Strategies

Example: Course Development

Vendor

Graphic Designer

Librarian

Technologist

Multimedia Developer

Instructional Designer

Leaders

Faculty

Adaptive / Active is a team sport!

Evaluation

Goals

90% Retention

- Do active learning in every class
- Help 90% of students get C or better
- Reduce withdrawal rate to under 5%
- Identify struggling students by week 2

Evaluation

Data Sources

Institutional
- Persistence (withdrawal rate)
- Performance (final grades)

Course
- Assessment (lesson or exam level)
- Final Grades
- Engagement

Stakeholders
- Student
- Instructor
- Administrators
- Vendor

Evaluation

Highlights

Do active learning in every class

Over 100+ faculty, instructors, teaching assistants
Exploration of Community of Practice
ASU is building multiple new Active Learning facilities

Help 90% of students get C or better

~90% in BIO 100: Introduction to Biology (~850 students)
+16% in ECN 212: Micro Economics (pilot, Fall'16- Fall'18, ~1000 students)
~87% in *PSY 101: Introduction to Psychology* (~2900 students)

Evaluation

Highlights

Reduce withdrawal rate to under 5%

Reduction in all adaptive / active over time
-17 % in *MAT 117: College Algebra* (~7500 students)
Inconsistent across semesters, modalities, instructors

Identify struggling students by week 2

Dashboard Development (combined data sources)
Exploration of Success Prediction
Increase in Faculty & Student usage of Learning Analytics

Summary

Benefits

Student benefits of adaptive / active learning

Respects their prior knowledge
Responds to their learning needs
Reduces gaps in their understanding

Faculty benefits of adaptive / active learning

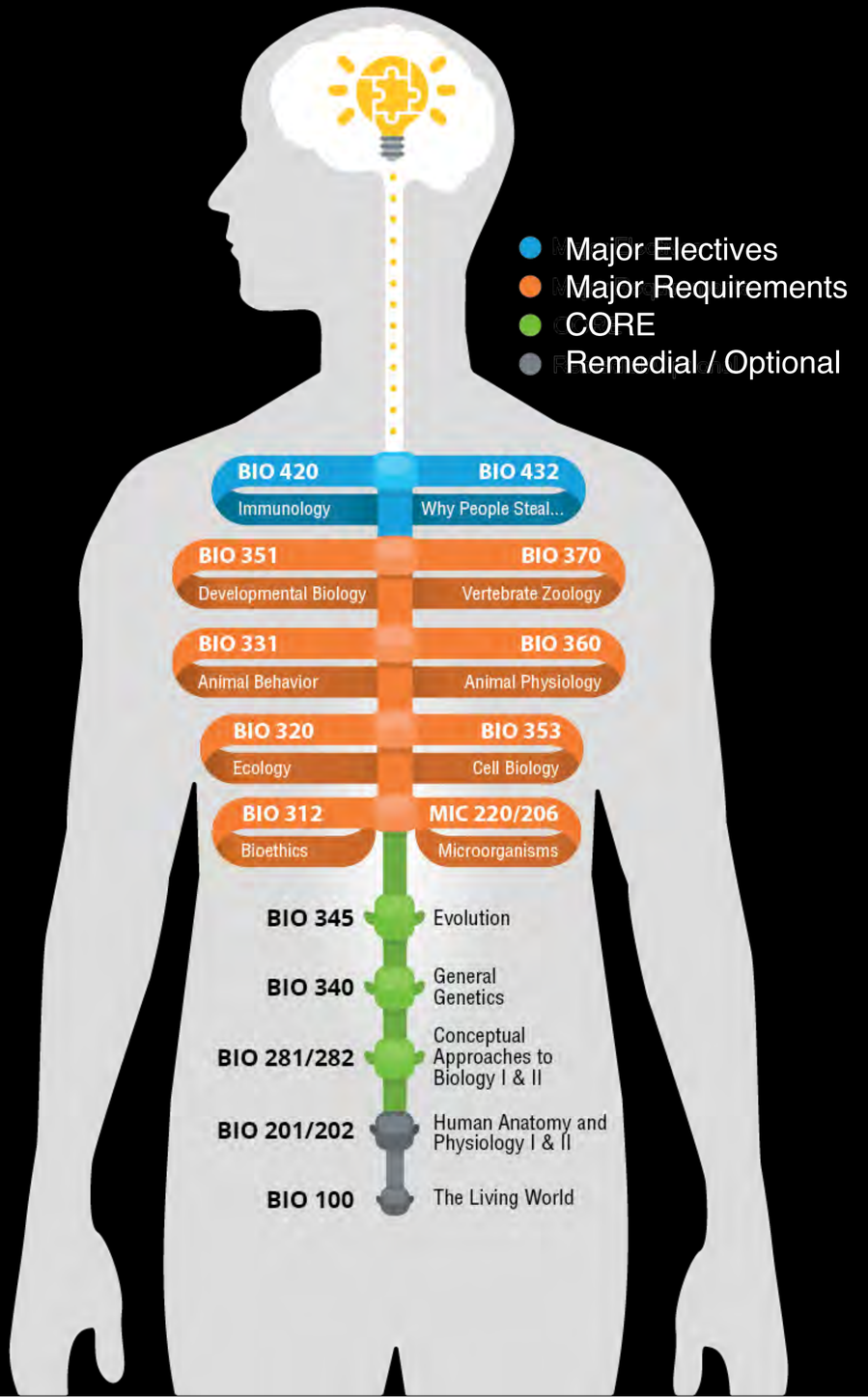
Monitors which students need assistance
Measures curriculum performance
Maximizes course outcomes

Future

Adaptive Program

The BioSpine Initiative

The BioSpine is a project in the School of Life Sciences (SOLS) to develop, implement, and evaluate an integrated undergraduate curriculum in the biological science. This project leverages adaptive courseware for engaging students in frequent formative activities and assessments. Instructors use evidence-based methods of teaching to engage students in real-world scenarios and problem-solving, helping students apply biological models in a collaborative setting.



Thank you.

Peter van Leusen, Ph.D.
Peter.van.Leusen@asu.edu

References

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