

Designing Digital Assessments for Maximum Impact

WILLEM WALLINGA, PHD

ASSISTANT PROFESSOR OF MATHEMATICS
FISHER COLLEGE

FACULTY PARTNER
CENGAGE LEARNING

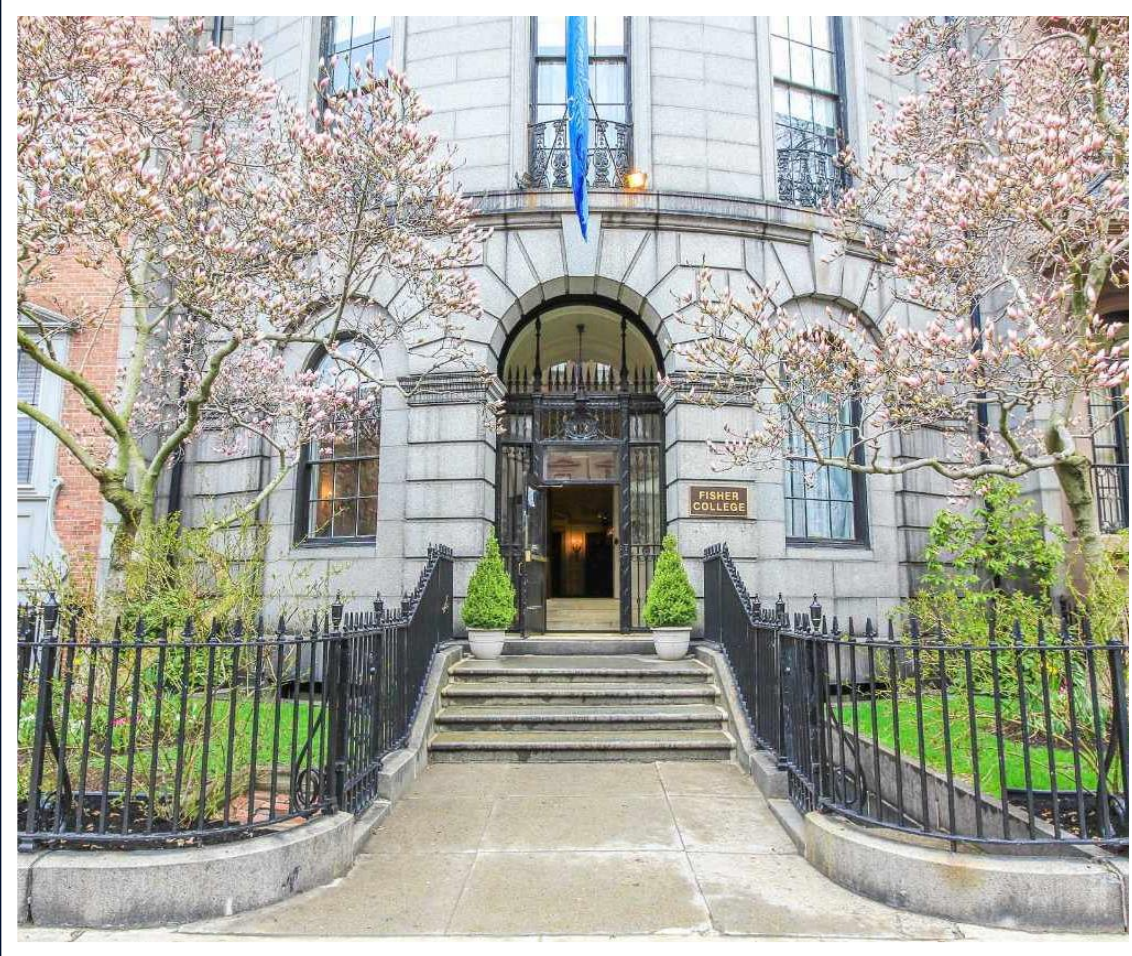
Agenda

- Fisher College Summary
- Project ACSEND

- Advanced Module Design
- Scaffolding for Maximum Impact

- Live Demo
- Questions/Comments

Fisher College



- 114 year-old private institution located in Boston's Back Bay with three satellite campuses and online
- ~2000 students (800 day, 1200 continuing education)
- Associates degree students complete Elementary Algebra
- Bachelors degree students complete College Algebra or Finite Math, and Basic Statistics



- Adopted school-wide in 2012 for mathematics
- Registration costs are covered through student fees
- All students have immediate access to digital materials

Benefits of WebAssign

- Immediate Student Feedback
- Formative Assessment for Instructors
- Enhanced Student/Instructor Communication
- Access to Digital Textbooks and Resources
- Significantly Reduced Cost to Students
- Assignment Flexibility
- Question Randomization
- Reduced Grading Time

Project ASCEND

Advanced
System of
Collaborative
E-learning
Numeracy
Development

- Piloted in 2015 with existing students in developmental mathematics
- Modified into summer bridge program for incoming students in 2016
- Expanded to satellite and online students in 2017
- Three-week sessions are held in January, May, August, and September

Origin

Motivation

- Over 65% of incoming students place into developmental math
- Over 30% of first-year students either fail or withdraw from developmental math

Ideation

- Design digital modules derived from course learning objectives to prepare students for college-level math
- Provide supervision, technical support, and teaching expertise

Implementation

- All course modules are interactive – students aren't just solving math problems
- Students have access to a digital textbook, tutorial videos, and other resources
- The tutorial design keeps students engaged and identifies potential knowledge gaps
- Students work at their own pace, with guidance from professional tutors

Results

- Bootcamp (2015-2018)
 - 62 students enrolled in courses ranging from Developmental to College Algebra
 - Average completion time: 21.5 hours
 - 38/62 students (61.3%) completed the program successfully
 - Students may retake the program
- Accelerator (2016-2017)
 - 11 students enrolled
 - Average completion time: 14.5 hours
 - 10/11 students (90.9%) completed the program successfully
 - 9/10 (90%) passed credit-bearing math with at least a C–

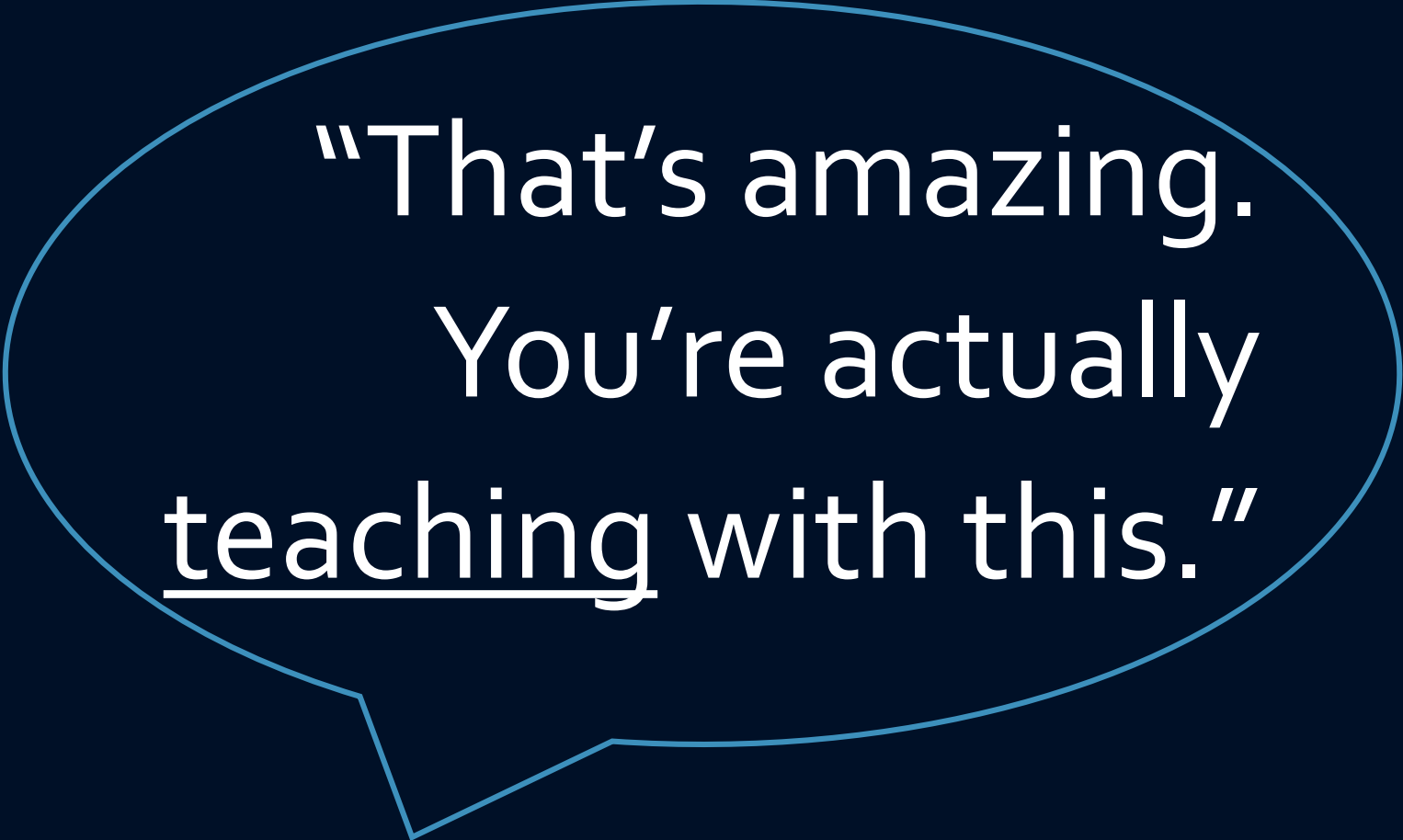
Digital Learning Innovation Award

- “Recognizing exemplary higher education faculty-led teams and institutions for advancing student success through the adoption of digital courseware.”
- Fisher College was awarded \$10,000 for project ASCEND in November, 2016



Advanced Module Design

- For use in:
 - homework assignments
 - laboratory problem sets
 - review and self-guided practice
 - summative assessments
 - your own project!



“That’s amazing.
You’re actually
teaching with this.”

- ~~Previously at Google~~ and now refreshingly enlightened IT guy

Advanced Module Design

- Learning Objective

Each module originates from a single course learning objective.

- Example:

Recognize and apply common techniques for factoring algebraic expressions.

- Course Content

Topics are selected within the scope of each learning objective.

- Example:

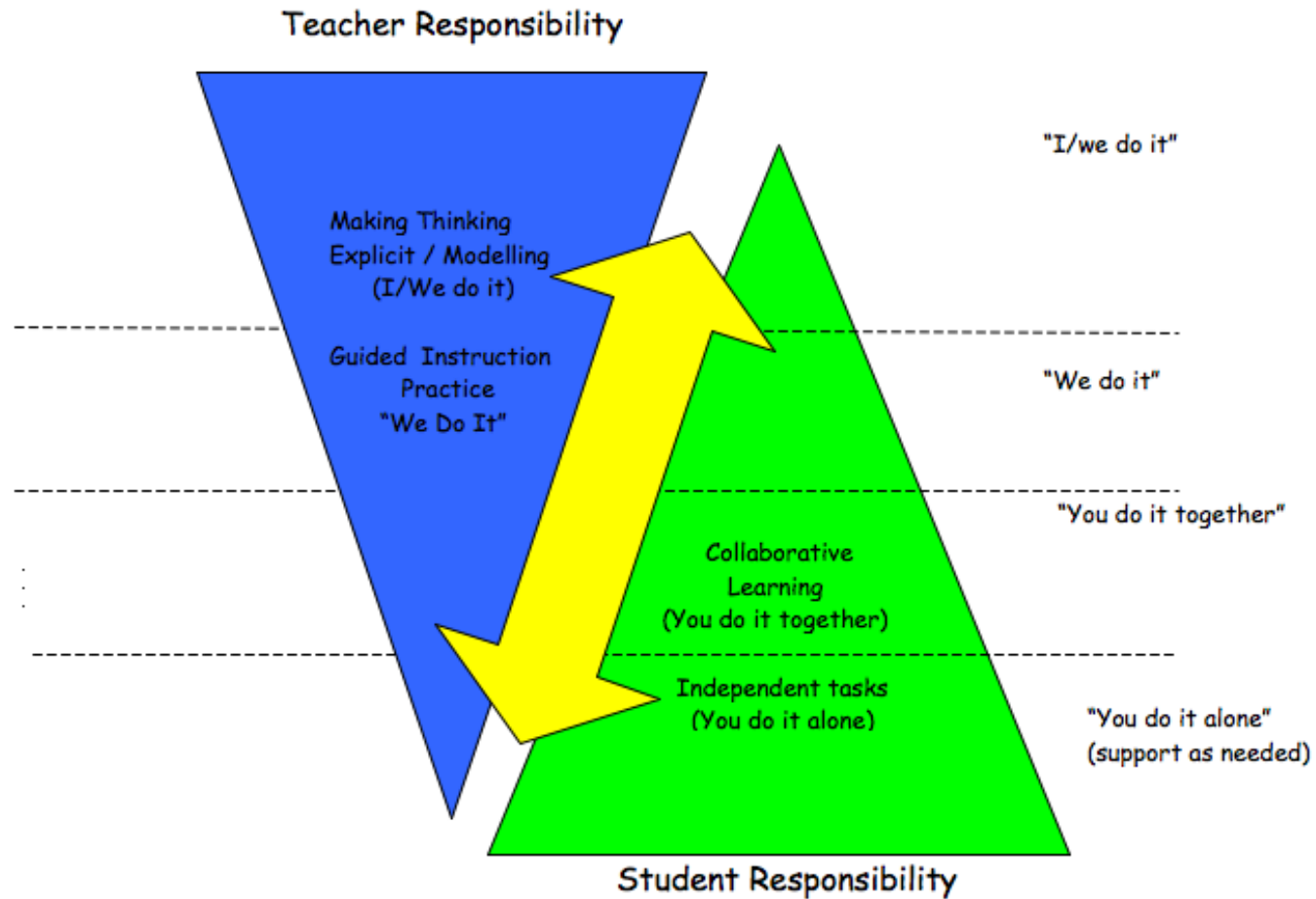
GCF
Difference of Squares
Trinomials
Grouping

- Completed Module

Questions are selected from a variety of digital sources that cover each of the topics.

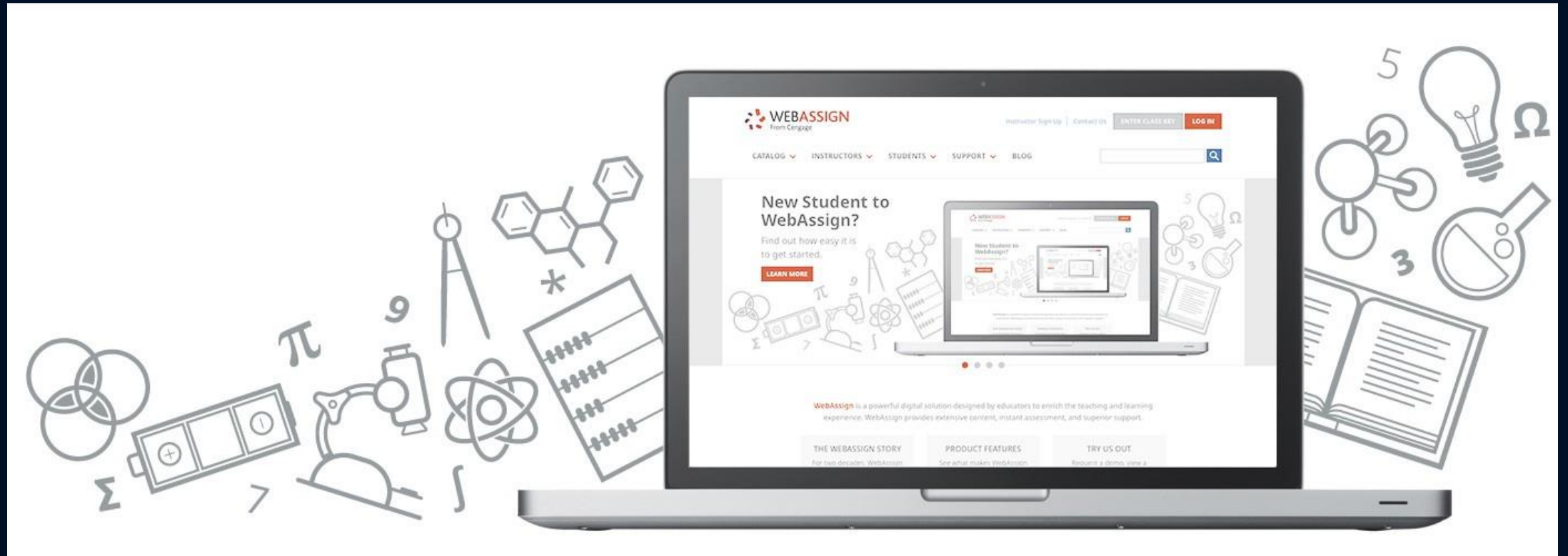
- Modules are constructed so that learning is scaffolded and knowledge gaps are identified and resolved

Scaffolding Modules



Adapted from: Frey, Fisher, Everlove (2009)

Live Demo!



Advanced Module Design

Learning Objectives

- Use course learning objectives to initiate module construction.
- Personalize content to the learning trajectory of your students.

Scaffolding

- Use incremental scaffolding techniques to represent the “big ideas.”
- Identify and resolve knowledge gaps at the speed of each learner.

Multiple Sources

- Keep students engaged by avoiding textbook problem monotony.
- Use tutorial banks, additional texts, or write your own problems!

Questions?



Thank You!

WILLEM WALLINGA, PHD

ASSISTANT PROFESSOR OF MATHEMATICS
FISHER COLLEGE

FACULTY PARTNER
CENGAGE LEARNING

EMAIL: WWALLINGA@FISHER.EDU
TWITTER: [@WILLEM_WALLINGA](https://twitter.com/WILLEM_WALLINGA)