

Focusing on Student Success:
Assessment of Learning Outcomes
in Blended Environments

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Course Redesign

Presentation Objectives

- DELTA's redesign program
- Students learning outcomes
- Students who benefit the most
- Students successfully transitioning to more advanced study

Course Redesign

DELTA's program

1. Precalculus Algebra and Trigonometry
2. Engineering Statics
3. Introduction to Statistics
4. College Physics – KitLab
5. Precalculus Algebra
6. Calculus I
7. Applied Differential Equations
8. Physics for Engineers and Scientists
9. Foundations of Graphics
10. Concepts of Financial Reporting
11. Microbiology
12. World Architecture

Course Redesign

Shared characteristics

- Gateway – Critical path
- “High-needs”
- 300+ annual enrollment
- Large lecture or multi-section
- Multiple instructors
- >25-35% students receive D/F grades
- Limited faculty resources
- Passive learning



Course Redesign

Introduction to Statistics (ST311)



Course Redesign

Introduction to Statistics (ST311)

Why “Flip”?

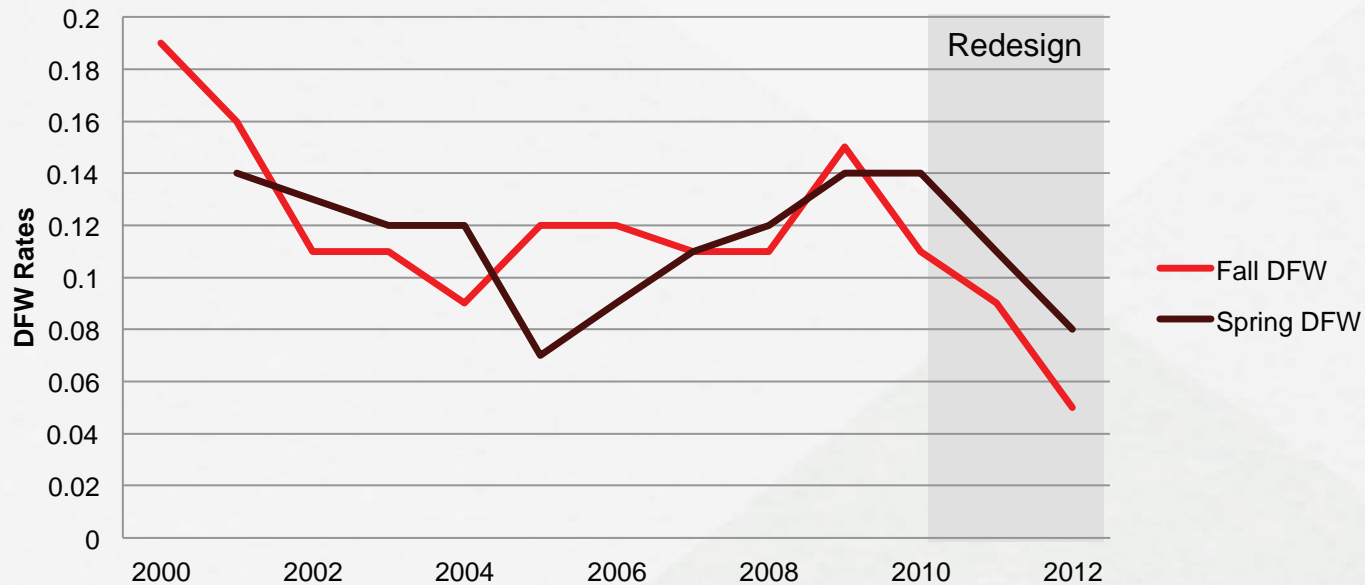
- Leverage technologies for content delivery
- Restructure student learning time to be more efficient

Comparison of ST311 Course Structure		
Prior to Redesign		
Lecture with Activities (65 students for 50 minutes)	Lecture with Activities (65 students for 50 minutes)	Lecture with Activities (65 students for 50 minutes)
Redesigned		
Individual Learning (individual students interacting with online content)	Individual Learning (individual students interacting with online content)	Face-to-face activities (30 students for 50 minutes)

Course Redesign

Introduction to Statistics (ST311)

ST311 Fall & Spring Term DFW Rates Before and After Redesign



Course Redesign

Introduction to Statistics (ST311)



Course Redesign

Introduction to Statistics (ST311)

Number of Observations Read	624
Number of Observations Used	527

R-Square	Coeff Var	Root MSE	MIDTERM1 Mean
0.309011	16.03649	11.85757	73.94118

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	20.97020408	3.89644713	5.38	<.0001
quiz1	2.48330859	0.32927755	7.54	<.0001
quiz2	1.63044920	0.36050273	4.52	<.0001
quiz3	0.30820746	0.26011519	1.18	0.2366
quiz4	0.24723395	0.25170188	0.98	0.3264
quiz5	0.71451881	0.34670876	2.06	0.0398
quiz6	1.48445150	0.31276309	4.75	<.0001

Course Redesign

Introduction to Statistics (ST311)

Number of Observations Read	624
Number of Observations Used	519

R-Square	Coeff Var	Root MSE	MIDTERM2 Mean
0.161952	17.11882	12.92619	75.50867

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	30.26195987	4.89071532	6.19	<.0001
quiz7	2.42328906	0.47612693	5.09	<.0001
quiz8	0.95897144	0.31204963	3.07	0.0022
quiz9	0.97288281	0.36300095	2.68	0.0076
quiz10	0.72936602	0.43362989	1.68	0.0932
quiz11	0.38597723	0.28068717	1.38	0.1697

Course Redesign

Introduction to Statistics (ST311)

Number of Observations Read	624
Number of Observations Used	588

R-Square	Coeff Var	Root MSE	FINALEXA Mean
0.635773	10.06305	15.47001	153.7309

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	25.77762778	4.68441924	5.50	<.0001
MIDTERM1	0.79345424	0.05801805	13.68	<.0001
MIDTERM2	0.60408366	0.06016594	10.04	<.0001
quizall	0.30105222	0.05751825	5.23	<.0001

Course Redesign

Precalculus Algebra & Trigonometry (MA111)

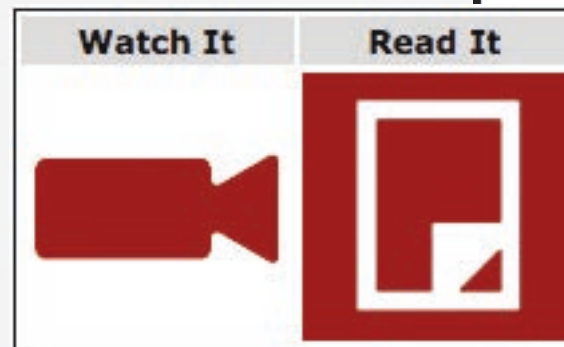


Course Redesign

Precalculus Algebra & Trigonometry (MA111)

Technology Used

- Moodle
- LiveScribe
- Videos (example problems)
- Static text documents (PDF)
- Online low-stakes quizzes



Example 4.3.1
Given the following sketch of the function h ,
find $h(x)$.

$(1, 4) + (0, 3)$ $(1, 0)$
 y -intercept = 3 $y = 0$
 $y = mx + b$
 $m = \frac{y_2 - y_1}{x_2 - x_1}$
 $\frac{3 - 4}{0 - 1}$
 $= \frac{-1}{-1}$
 $= 1$
 $y = x + 3$

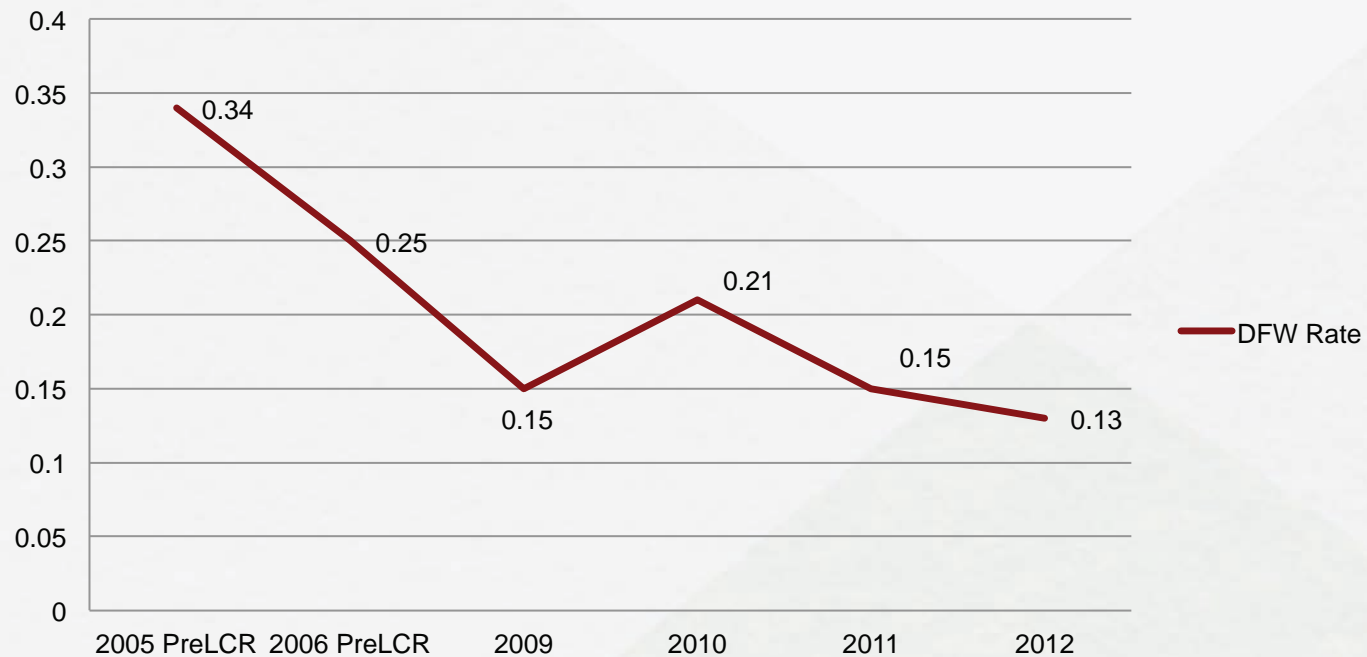
$h(x) =$	$x + 3$	$x \leq 1$
	3	$x > 1$

Video player controls: play, stop, volume, full screen, and a progress bar showing 100%.

Course Redesign

Precalculus Algebra & Trigonometry (MA111)

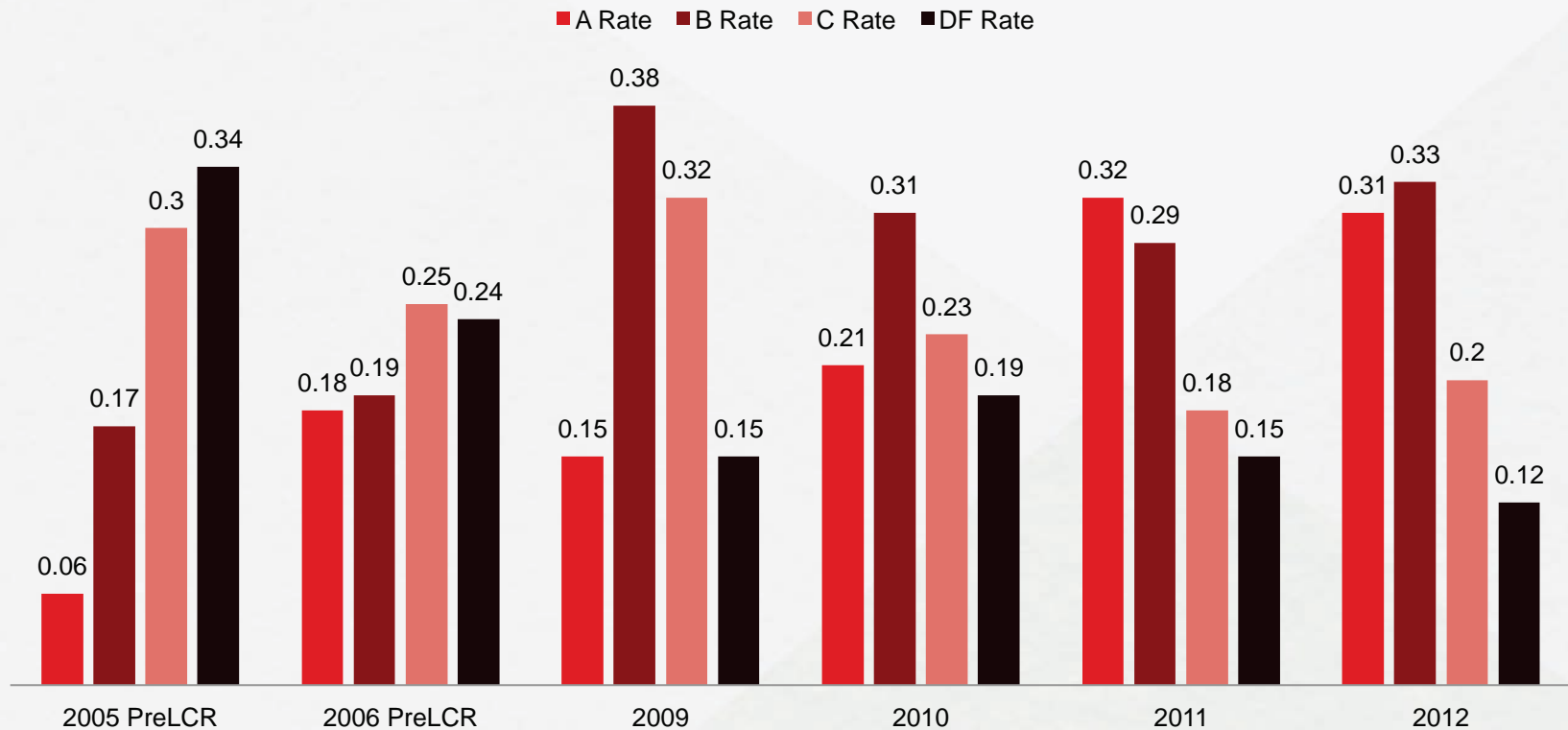
MA111 DFW Fall Term Rates
After Course Redesign



Course Redesign

Precalculus Algebra & Trigonometry (MA111)

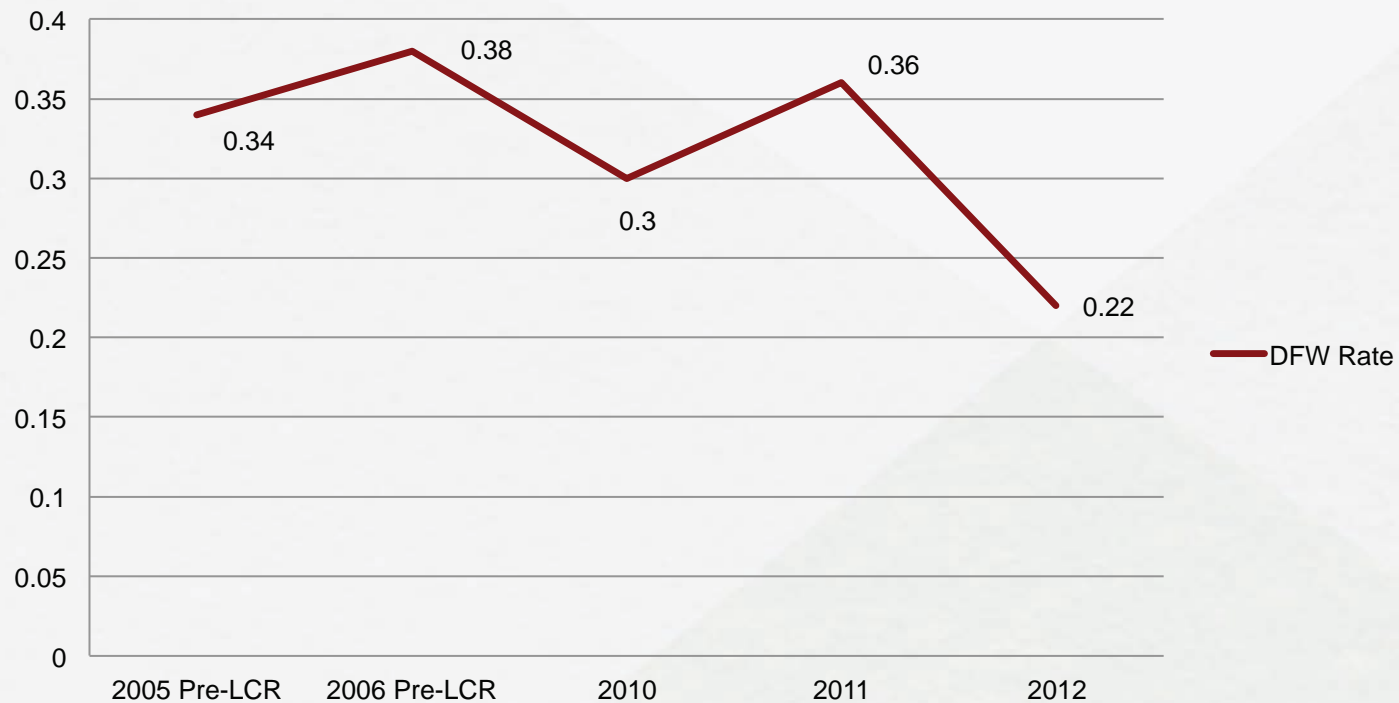
MA111 Fall Term ABCDF Rates After Redesign



Course Redesign

Precalculus Algebra & Trigonometry (MA111)

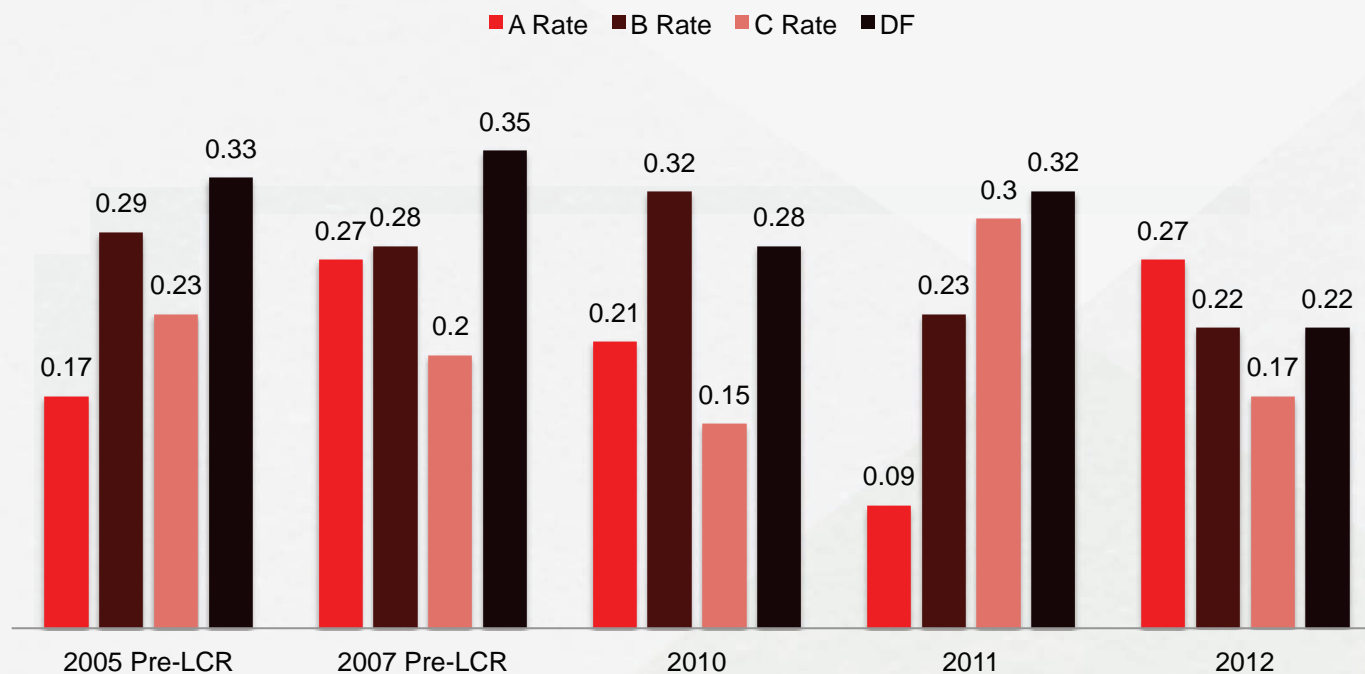
MA111 Spring Term DFW Rates After Course Redesign



Course Redesign

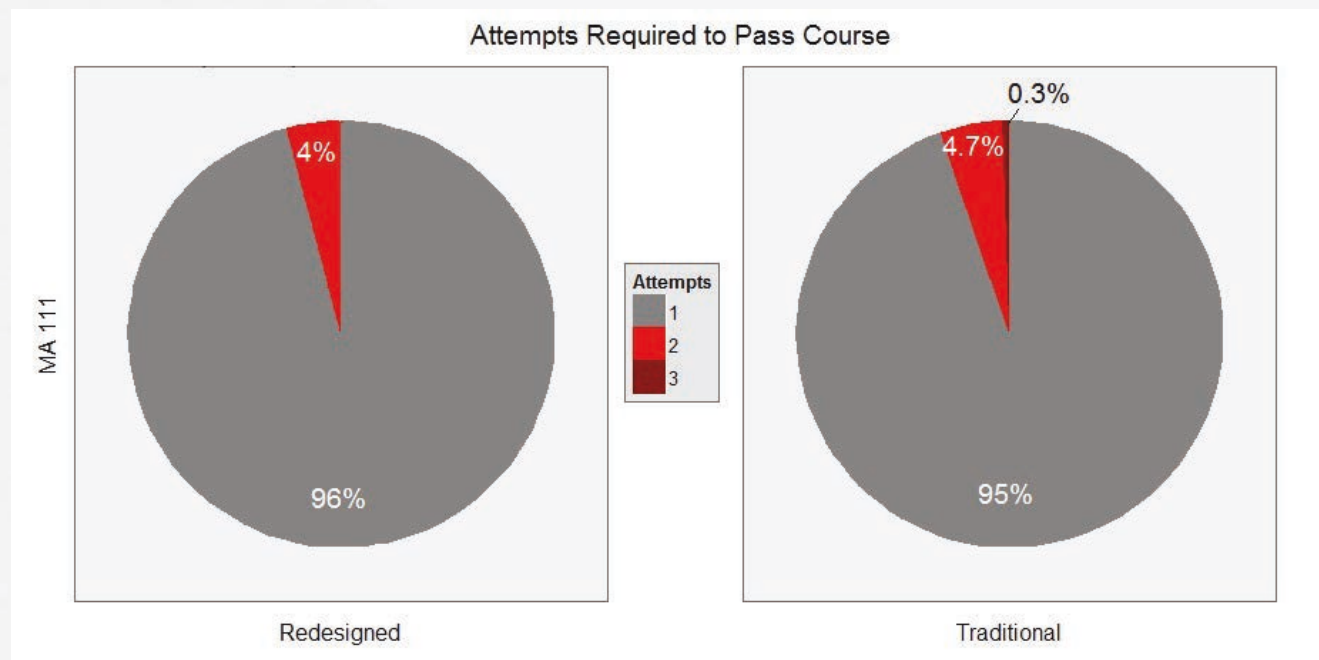
Precalculus Algebra & Trigonometry (MA111)

MA111 Spring Term ABCDF Rates After Course Redesign



Course Redesign

Precalculus Algebra & Trigonometry (MA111)



Students who took MA111 redesigned or traditional lecture course

Course Redesign

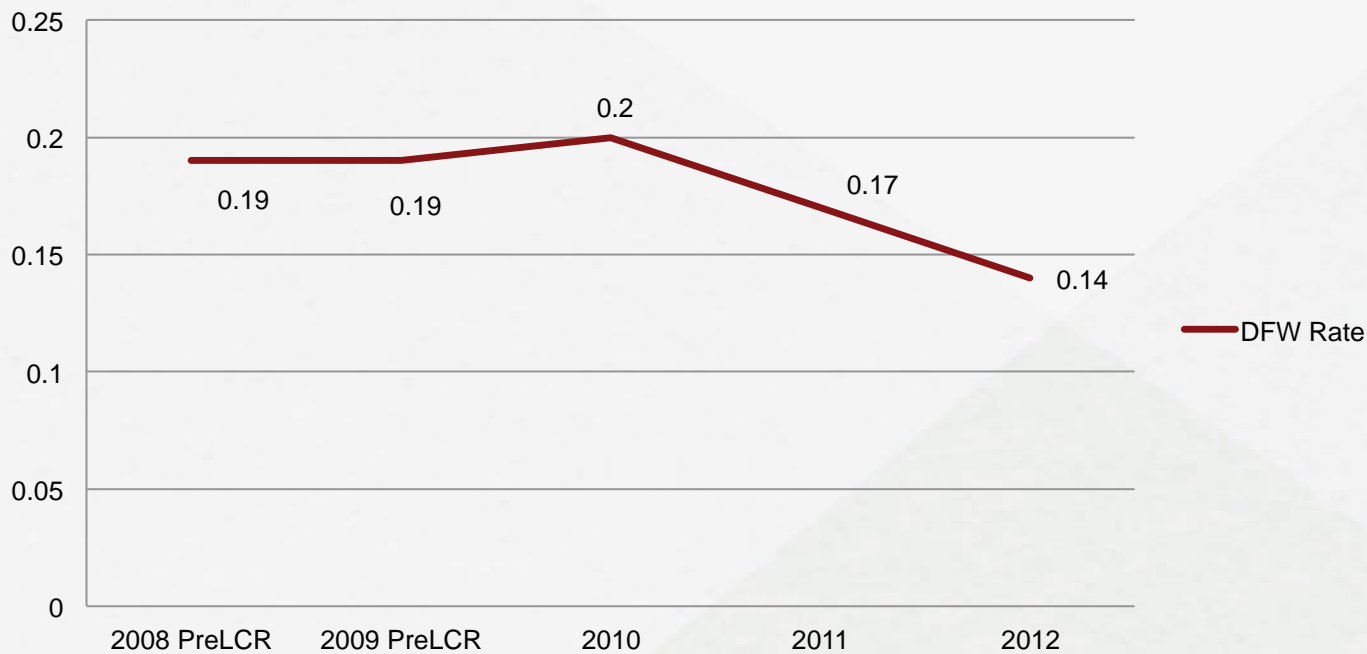
Precalculus Algebra & Trigonometry (MA111)

“[The examples] gave me an idea /understanding before we went over it in class, or helped solidify the material after the lecture.”

Course Redesign

Tracking students to Calculus (MA141)

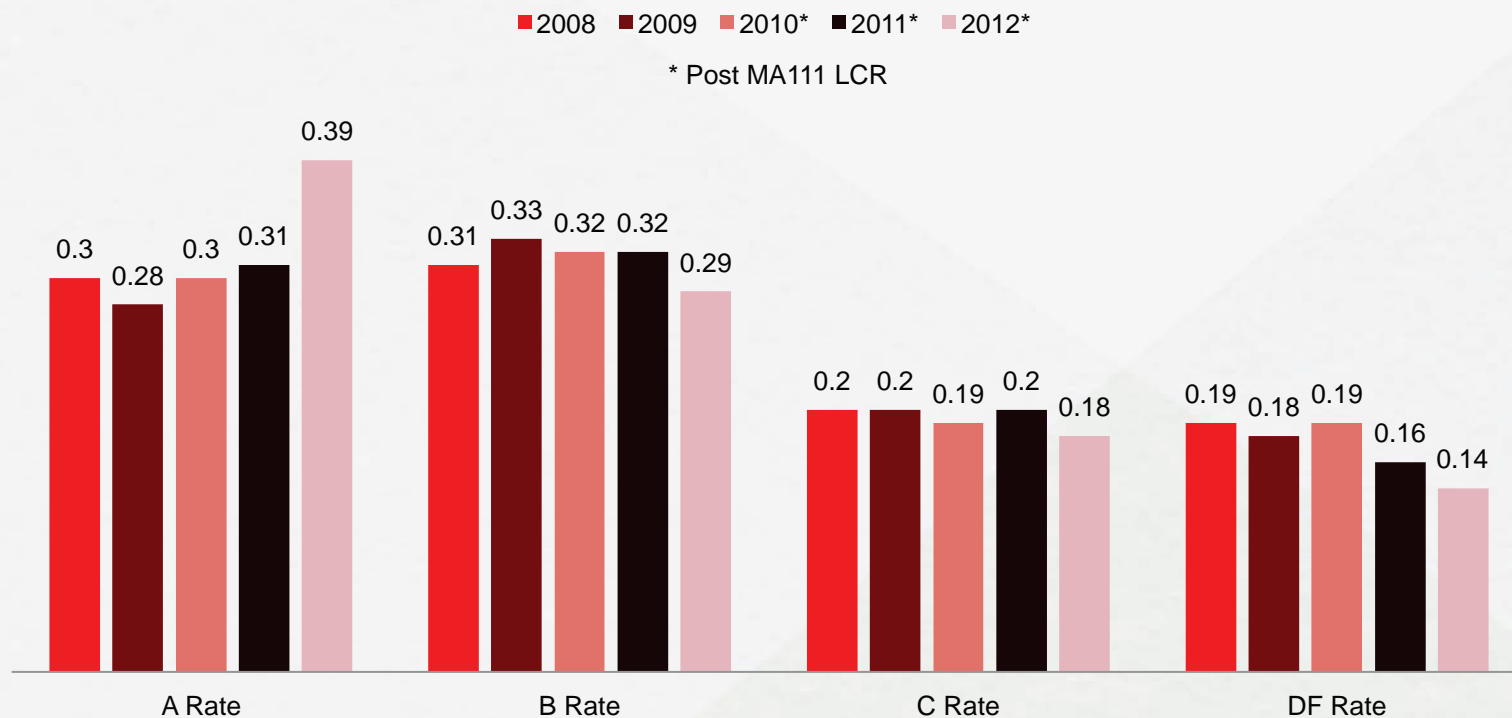
**MA141 Fall Term DFW Rates
After MA111 Course Redesign**



Course Redesign

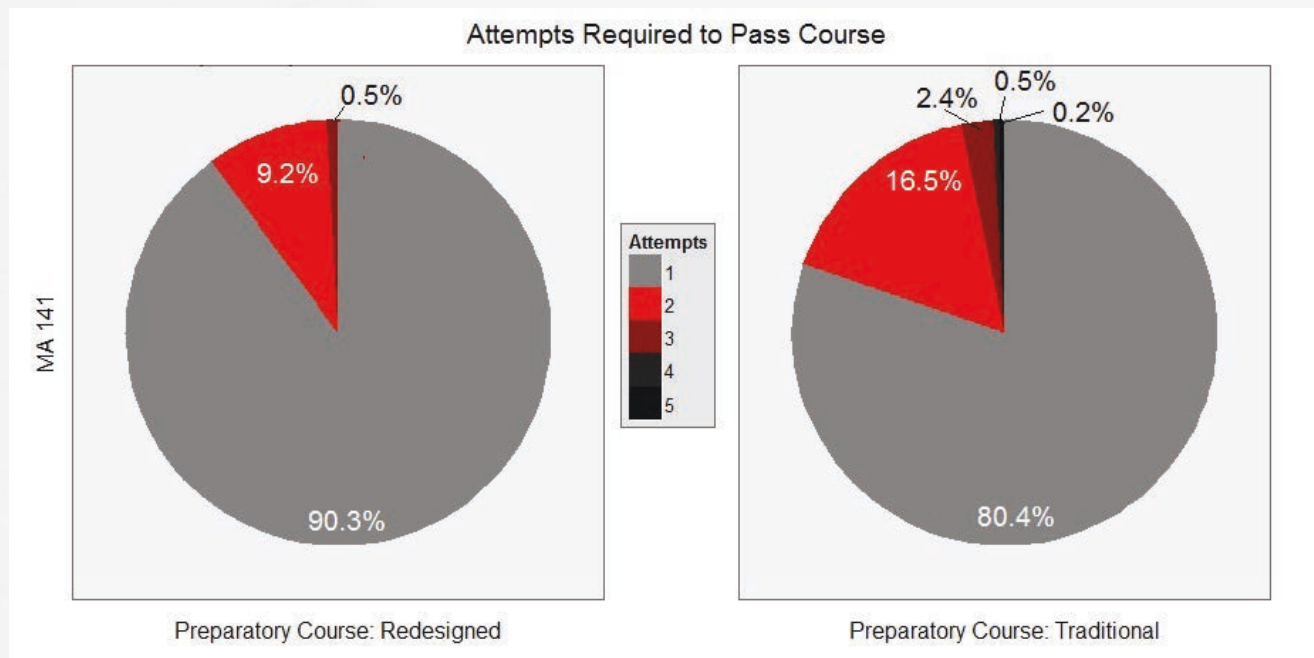
Tracking students to Calculus (MA141)

MA141 ABCDF Rates After MA111 Course Redesign



Course Redesign

Tracking students to Calculus (MA141)



Course Redesign

Statics (MAE206)

video taped lectures **FLIP**
Mechanical lecture technology
LiveScribe
Biomedical Redesign
homework inclass **Online**
SCALE UP
Student groups **collaboration** activities
C **wall**
Aerospace
ENGINEERING **Critical path**

Course Redesign

Statics (MAE206)

Technology Used

- Moodle
- LiveScribe
- Mediasite
- Clickers
- Wikis
- Matlab



MAE 206
Statics

$$\sum \vec{F} = 0$$

$$\sum \vec{M} = 0$$


$$\vec{A} = A_x \vec{i} + A_y \vec{j} + A_z \vec{k}$$



Welcome to MAE 206! Each of the tan blocks below expands to show you the content for that week. (Click on any date / topic below to expand it.) Start with Week 1 and jump right in. Click on the house icon course content home icon to the left to return to this main menu.

Week 1: Course Introduction, Prerequisites Review, Introduction to Statics and the Problem Solving Process

Week 2: Particles, Point Forces, Free Body Diagrams for Particles

Week 3: Equilibrium of a Particle in Two and Three Dimensions

Week 4: Exam 1, Rigid Bodies

Week 5: Moments, FBDs, and Equilibrium for Two-Dimensional Rigid Bodies

Week 6: Moments in Three Dimensions, FBDs for Three Dimensional Rigid Bodies



[Class 14](#), [Class 15](#), and [Class 16](#)

[Skills Quizzes](#)

Respond (Due Mon-9-28 / Tue-9-29)

[Concepts Quiz](#)
[Skills Quiz](#)
[Homework](#)

Respond (Due Mon-9-28 / Tue-9-29)

[Concepts Quiz](#)
[Skills Quiz](#)
[Homework](#)

Week 7: Equilibrium of Rigid Bodies in Two Dimensions, Distributed Forces

Week 8: Equilibrium of Rigid Bodies in Three Dimensions, Moments of Inertia

Week 9: Equilibrium of Rigid Bodies in Three Dimensions, Moments of Inertia

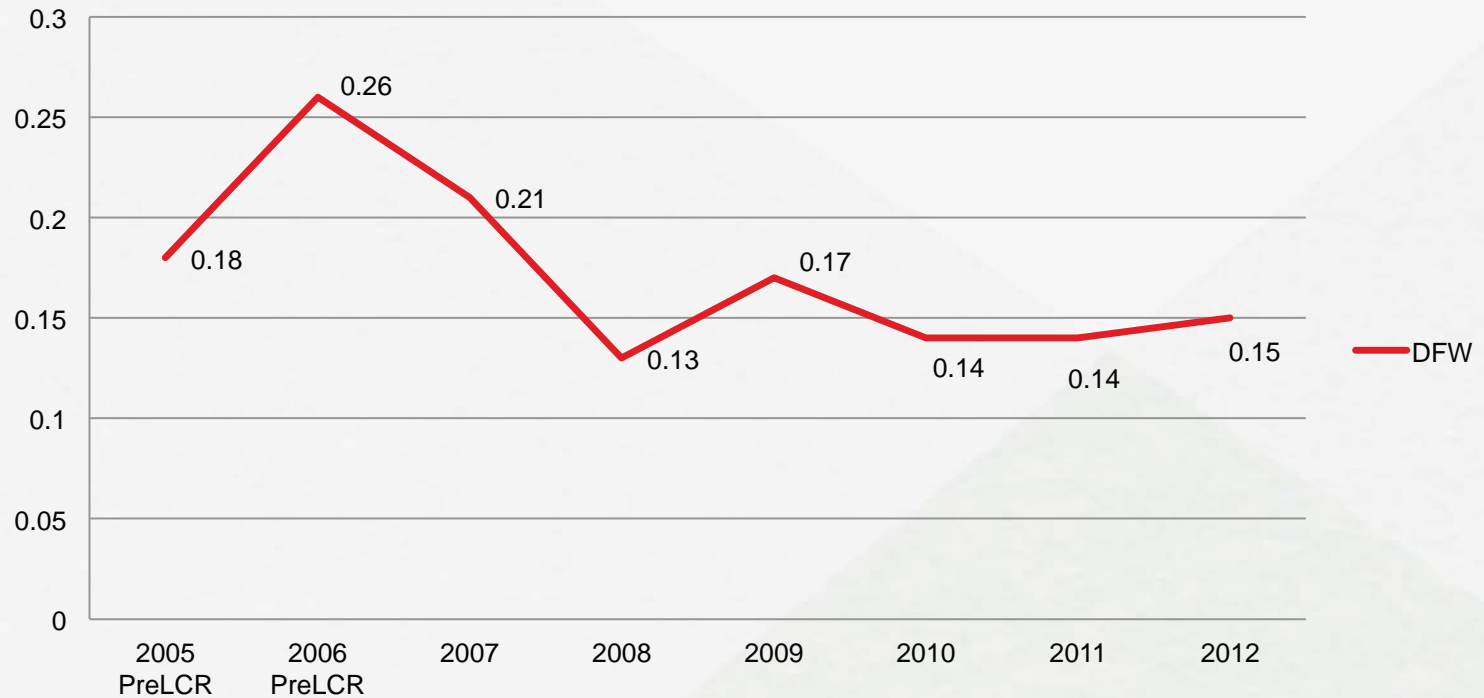
Week 10: Equilibrium of Rigid Bodies in Three Dimensions, Moments of Inertia

Week 11: Friction Applications

Course Redesign

Statics (MAE206)

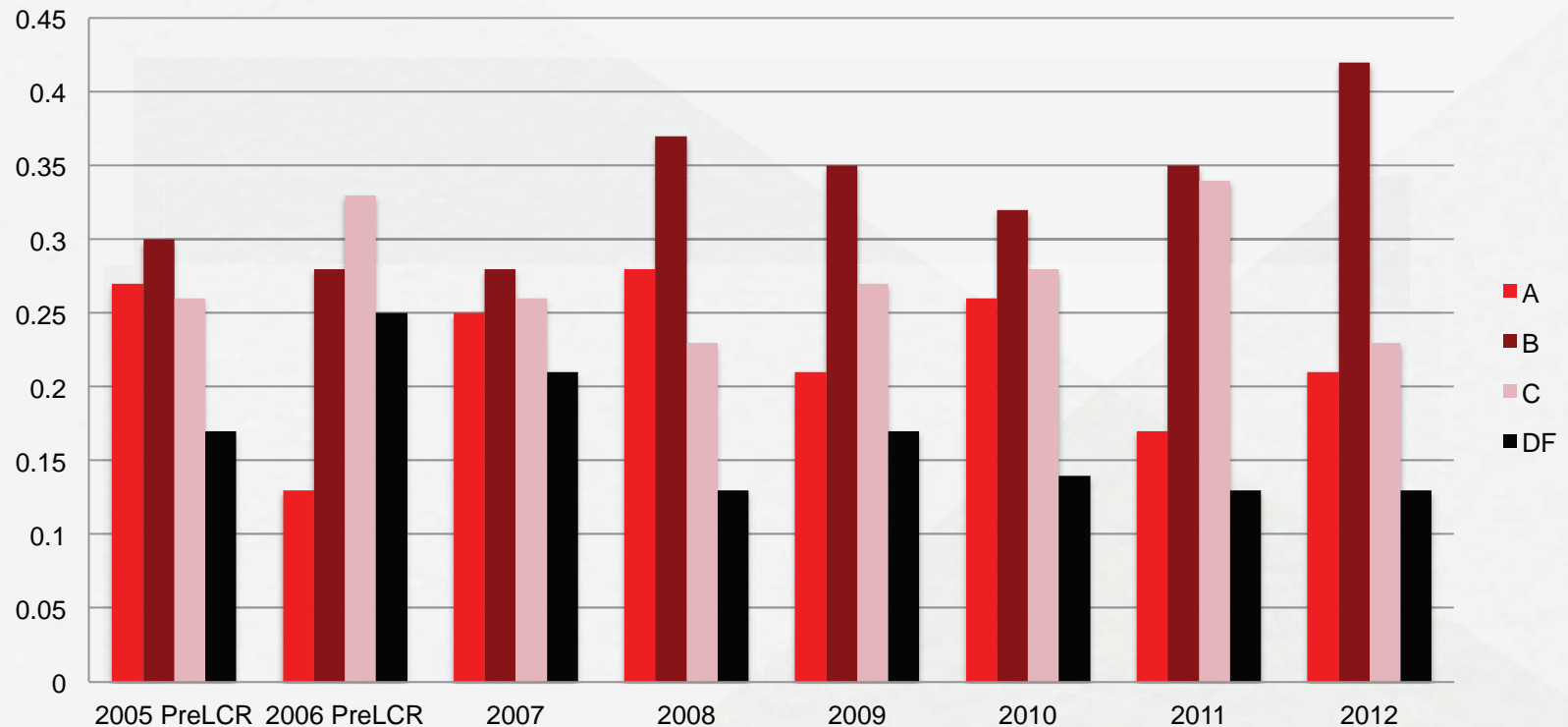
MAE206 Fall Term DFW Rates
After Course Redesign



Course Redesign

Statics (MAE206)

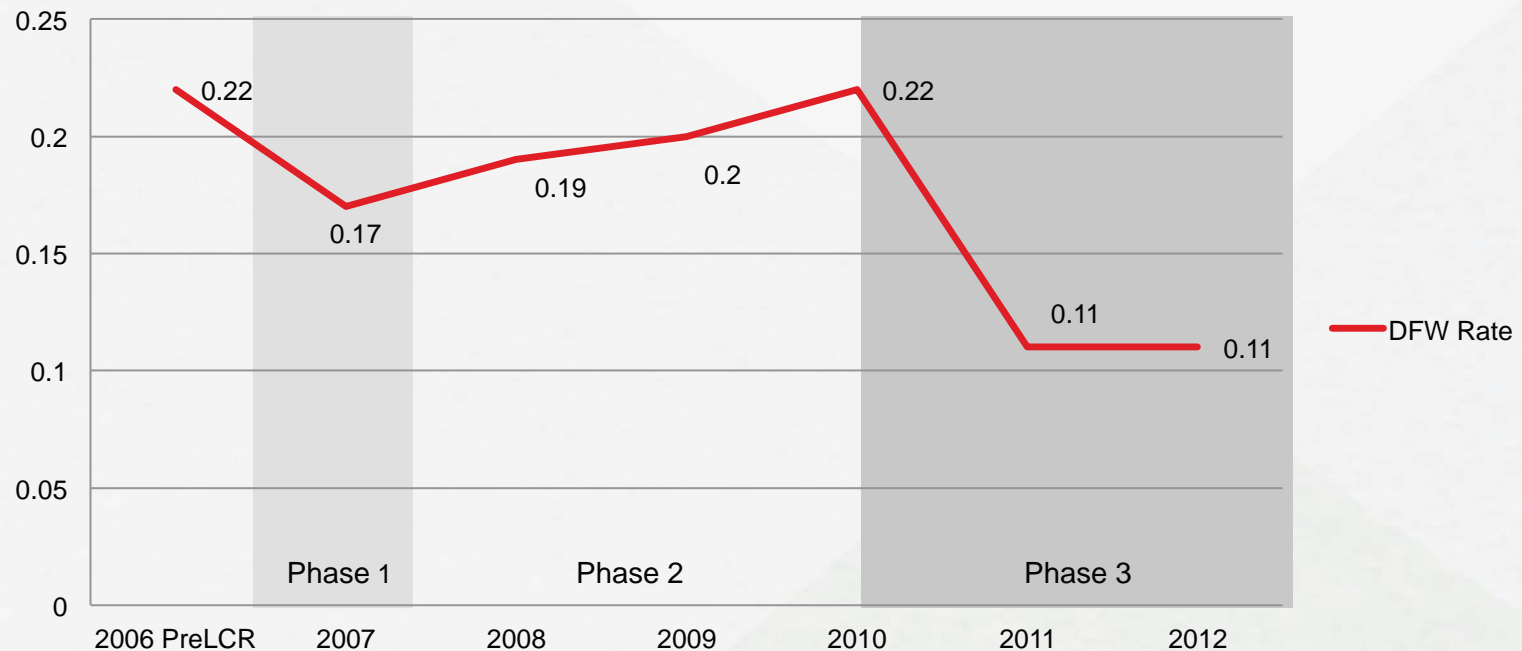
MAE206 Fall Term ABCDF Rates After Course Redesign



Course Redesign

Statics (MAE206)

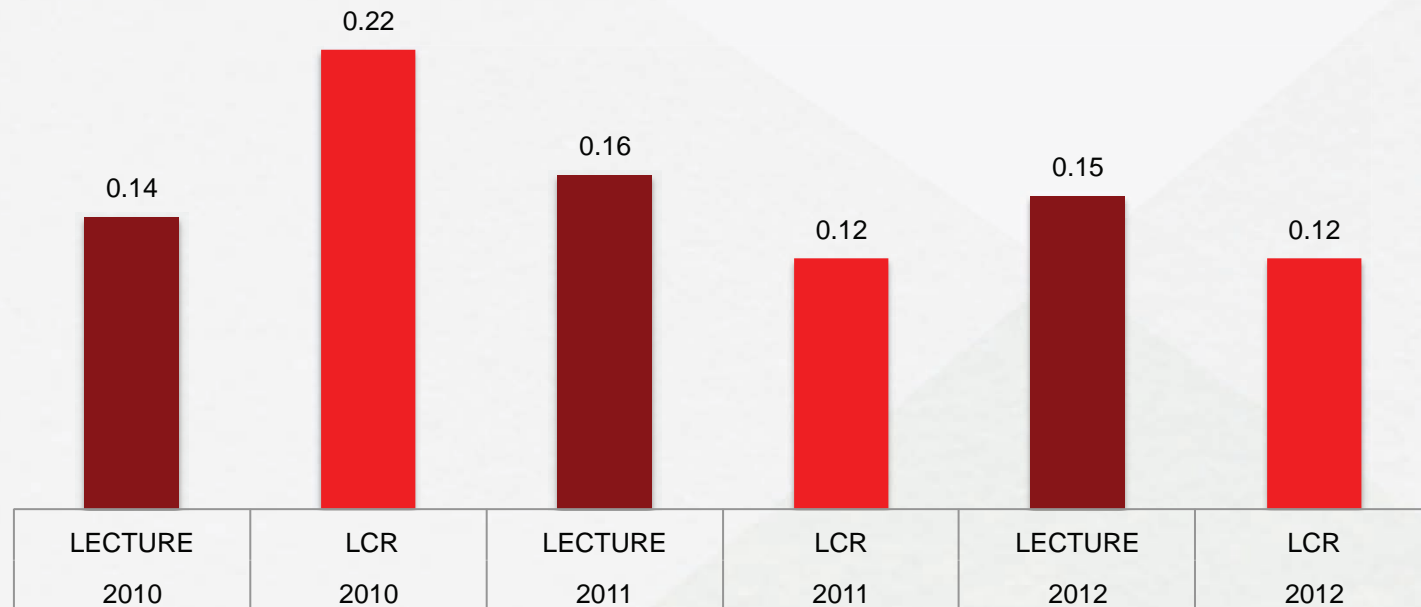
MAE206 Spring Term DFW Rates
After Course Redesign



Course Redesign

Statics (MAE206)

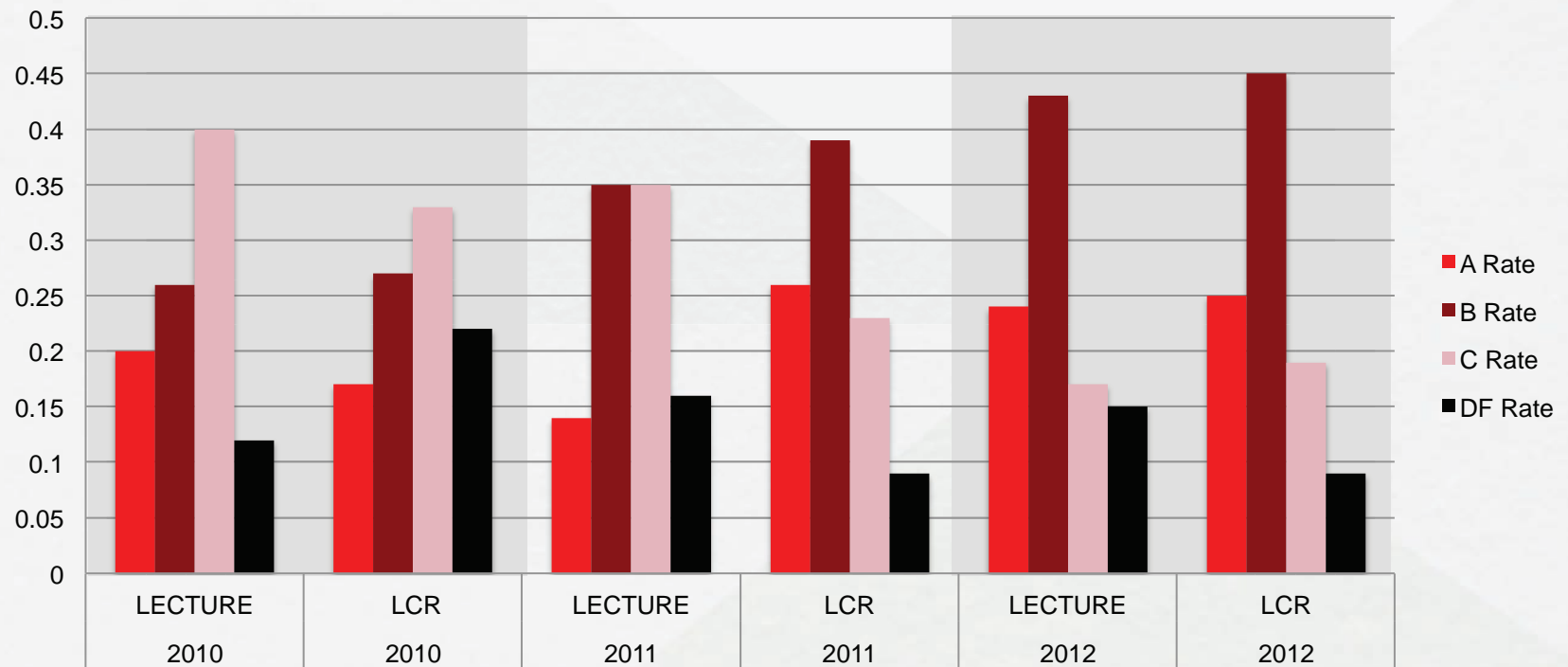
MAE206 LCR Phase 3: Spring Term DFW Lecture and LCR Course Comparisons



Course Redesign

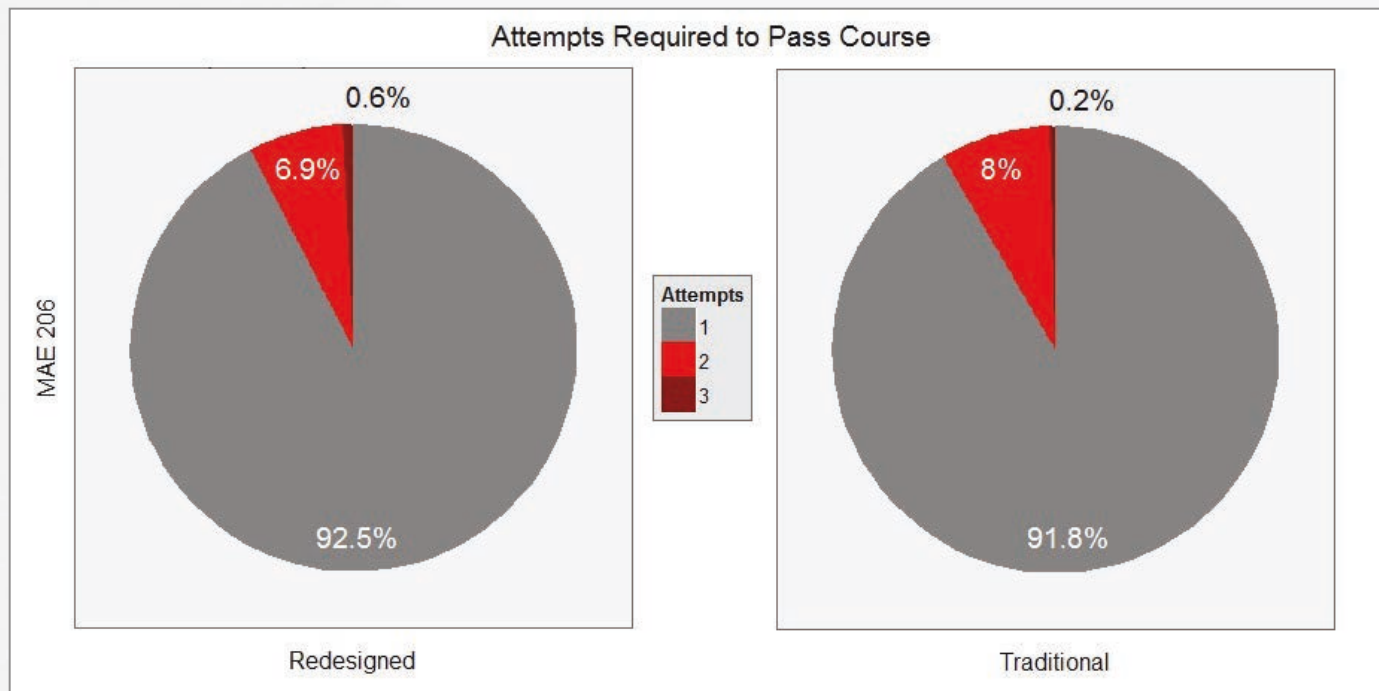
Statics (MAE206)

**MAE206 LCR Phase 3: Spring Term ABCDF Rates
Lecture and LCR Course Comparisons**



Course Redesign

Statics (MAE206)



Students who took MAE206 redesigned or traditional lecture course

Course Redesign

Statics (MAE206)

Probability of Success by GPA

	LCR	Non-LCR	Difference
2.00	.42	.28	.14
2.25	.55	.40	.15
2.30	.57	.42	.15 (max)
2.50	.67	.53	.14
2.75	.78	.65	.12
3.00	.85	.76	.09
3.25	.91	.84	.06
3.50	.94	.90	.04
3.75	.97	.94	.03
4.00	.98	.96	.02

Course Redesign

Statics (MAE206)

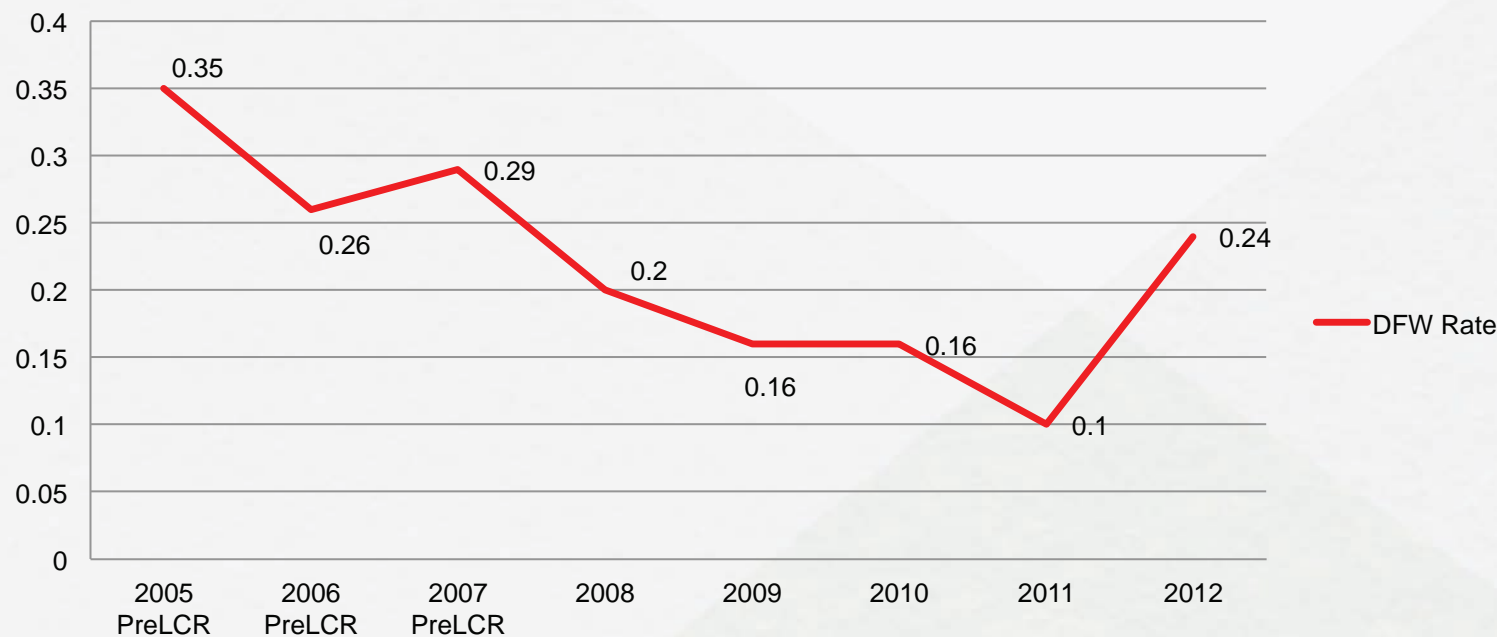
“39% of students cited the notes and online examples as THE most important element in their learning.”

“As many as 70% of students say their attendance improved because of daily quizzes.”

Course Redesign

Tracking students to Mechanics (MAE208)

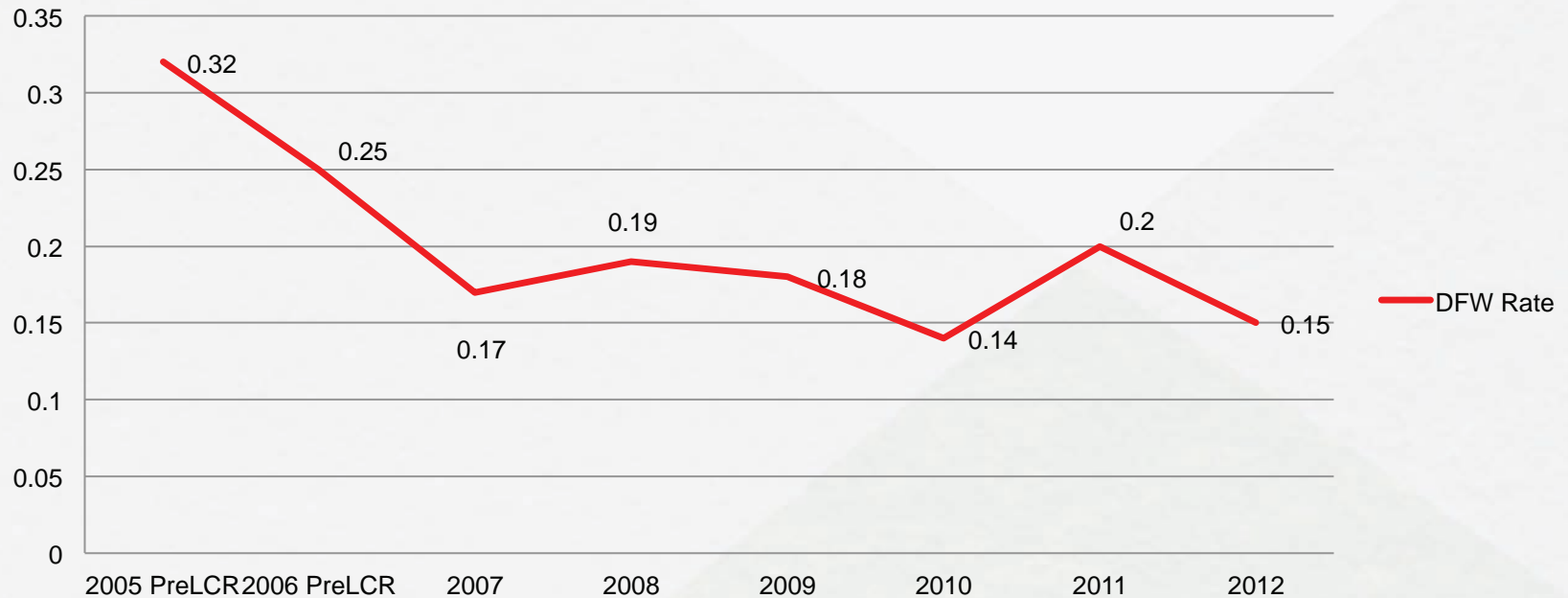
**MAE208 Spring Term DFW Rates
After MAE 206 Course Redesign**
(includes students enrolled in lecture and LCR)



Course Redesign

Tracking students to Mechanics (MAE208)

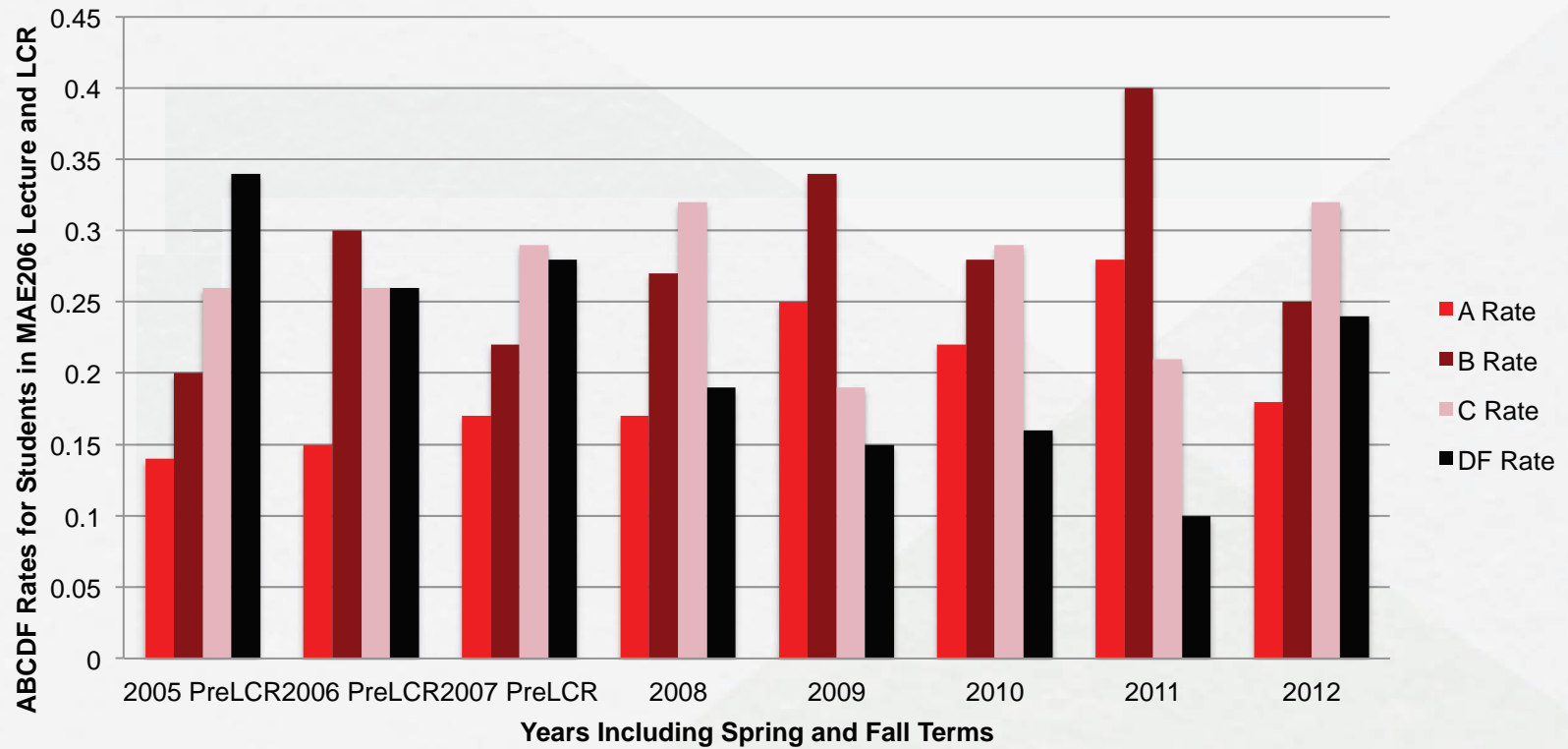
**MAE208 Fall Term DFW Rates
After MAE 206 Course Redesign**
(includes students enrolled in lecture and LCR)



Course Redesign

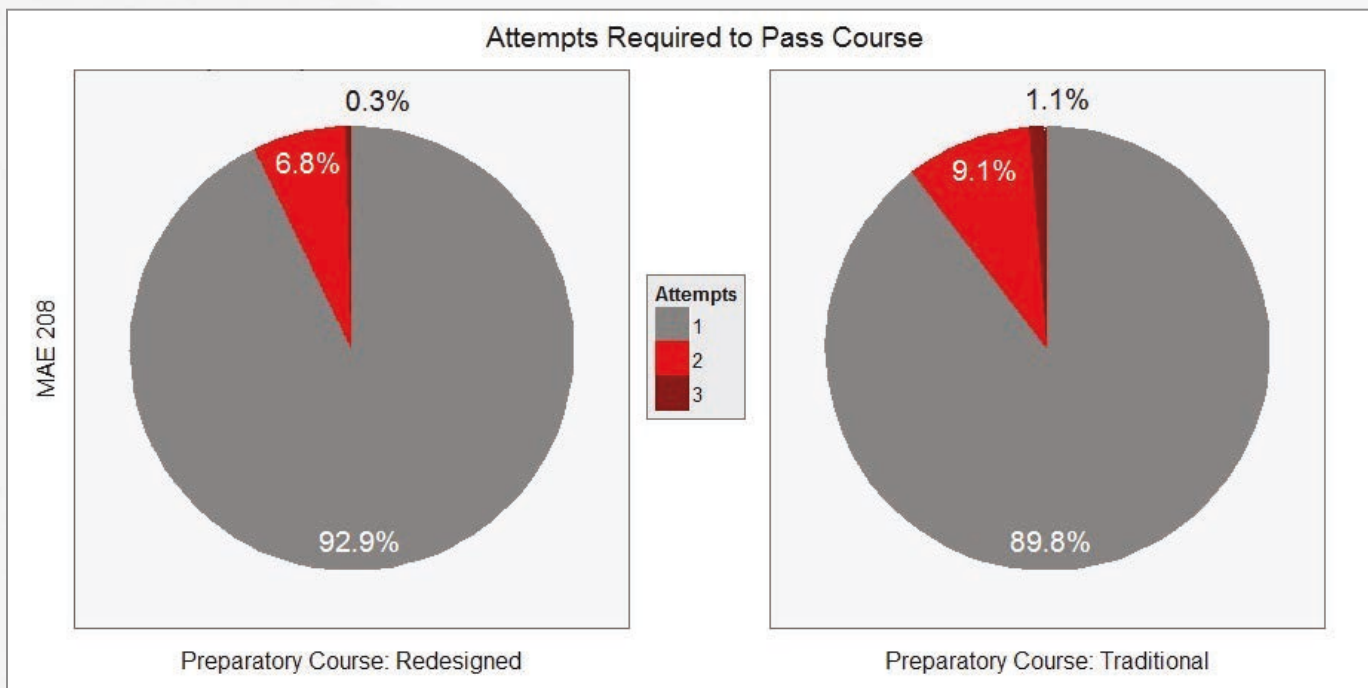
Tracking students to Mechanics (MAE208)

MAE208 ABCDF Rates After MAE206 Course Redesign



Course Redesign

Tracking students to Mechanics (MAE208)



Students who were enrolled in the MAE206 redesigned course and moved on to MAE208

Course Redesign

Final Thoughts

LCR is better

- Notes and online examples as THE most important element in their learning
- Attendance improved because of in-class activities
- More students in lecture skipped final exams, failed course
- Less students drop
- Higher student satisfaction
- Prepared to tackle homework
- Students in redesigned courses want another redesigned course
- Students in lecture courses want another lecture
- No single format can meet the needs of all the students

Course Redesign

Thank You!

Contact:

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