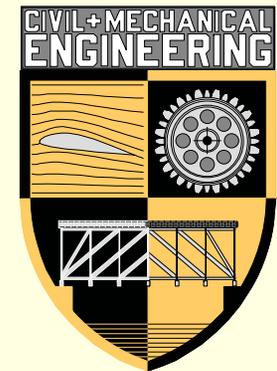


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# On-Demand Video Additional Instruction: *Adding Pull Content to a Push Learning Environment*

CTE Brown Bag Seminar  
14, 15 November 2007  
Dr. Led Klosky and MAJ Jake Bruhl  
Civil and Mechanical Engineering  
*The Nation's First Department of Engineering*



# Recent Technology Trends

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- TiVO
- Podcasting
- Vodcasting
- Wireless Internet
- Digital Natives

**ON- DEMAND!!**  
**They get what they want**  
**when they want it.**



# A Bit of Background\*

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- 78% of children ages 12-17 go online (a common activity is schoolwork)
  - Research
  - Virtual tutor
  - Study shortcut
- “Students are frustrated and increasingly dissatisfied by the digital disconnect they are experiencing at school”

\* Levin, D., and Arafah, S. “The Digital Disconnect: The Widening Gap Between Internet-Savvy Students and Their Schools”, Pew Internet and American Life Project, Washington, DC, 2007

# A Bit More Background\*



- Realities of “Digital Native” life
  - Media + gadgets + social networks = ubiquitous
  - Digital connectivity is at the center of the revolution
  - “Continuous partial attention” (It’s bad, right?... right?)
  - We can all be publishers, movie makers, artists, song creators, and story tellers (that’s good, right?... right?)
  - Radical changes in the way we create and consume media are upon us
- Students are digital natives. Are we?



\* Rainie, L. “Digital Natives: How today’s youth are different from their ‘digital immigrant’ elders and what that means for libraries”, a presentation to the Metro-NY Library Council, Pew Internet and American Life Project, Washington, DC, 2006

# Just a Bit More Background

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- Using “Constructivism” and “Connectivism” to better educate our cadets\*
  - Time-independent learning
  - Encourage interaction - engage
  - Facilitate individual communication
  - Meet them where they are – on their turf – AIM, the Web, Facebook, YouTube, ... that’s good, right?

\* Schroeder, R. “Harvesting the Promise of Distance Learning: Emerging Trends and Practices”, the keynote presentation to the 13<sup>th</sup> Annual AACIS Conference, November 2005.

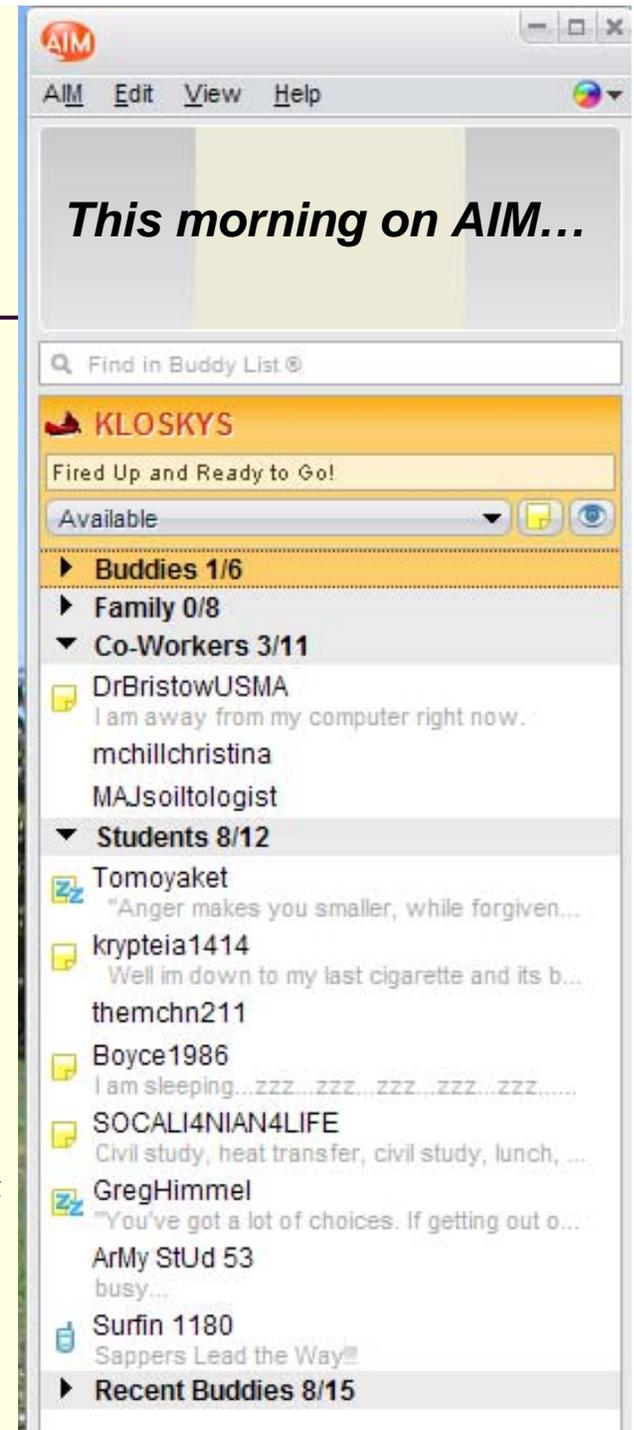
# Instant Messaging

- Students use it – constantly and confidently
- A well-known “pull” technology
- “Nobody’s using it”

■Klosky and Ressler. 2007. “Asynchronous delivery of engineering courses to a widely dispersed student body”. American Society for Engineering Education, 2007 National Conference, Honolulu, HI.

■Klosky, J.L. and M. Klosky. 2006. “The Internet Communications Tsunami – It’s Not Coming, It’s Here.” Solicited by the editor for *Means, Methods and Trends*, the on-line journal of ASCE’s Construction Institute. Published Spring 2006.

■Klosky, Hains, Ressler, Evers and Erickson. 2006. “AIM for Better Student Learning: Best Practices for Using Instant Messaging and Live Video to Facilitate Instructor-Student Communication.” American Society for Engineering Education, 2006 National Conference, Chicago, IL.



# What Does This Mean to Us?

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- Cadets are used to and want on-demand content, but . . .
- Our classrooms are primarily “force feeding” environments
- **Question:** Can we adopt some of the on-demand concepts without sacrificing the benefits of a traditional classroom?

# Video AI (or “AI On-Demand”)

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- A unique resource for cadets using technology with which they are comfortable
- A new way to use emerging technology
- A tool that seems to have positive academic impact

Jake *all alone* in  
the Video AI  
Studio!!



# A quick example...

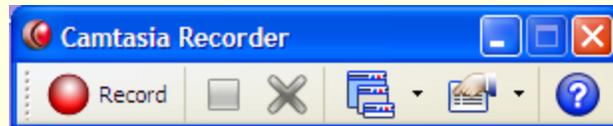
VIDEO AI

Note Title



# How do I create a video like that?

- What do I need?
  - Tablet PC or Smartboard
  - Microphone
  - Video screen capture software (i.e. Camtasia)
- How much time does it take?
  - You: As long as it takes to write and speak
  - Computer: About 5-10 minutes to create various formats
- How hard is it?
  - If you can run a VCR, you can do this!



# Initial Implementation

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- CE 300, 125 cadets, 3 instructors
- Early-April 2007 (toward end of AY07-2)
- 4 Videos posted 1 week prior to WPR 2
  - Shear & Moment Diagrams
  - Beam Design (2 videos)
  - Calculating First Moment of Outward Area
- 3 Videos posted between WPR2 and TEE
  - Truss Analysis
  - Axial Design (Tension member & Compression member)
- All videos were of example problems being worked

# Initial Implementation

- Posted on Blackboard (along with other resources)

UNITED STATES  
MILITARY ACADEMY

Home Help Logout

My USMA Courses Content Collection Community USMA Library Dean Internal Site

FUND OF ENGR MECH AND DESIGN (CE30020081) > VIDEO AI EDIT VIEW

## Video AI

**Forces (components and resultants)**  
[Windows Media File](#) (5.042 Mb)

This video explains the concept of the resultant force as well as force components through examples. The understanding of force components and resultants is foundational to your success in CE300 and subsequent engineering courses. **This topic is introduced in Lesson 2.**

**Moments**  
[Windows Media File](#) (3.895 Mb)

This video describes the concept of the moment of a force and the moment of a couple. The method for calculating moments of forces is described for the general 3D case as well as the specific 2D case common for the bulk of CE300. The method for calculating the moment of a couple is described in 2D only. Along with understanding and working with forces, a solid understanding and ability to find moments is foundational to your success in CE300 and subsequent engineering courses. **The concept of moments is introduced in Lesson 3.**

**2D Static Equilibrium**  
[Windows Media Format](#) (5.649 Mb)

This video is a solution of one of the Lesson Review Problems for Lesson 4 (6-13). It is a static equilibrium problem in which support reactions of a simply-supported beam (that is, *one support is a pin and the other a roller*) are determined. The five step problem solving process is applied within this solution. **The concept of equilibrium is introduced in Lesson 4.**

**More 2D Equilibrium**  
[Windows Media Format](#) (5.394 Mb)

This video shows the solution of a lesson review problem from Lesson 5 - a beam with a *fixed support*. The ability to determine support reactions is critical to success in CE300. You'll use it for almost every problem throughout this and other engineering courses. **The concept of equilibrium is introduced in Lesson 4.**

**Truss Analysis (complicated geometry)**  
[Windows Media Format](#) (11.569 Mb)

Course Admin  
Faculty Info  
Announcements  
Reading Questions  
Discussion Board  
Video AI  
Handouts  
SG Problems  
LRPs  
Problem Sets  
WPRs  
Tension Lab  
Technical Writing  
Interest Material  
Surveys

Tools

Powered by Blackboard Local intranet

# Initial Implementation

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- Video details:
  - No longer than 10 minutes
  - Available in Windows Media and Video iPod formats
- Survey available to gather student feedback on **how** they used it and what they thought about it.
- Statistics tracked:
  - **Who** viewed **which** videos **when**

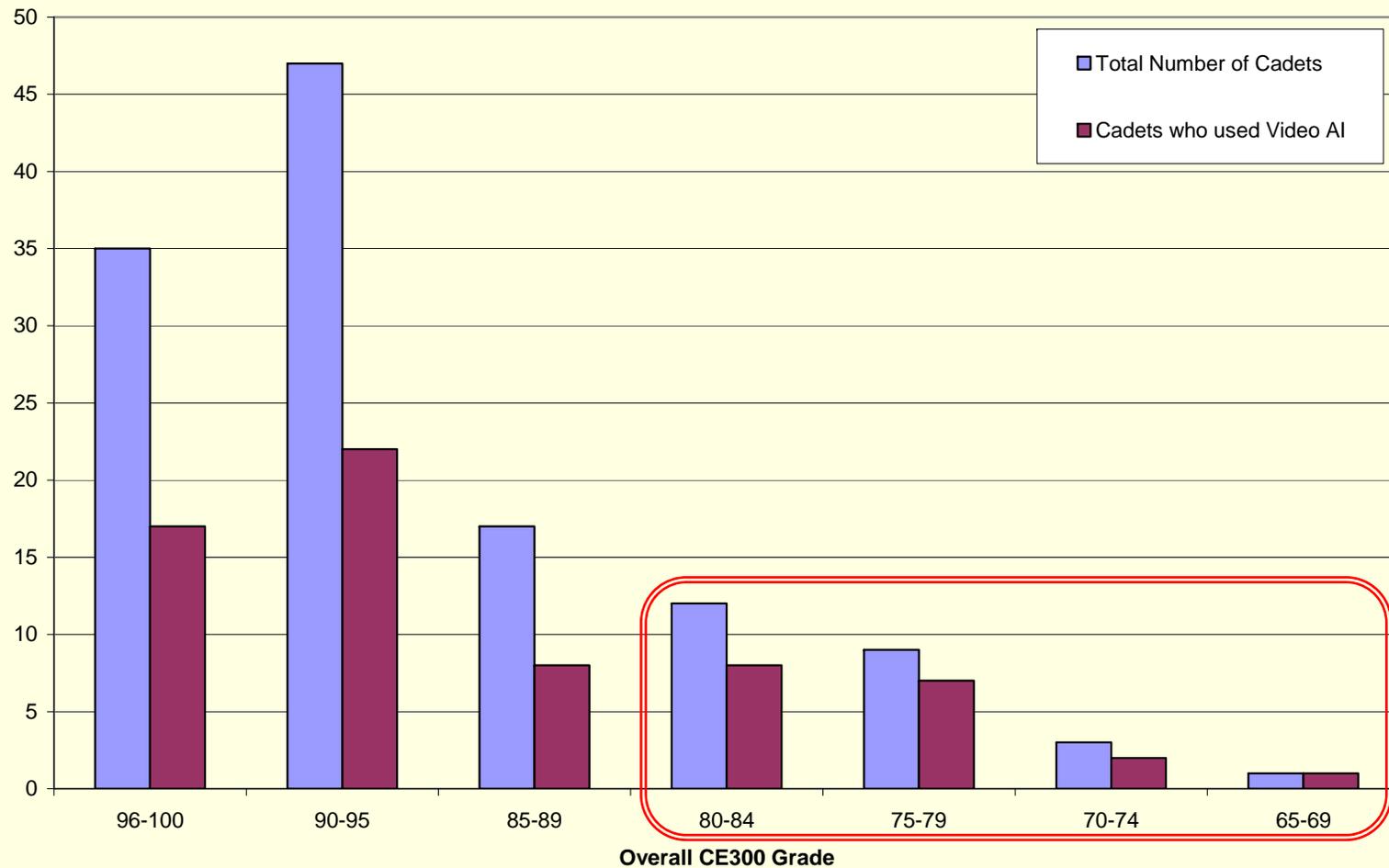
# Bottom Line

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- Appears to have very positive effect on academic performance.
  - Grade on the shear and moment diagram was 7% higher than average (14% higher than last semester)
  - Grade on the beam design was 8% higher than average (5% higher than last semester)
  - Performance was average on the portion of the exam (short answer) that did not have a Video AI available

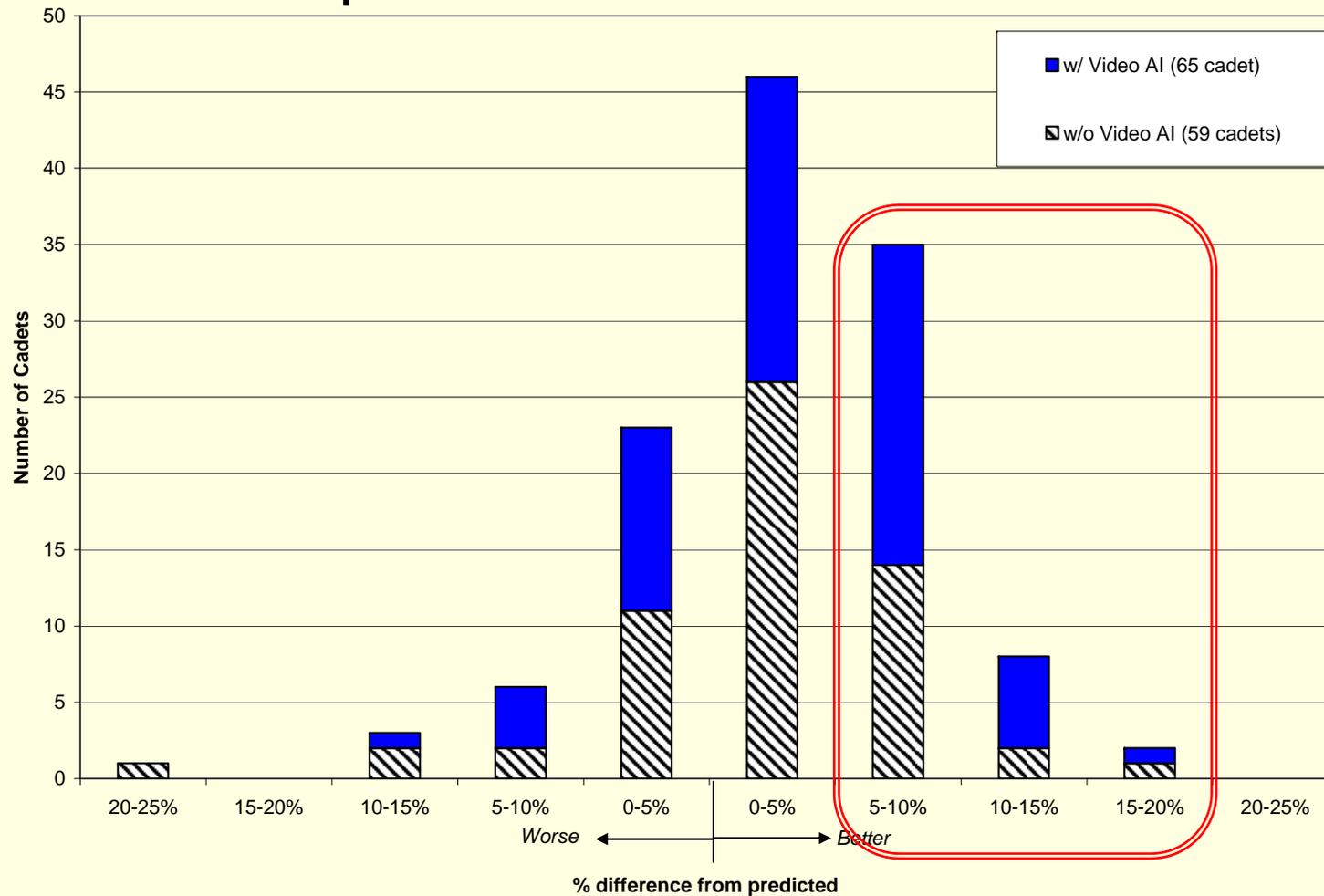
# Results (Statistics)

## Who used it:



# Results (Statistics)

## ■ How it helped individuals:



# How we predicted performance

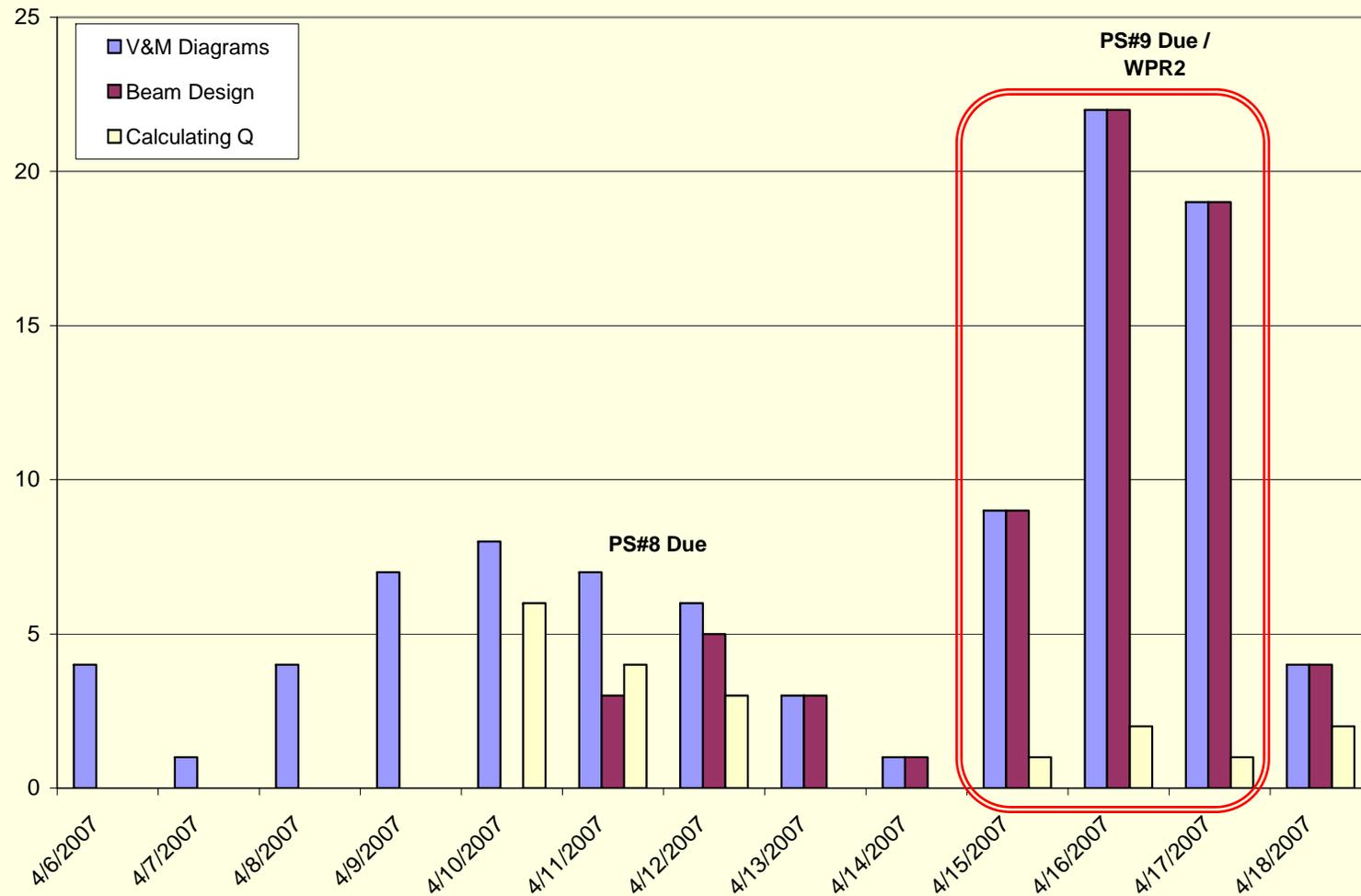
- Considered two indicators:
  - Incoming QPA
  - Incoming QPA in only MSE courses
- Used two models:
  - Straight QPA to % relationship
  - Statistical “Z-score” with historical CE300 average and standard deviation
- Bottom line: Using MSE-QPA with CE300 historical data was the most accurate

|                                   | QPA (%) | QPA (avg) | MSE-QPA (%) | MSE-QPA (avg) |
|-----------------------------------|---------|-----------|-------------|---------------|
| Average difference*               | 4.18    | 1.25      | 2.75        | 1.25          |
| Standard Deviation of differences | 4.50    | 4.54      | 4.31        | 4.33          |

\* Positive value means cadets do this % better in CE300 than predicted

# Results (Statistics)

## ■ When cadets used it:



# Results (Survey feedback)

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- **What** cadets reported using it for:
  - 72% - to prepare for WPR
  - 67% - to improve understanding of material
  - 50% - for help on problem sets

# Results (Survey feedback)

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- **How** cadets reported using it:
  - Most pause the video while watching in order to implement the concept described in the video to the problem they are working on
  - Very few watched the videos straight through without pause
  - 44% reported that they took notes while watching the videos.

# Where to go from here

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- Implementing in CE300 throughout AY08-1
  - “Prepo” videos of common trouble topics
  - Create videos as trends develop
- Try various things
  - Describe theory/ concept - not just example problems
  - Mix PowerPoint builds with handwriting
  - Deliberately try various lengths
- Link to learning style preferences
- Write-up results for ASEE national conference

# Where to go from here

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- Gather specific feedback and data
  - Surveys throughout semester
  - End-of-Course feedback
- Use in other courses?
  - Coordinate efforts to gather data

# Conclusions

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- Exciting technology with lots of possibilities
- Received extremely favorably by cadets
- Not time-intensive for instructors

# References

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