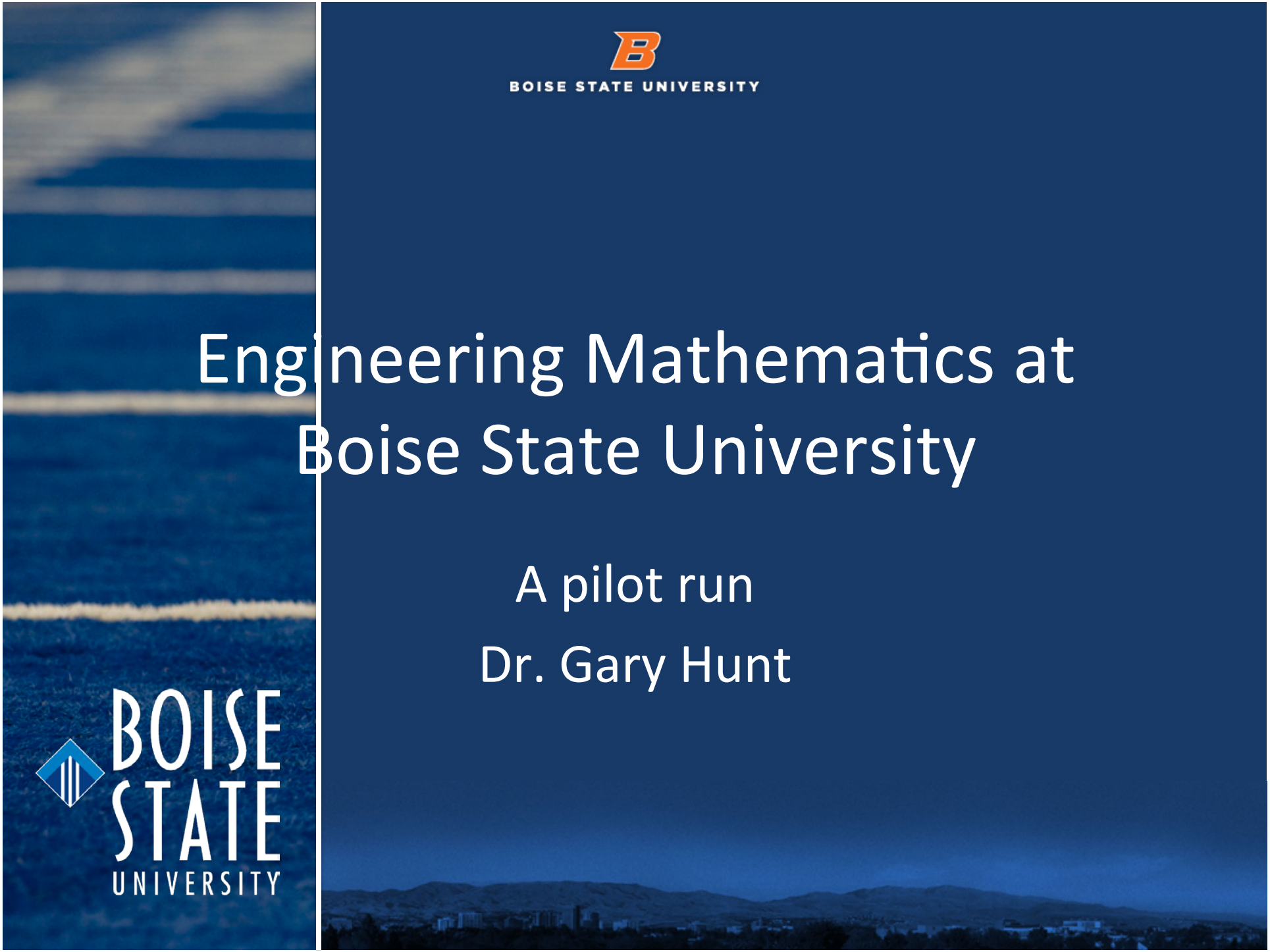


Engineering Mathematics at Boise State University

A pilot run

Dr. Gary Hunt

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Background: Why?

- ***Student Retention*** within the College of Engineering
  - Cohort of Fall 2009 to fall 2012, retention=68% (FTFT)
  - Total number of Engineering Students= 2240 (UG)
  - Total number of students at BSU= 22,003 (fall 2013 headcount)

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Course Goals:

- ***Mathematics***: Student competence of math within the context of a complicated engineering problem.
- ***Laboratories***: Student competence analyzing data sets recorded during lab activities.
- ***MATLAB***: Student competence at using matlab to solve typical sophomore and junior level engineering problems

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Implementation at BSU ENGR-120, Fall 2013

- Three sections of Engr-120
  - Two sections of our traditional 120, project design, N>100
  - One section of Engr-120K, Wright state model, N=95

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Implementation at BSU ENGR-120, Fall 2013

- Lecture times: Twice per week, 75 min
  - Topics = from the Rattan Book
- Lab meetings: Twice per week, 100 min
  - First meeting, Lab activity/Matlab supplement
  - Second meeting, recitation. Lead by student TA's
  - Lab book, used the Wright State lab book

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Summer course development

- One month of time in summer
- TA's work through lab book to become familiar with labs and debug equipment
- Instructor and TA's complete the homework problems
- TA's complete the MATLAB assignments.

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Results: FTFT retention, Fall 2013 cohort in ENGR-120k

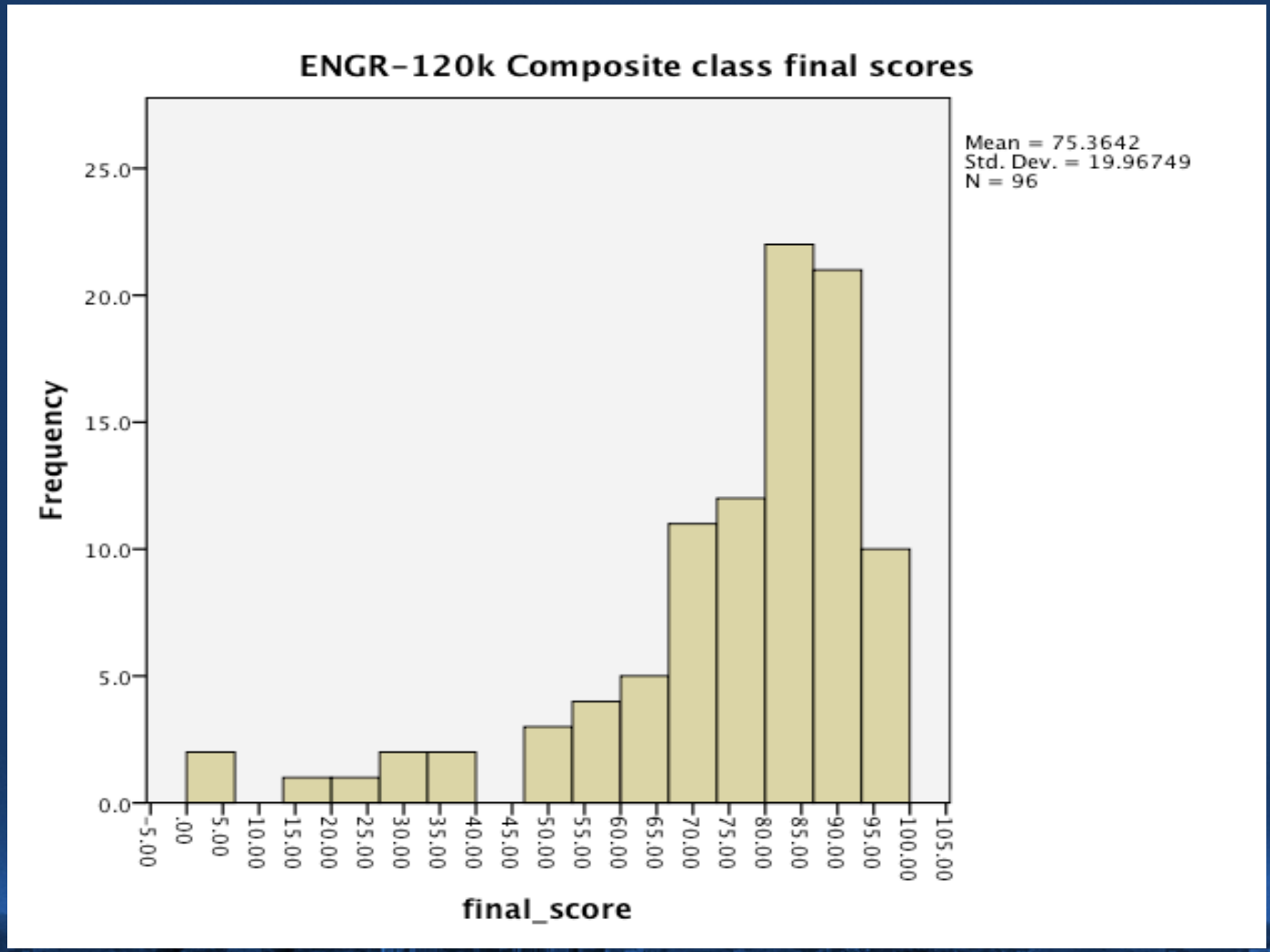
- N=95 students
- 76 retained, 80.0%
- 12 dismissed, 12.6%
- 7 (7.4%) possibly still around, have not registered yet

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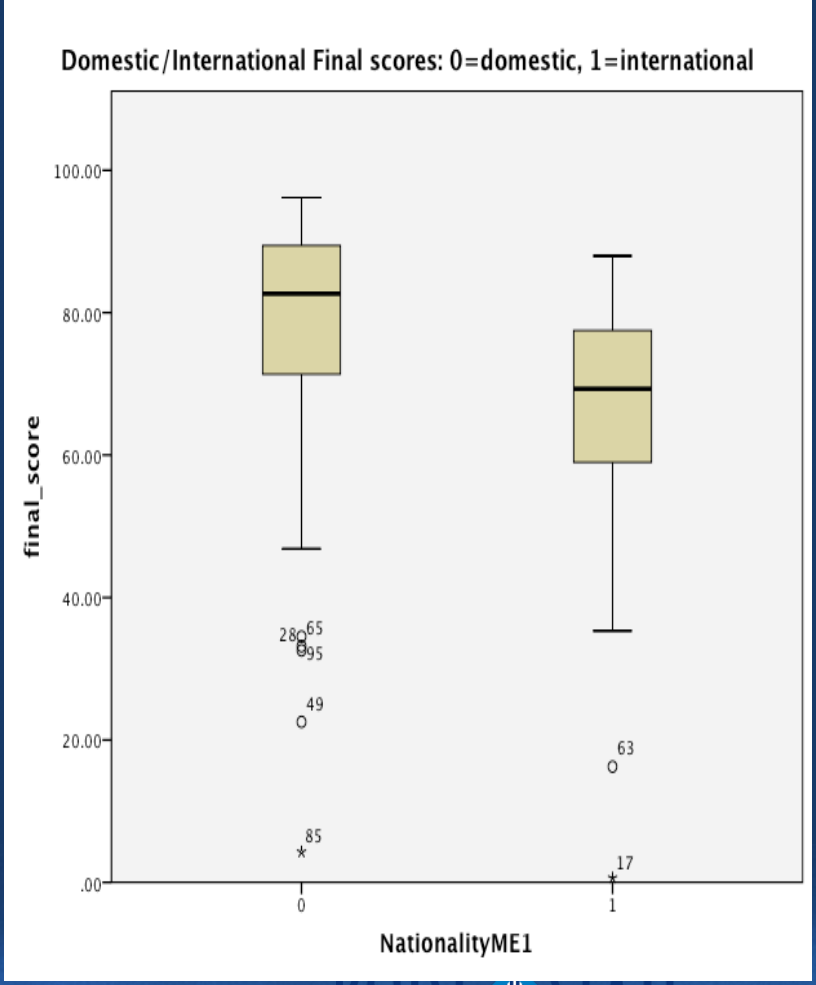
Results, Fall 2013

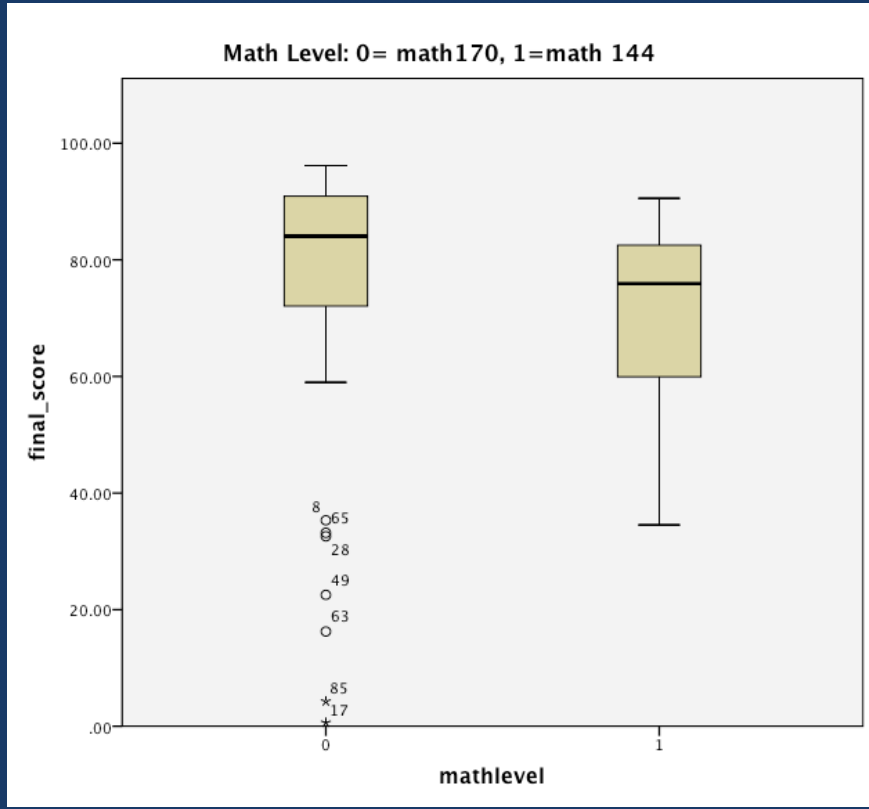
- Student scores within our ENGR-120k:



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Final scores Fall 2013





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Results, Fall 2013

- Student score in concurrent math classes:

Summary	120	120K
Students in both Engr 120 and Calc 1 (M170)	82	42
Got an A or B in 120	68%	67%
Passed 120	83%	88%
Failed 120	17%	12%
Got and A or B in M170	30%	50%
Median GPA in M170	2.00	2.50
Passed M170	63%	69%
Failed M170	38%	31%

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Tentative Results, Fall 2013:

Student scores in following math classes

- One-way Anova to evaluate the effect of 120k on the grade in math the following semester
- The results were not significant, i.e. ***there was no statistically significant effect of 120k on the grade in the next semesters math class.***
- $F(2, 127) = 0.8$, $p = .37$

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Results:

- Students self-selected in Project version of class
  - Spring section of Engr-120k was small, N=35

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Conclusions:

- We are positively impacting retention.
- Students who take this course also do better in a concurrent math class.
- We need to investigate further why there is a group of students failing who are apparently calculus ready.
- Only offer one version of Engr-120

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Conclusions:

- We need to investigate further to see what does have an effect on the following math class.

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Next Step:

- One version of Engr in the fall of 2014
  - Mashup of math and open ended projects
  - About 60% math, 40% projects

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Questions?