

Matter & Interactions: Testing a
New Physics Curriculum at
Georgia Tech

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Project overview

- Preparing students for 21st century science and engineering
 - Update course content (typical intro physics course: 19th century concepts)
 - Introduce students to important skills in modern sci./eng.
- Impact of university intro physics curriculum reform
 - Potential to affect large numbers of students
 - Nationwide (NC State, Purdue)

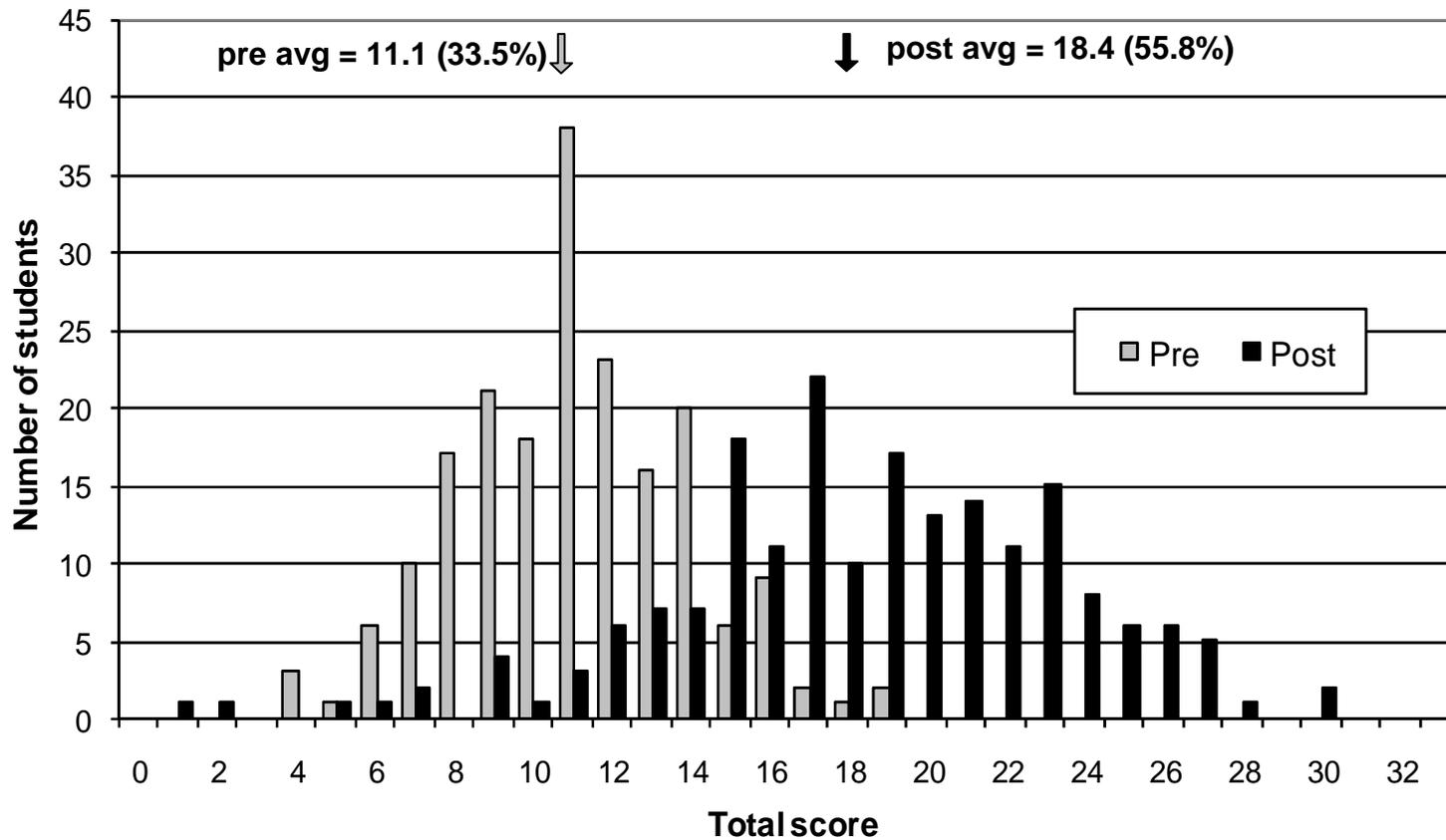
Matter & Interactions

(R. Chabay & B. Sherwood, Wiley, 2006)

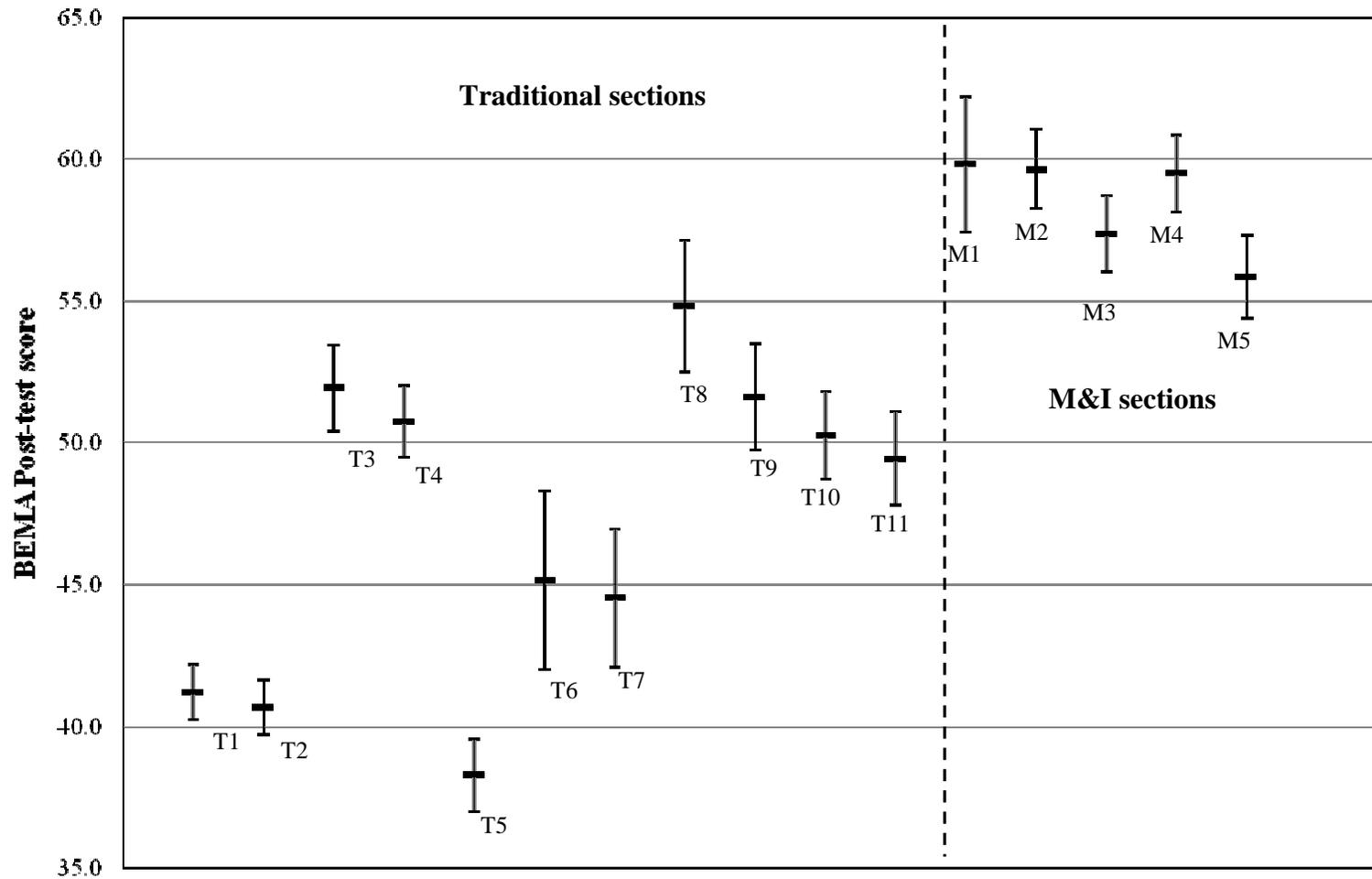
- Innovative introductory calculus-based physics curriculum
- Modern content
 - Fundamental principles
 - Atoms and structure of matter
 - Relativity and quantum physics
 - Macro/micro connections
- Modern tools/techniques
 - Computer modeling

Semester	M&I mechanics	M&I EM	Faculty w/M&I experience
Summer 06	1 section, 40 students	None	0
Fall 06	1 section, 120 students	1 section, 45 students	1
Spring 07	2 sections, 200 students total	1 section, 150 students	2
Summer 07	None	1 section, 150 students	3
Fall 07	1 section, 150 students	2 sections, 300 students total	4
Spring 08	2 sections, 300 students total	2 sections, 300 students total	4
Summer 08	1 section, 180 students	1 section, 180 students	4
Fall 08	2 sections, 300 students total	3 sections, 450 students total	5

- Energy concept assessment, Spring 07 M&I sections (193 students)



- Brief E&M Assessment: various sections from Fall 06 to Fall 07



Assessment and Dissemination

- E&M Assessment results
 - Currently compiling results of comparative measures of M&I vs. traditional curriculum at 4 large institutions (GT, Purdue, NC State, Carnegie Mellon)
 - Will be submitted for publication in Phys. Rev. ST: Research in Physics Education

Assessment and Dissemination

- Mechanics
 - M&I weaker than trad. course on Force Concept Inventory
 - Spring 08: “talk-aloud” protocol study
 - M&I and traditional students work FCI problems while verbalizing their reasoning for their answers
 - Data analysis ongoing
 - Long term: Impact of M&I on complex problem solving.