Engaging Students Through a Proficiency-based Assessment and Reassessment of Learning Outcomes (PARLO) System

Joint Mathematics Meetings
SoTL in Collegiate Mathematics Session
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Background/Overview
• Becoming a SoTL Researcher
  – What if we trained airline pilots like we trained teachers? (Laboy-Rush, 2012)
  – Formative Assessment Workshop through MSPGP
  – SMER Report, CAUSEmos Research Cluster
• The PARLO System
• Villanova PARLO Study
• NSF PARLO Study

The PARLO System
Proficiency-based Assessment and Reassessment of Learning Outcomes

Success in High Schools
• Young Women’s Leadership Charter School of Chicago (www.ywlics.org)
  – Specific learning objectives for each course
  – Proficiency grading
    • Not Yet Prof (N), Proficient (P), High Performance (H)
  – Unlimited resubmissions allowed
  – Success!
    • Highest grad rate of non-selective public schools
    • >95% of graduates admitted to college
    • >85% of initial cohort still in college in 2005-2006
    • Transformed summer school format
• Quakertown Community School District
  – Increased score on statewide assessments

Villanova PARLO Study (VPS)
What are the impacts on student attitudes and performance of offering a PARLO Assessment System?

VPS Methods
• Two sections of intro statistics (for non-majors)
  – Same instructor, same material
  – Back-to-back class times (1:30 / 3 pm on Mon & Wed)
  – Control group
    • Numeric grading on each homework
    • No resubmission allowed
  – PARLO group
    • Proficiency grading on each learning outcome
    • Assignment resubmission (once)
  – Cross-over design (two years)
  – Outcomes: Common Final Exam, CAOS, SATS
VPS Results - Attitudes

Boxplots of Student Attitudes

VPS Results - “Second Class” Learner?

Scatterplot of Final Exam vs. Delayed Proficiency

VPS - Other Results

• Common Final Exam
  – PARLO group didn’t perform better on common final
  – Controlling for Math SAT didn’t change results
  – A gender-PARLO effect (males did worse)
• 92% strongly satisfied with grading system
  – none dissatisfied
• Students in the PARLO group thought the course was graded more fairly (4.45 vs. 4.0, p<0.05 (t-test and J-T))
• More PARLO students came to office hours
• Improved instruction and assessment by focusing on learning outcomes

VPS - One More Result…

• The following did NOT occur…

NSF PARLO Study

• Evidence-based STEM education on national agenda
• Five year, $2.4mil RCT of 32 high schools
• Use PARLO in 9th grade mathematics to improve attitudes, engagement and achievement
• Includes professional development and professional learning communities for teachers
• Currently in third year of implementation
• Results forthcoming

References

• The PARLO Project. http://www.parloproject.org