

Improving Student Preparedness with Just In Time Teaching (JiTT) Techniques

Bill Kitch, Associate Professor
Cal Poly Pomona
Civil Engineering
wakitch@csupomona.edu

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Outline

- Motivation for this research
- What is JiTT
- Courses assessed
- JiTT effectiveness
- ~~Implementation in BlackBoardTM~~
- Conclusion



My Motivation

- Students ill-prepared for class
- Students happy to have text material repeated in class
- Lack of classroom time for higher levels of learning



Goals

- Improve student pre-class preparation
- Allow more time for active learning in class
- Improve steady-state learning (i.e. decrease cramming)



What is JiTT

- Method of getting input on current student knowledge & skill level **before** class
- Allows instructor to tailor class based on students' current knowledge & skill
- Implicitly encourages pre-class student preparation

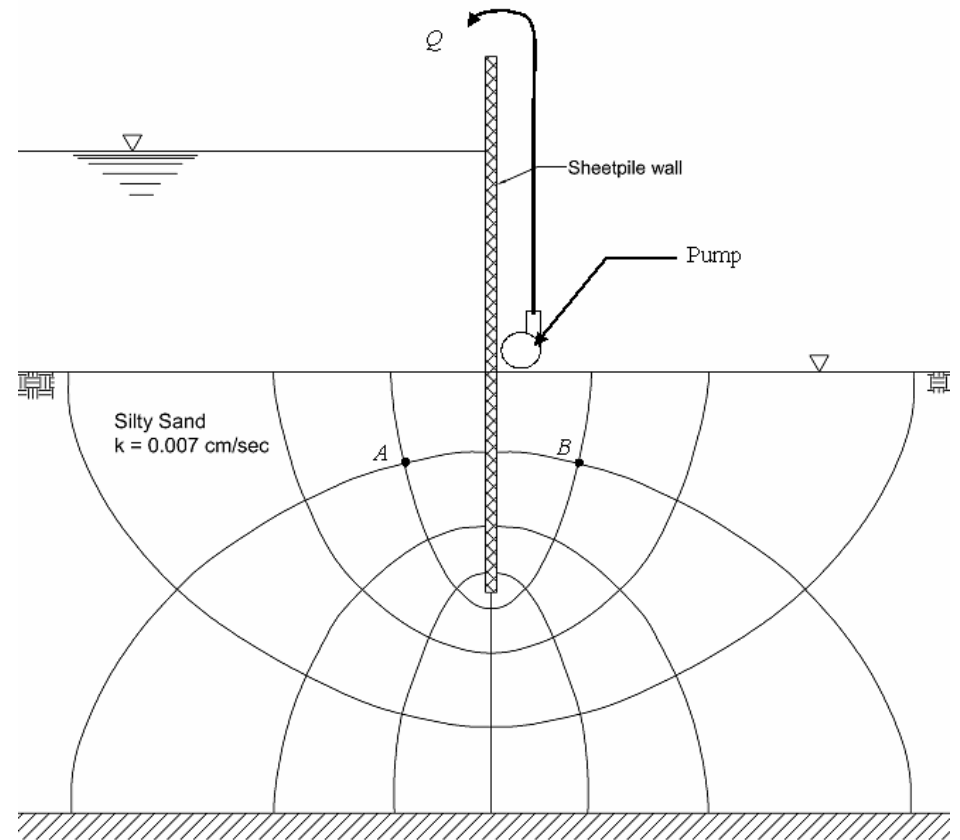


JiTT Process

- Instructor posts on-line homework questions for upcoming classes
- Student respond to questions the night before class via the web
- Instructor reviews student responses before class
- Instructor modifies class material, structure, or schedule based on students' current level

Example Pre-Class Questions

- Does point A or point B have a higher pore pressure? Explain
- If wall is extended deeper, will Q change? Explain.
- If the height of water rises, how will the flow net change?





Key questions

- Always asked at end of pre-class homework
 - What part of today's material do you still have questions about?
 - What seemed hard or confusing?
 - If nothing was difficult or confusing, what did you find most interesting?



Courses Assessed

- CE 325 & 326: Geotechnical Engineering
- Required technical sequence for majors
- Five quarter units total (2 + 3)
- Five sections assessed over four quarters
 - Two different instructors during one quarter



Learning Techniques Used in Courses

- JiTT Homework: Pre-class questions
- Problem Sets: Traditional computational homework
- Peer Instruction: In-class exercises for peer-to-peer learning
- In-class examples: Traditional example problems performed by instructor
- Posted learning outcomes for every lesson




Assessment tool

- Student self-assessment questionnaire
- Completed on-line during last week of class
- No Pre- & Post-JiTT assessments of student learning
- No control group comparison
- Limited to student self-assessment



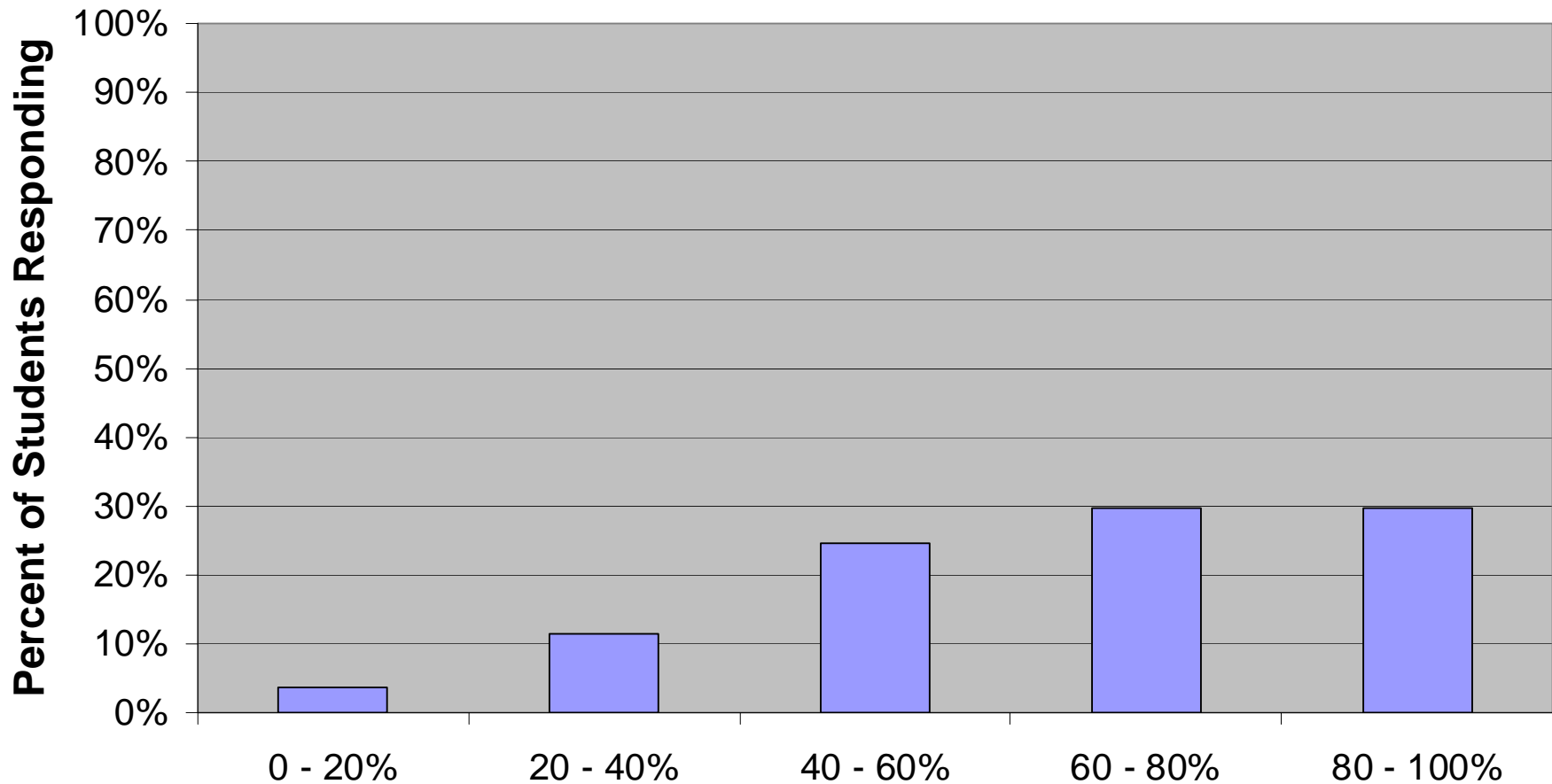
Assessment Results Presented in Three Groups

- Perceived effectiveness of JiTT in student pre-class preparation
- Comparison of effectiveness of learning techniques use in courses
 - JiTT, problem sets, learning outcomes
 - Measured by class grade (GPA)
- Perceived effectiveness of JiTT in reducing cramming



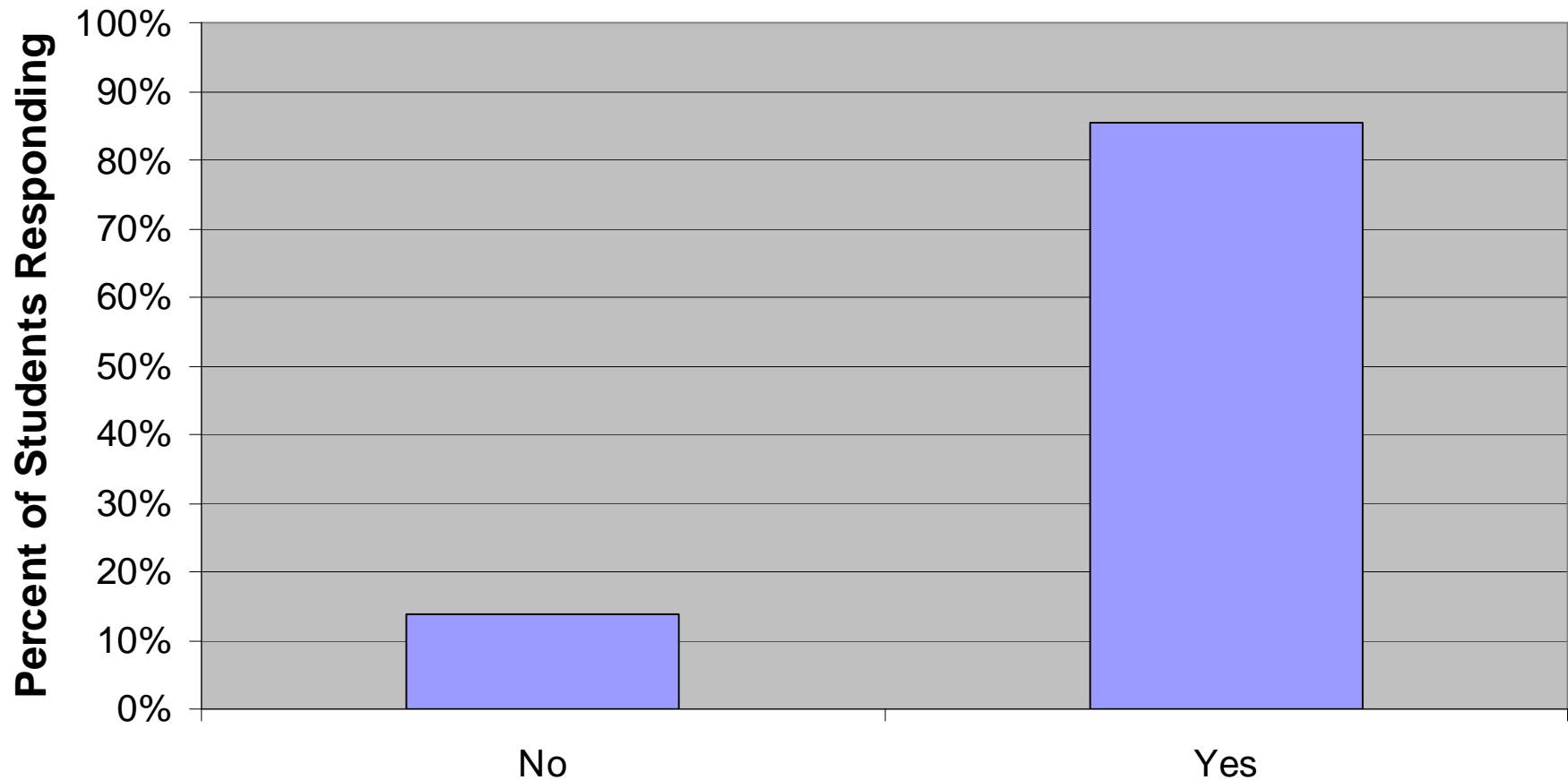
JiTT Effectiveness in Pre-Class Preparation

Reading Assignment Completion Rate



Q2: What percent of time was assigned reading completed before class?

JiTT Effects on Student Preparedness



Q4: Was JiTT exercise effective in keeping student caught up with class material?



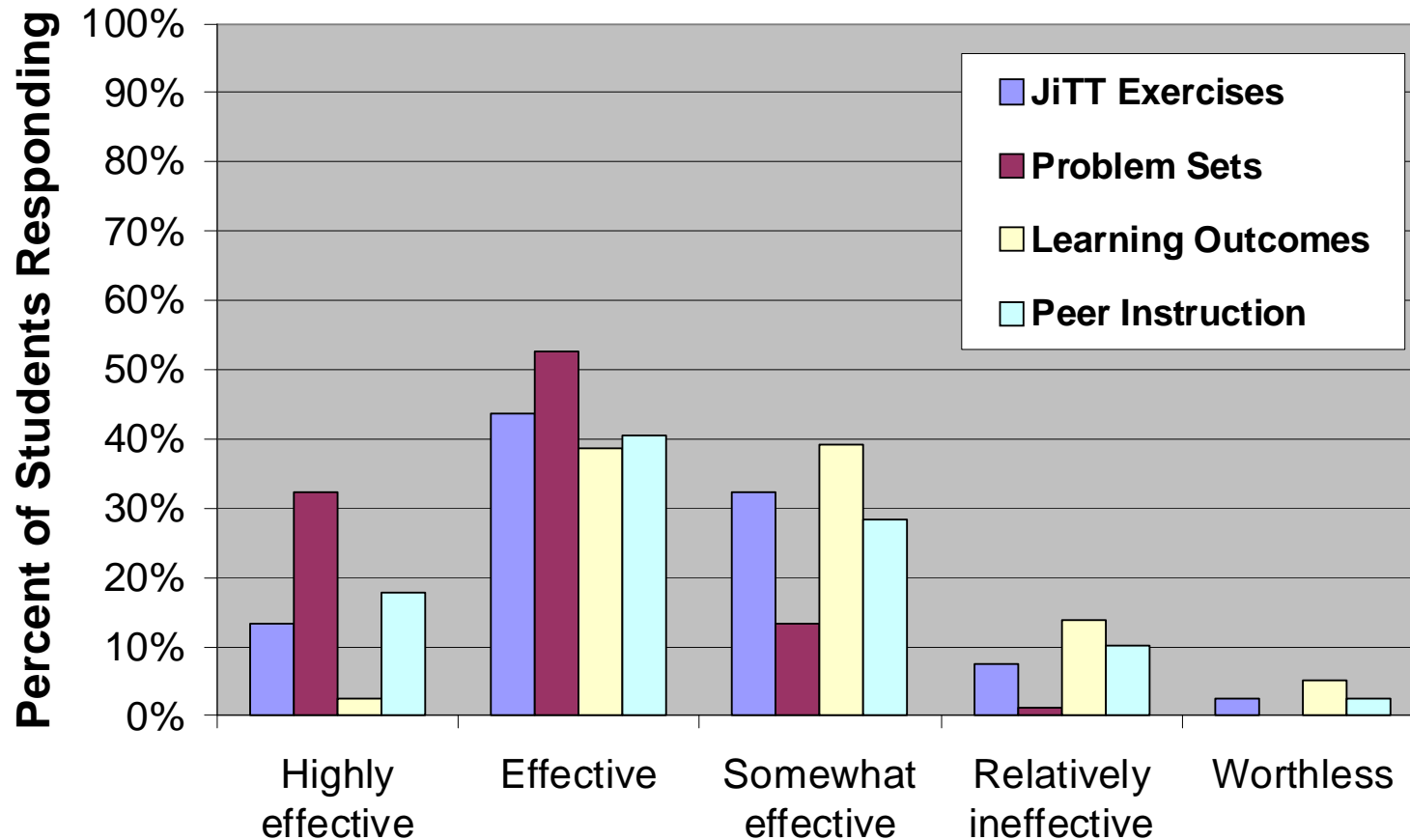
JiTT Effectiveness in Pre-Class Preparation

- Students in CE 325 & CE 326 report completing pre-class assignments at high rates
- Student perceive JiTT as an aid in keeping them prepared for class



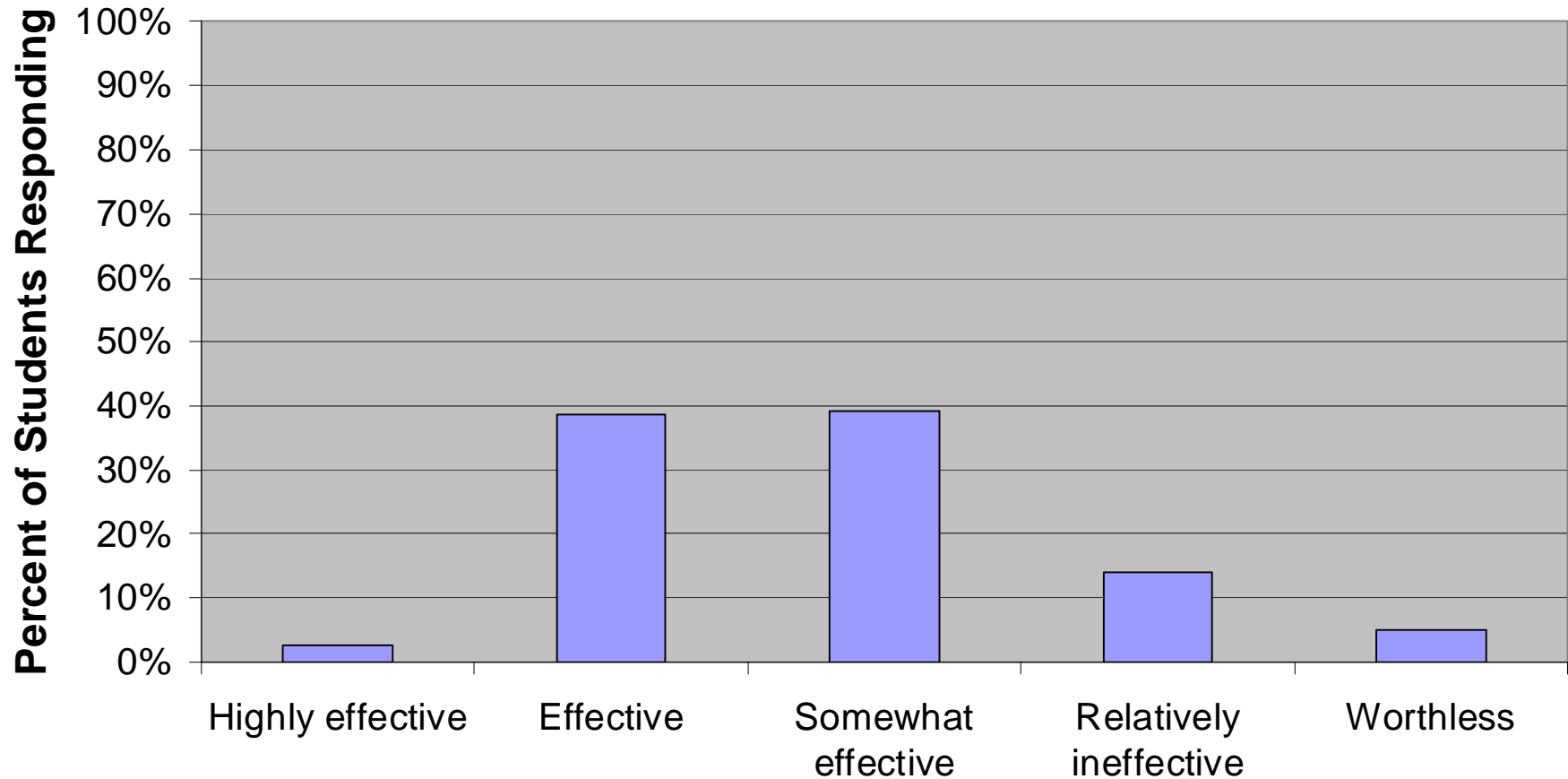
Effectiveness of Course Learning Techniques Used

Perceived Effectiveness of Course Learning Techniques Used



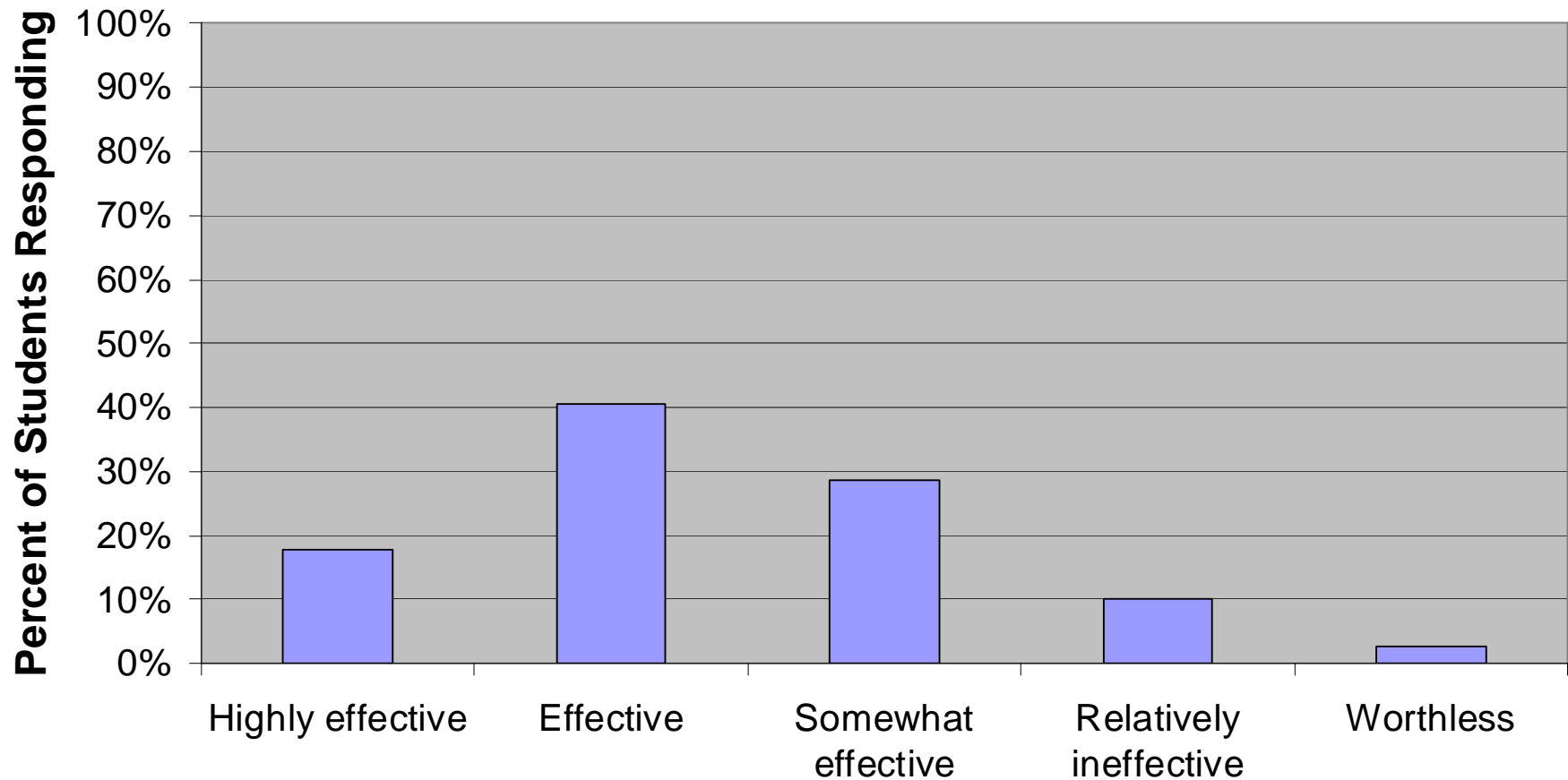
Q6,10,12 & 13: How effective were _____ in helping student learn course material?

Learning Outcomes Effectiveness in Learning



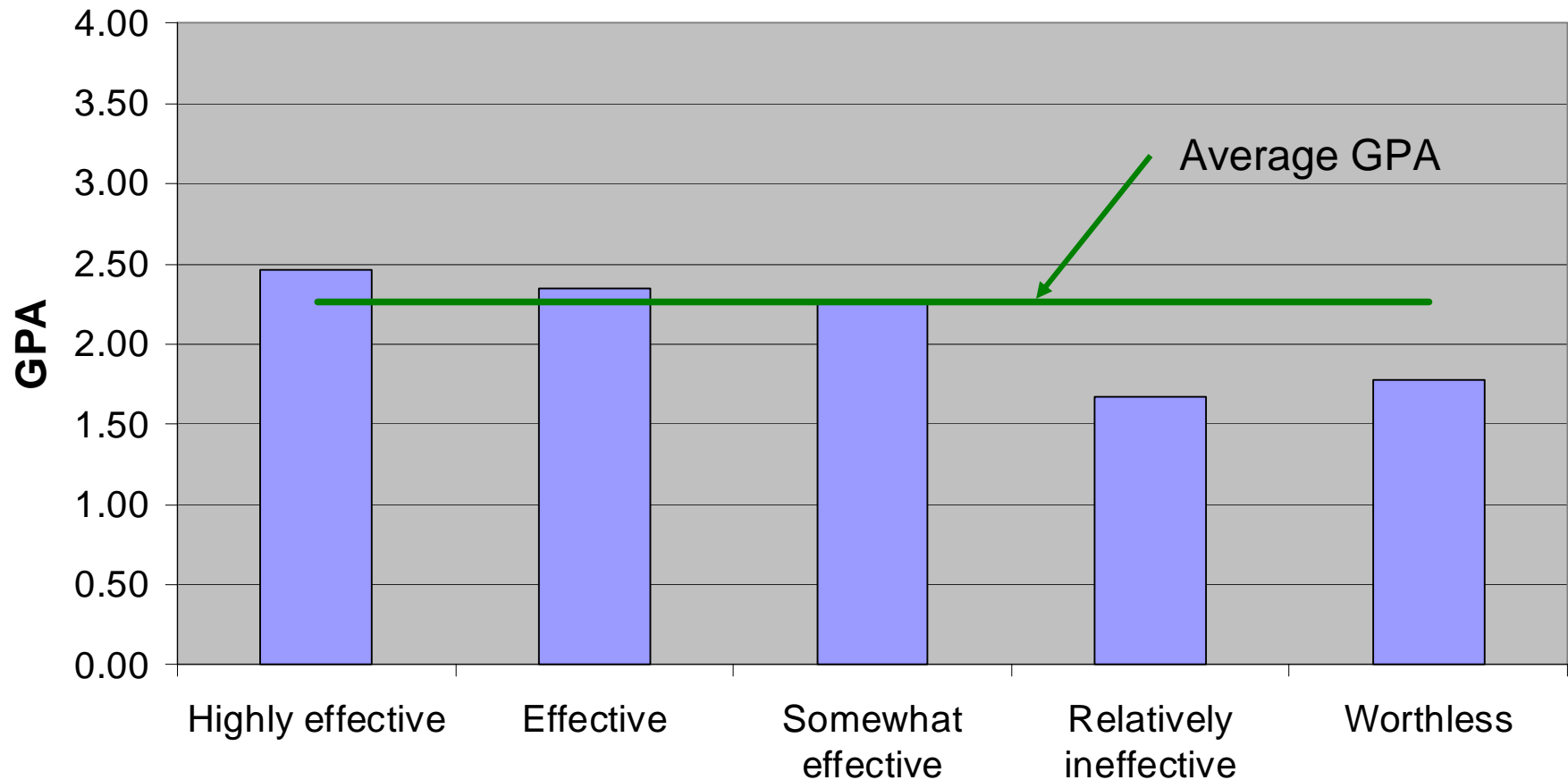
Q12: How effective were learning objectives in helping student learn material?

Peer Instruction Effectiveness in Learning



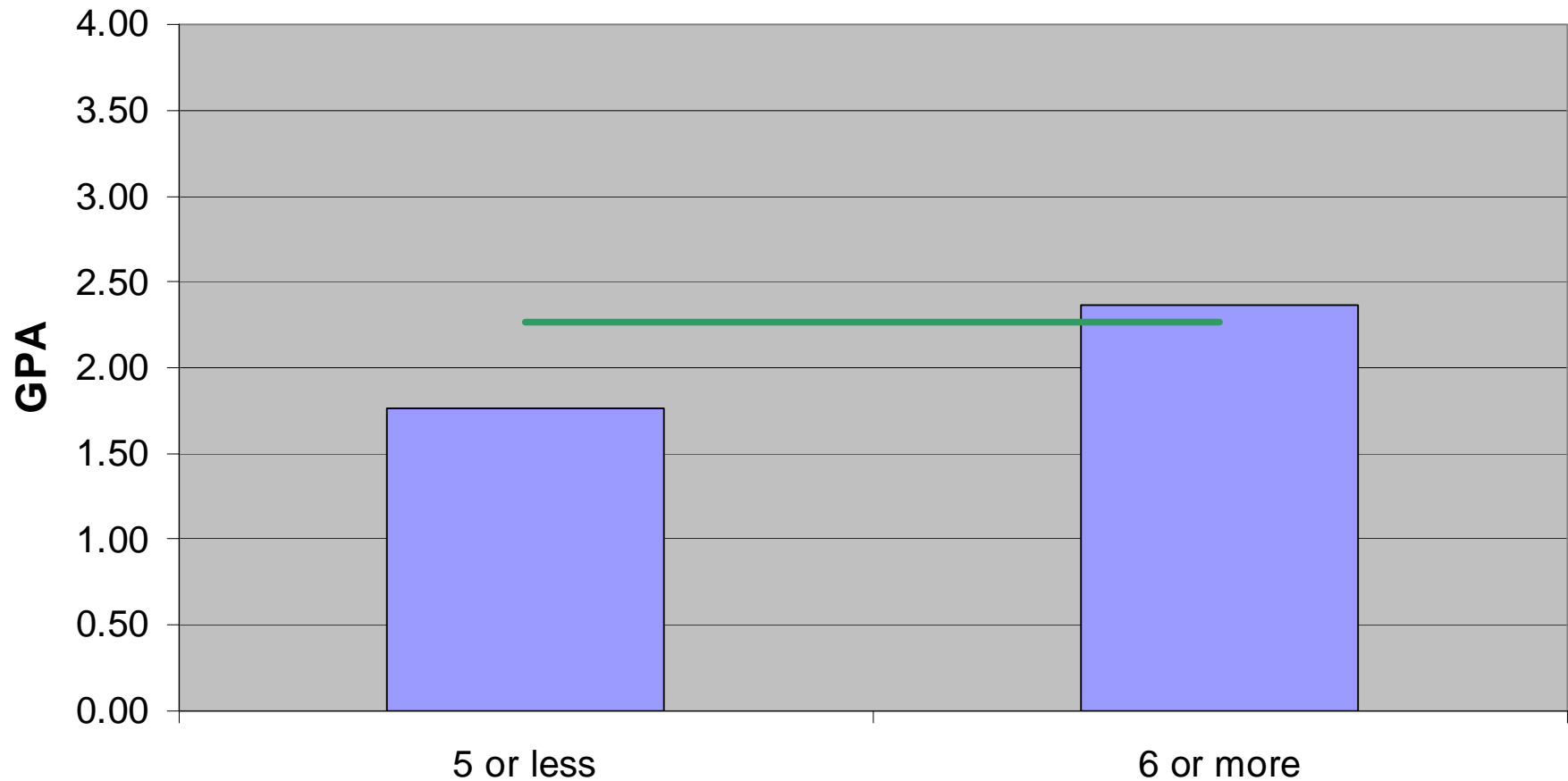
Q13: How effective were in class peer instruction exercises in helping student learn material?

Relation Between Course GPA & Perceived JiTT Effectiveness



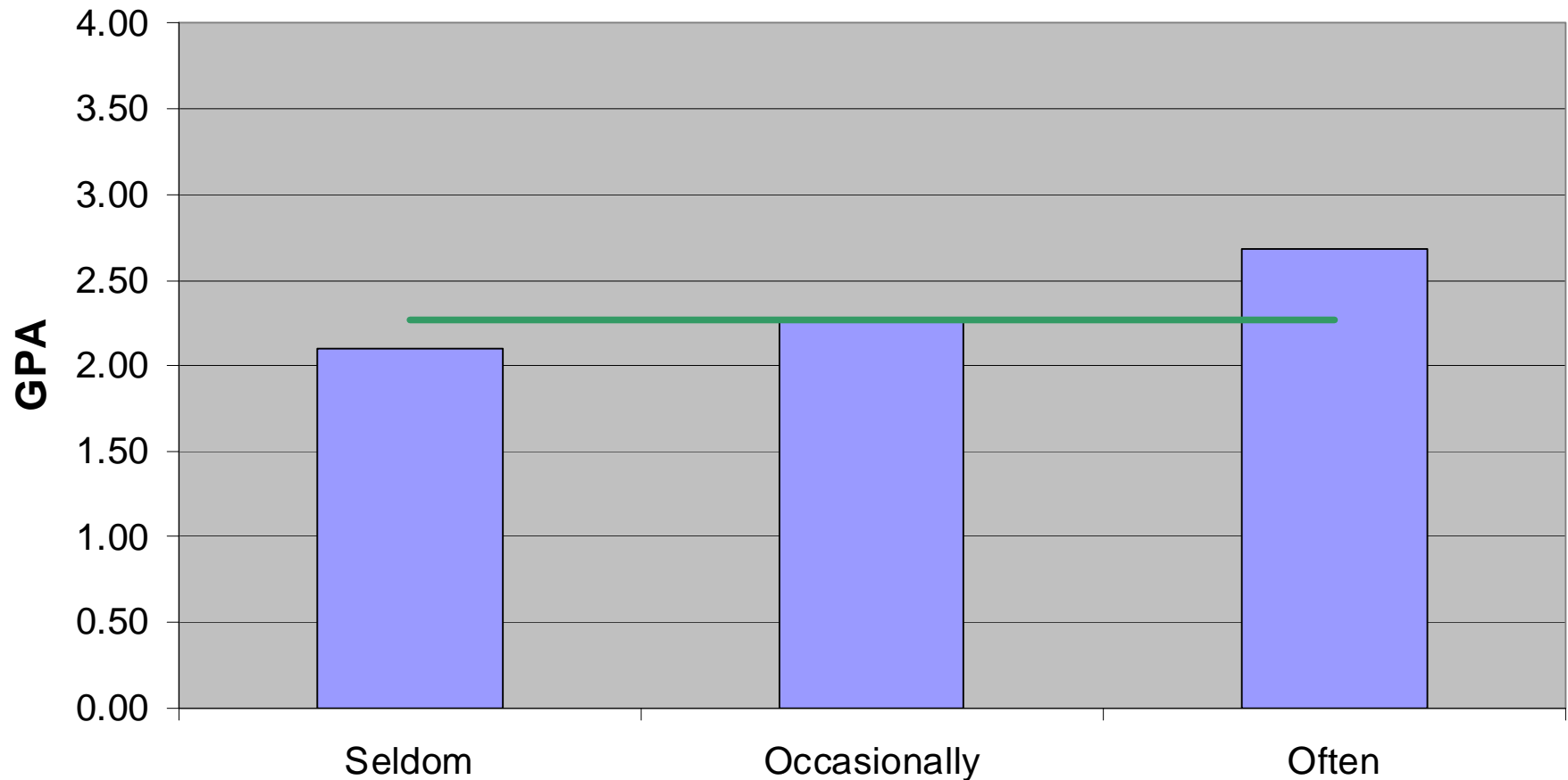
Q6: How effective was JiTT exercise in helping student learn course material?

Relationship Between Course GPA & Completed Problem Sets



Q7: How many of the 8 assigned problem sets did student submit for a grade?

Relationship Between Course GPA & Use of Learning Outcomes



Q11: How often did student use the posted learning objectives?



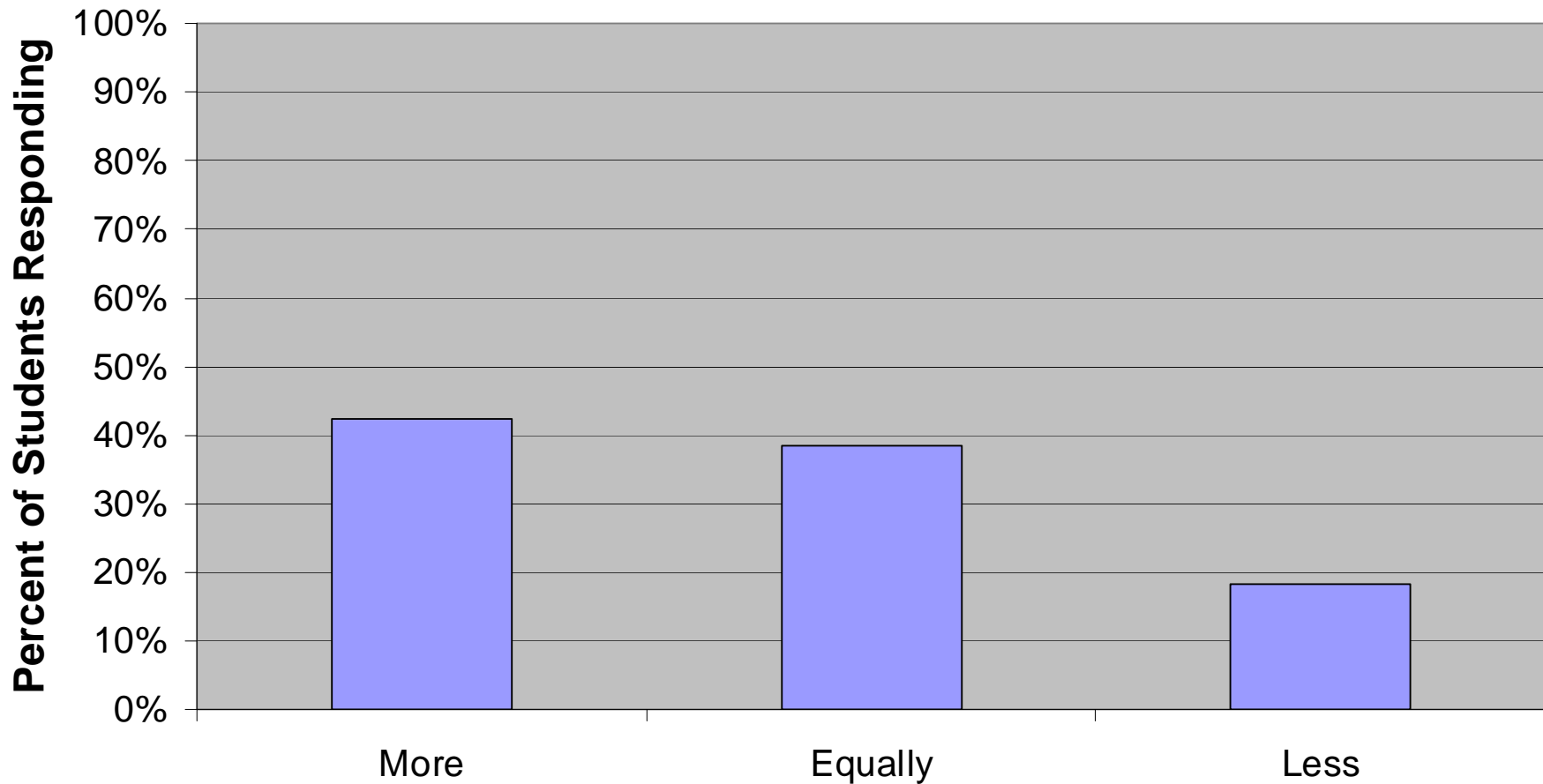
Perceived Effectiveness of Course Learning Techniques Used

- Problem sets perceived by students to be effective and are strongly related to student performance
- JiTT exercises were perceived as effective and are significantly related to student performance
- Availability of learning outcomes perceived as less effective but are still significantly related to student performance



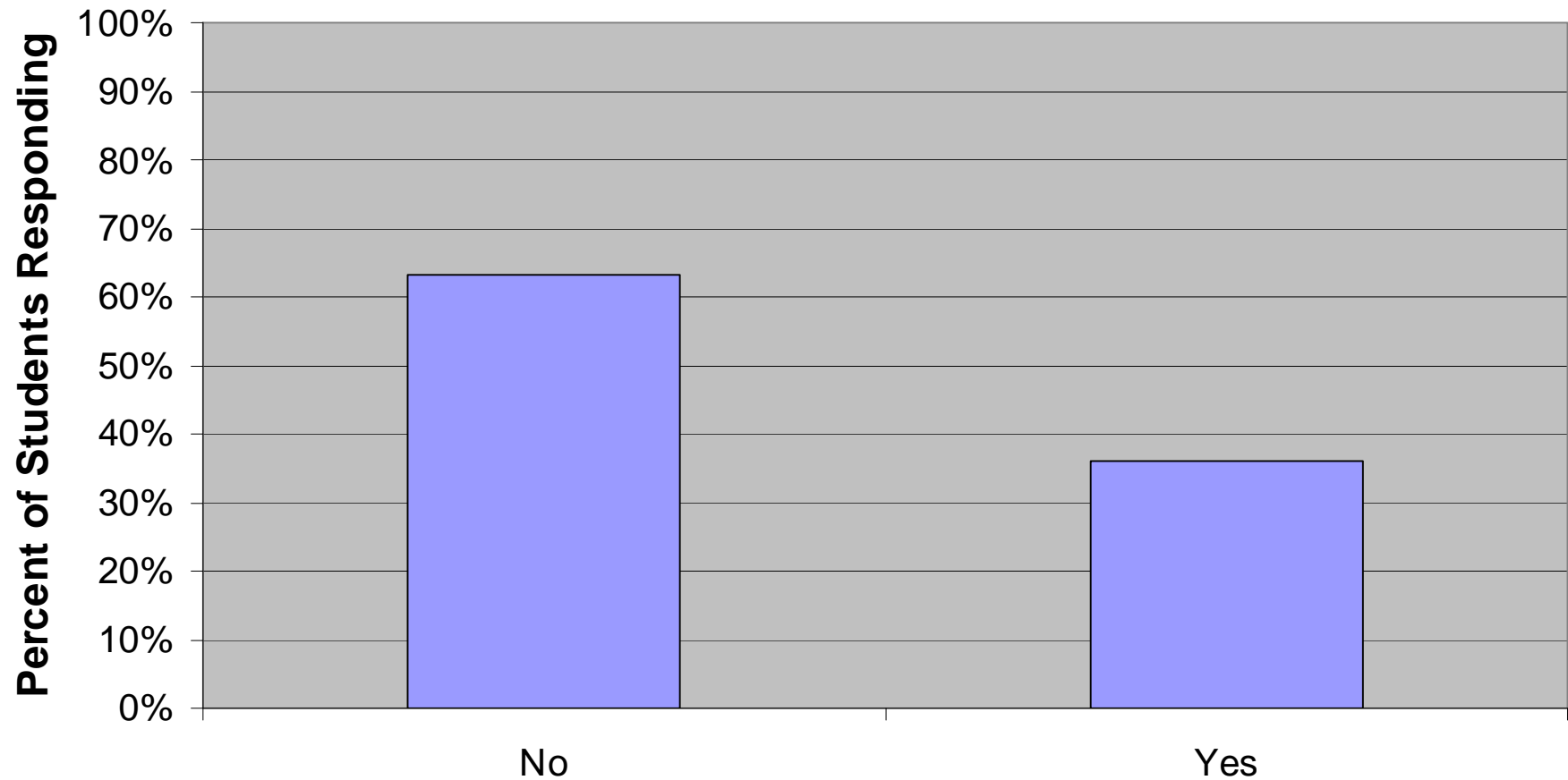
JiTT Effectiveness on Class Preparation & Cramming

Preparedness Compared to Other Classes



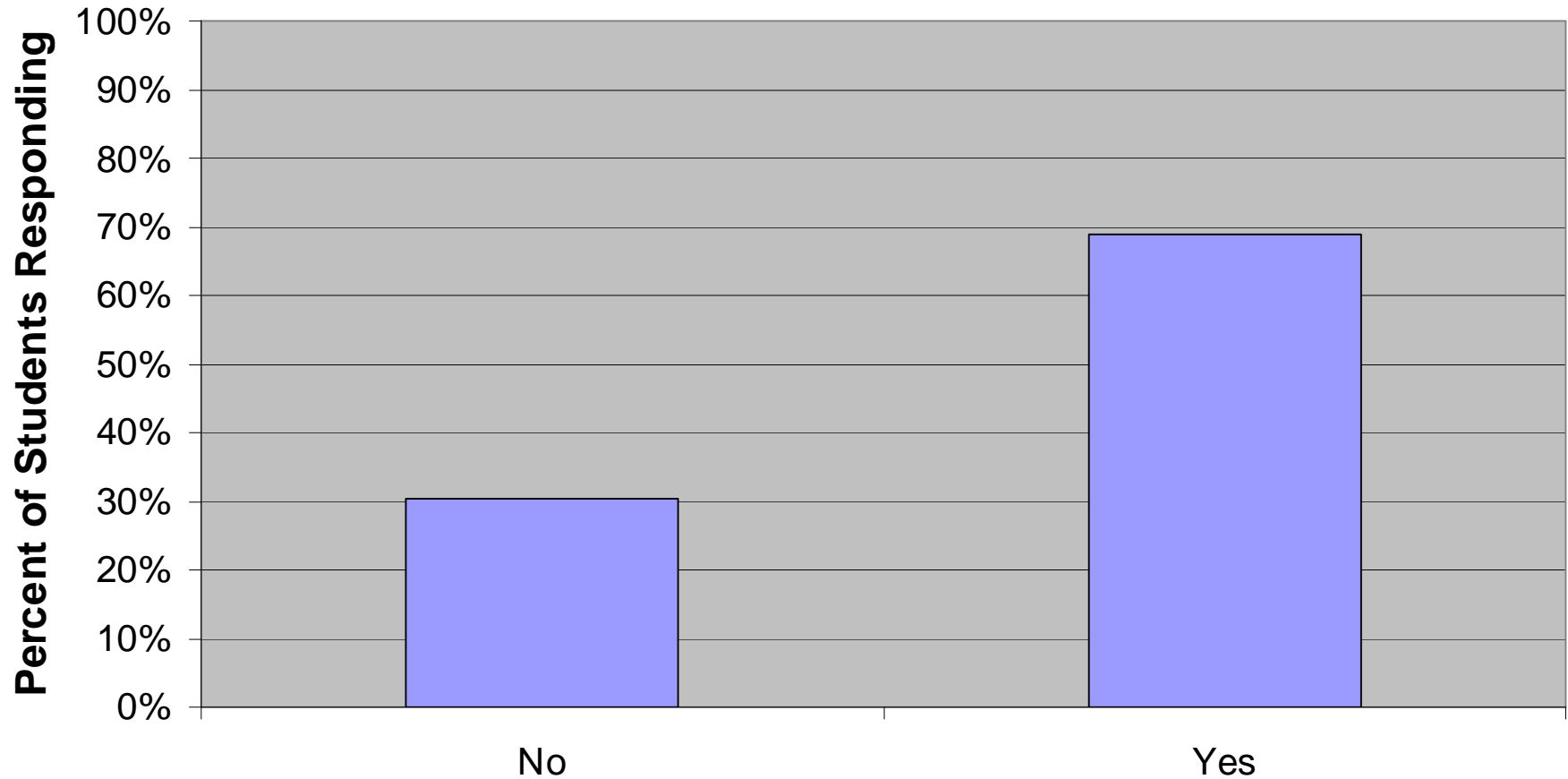
Q5: Was student more or less caught up in this class compared to other classes?

Perceived Amount of Cramming



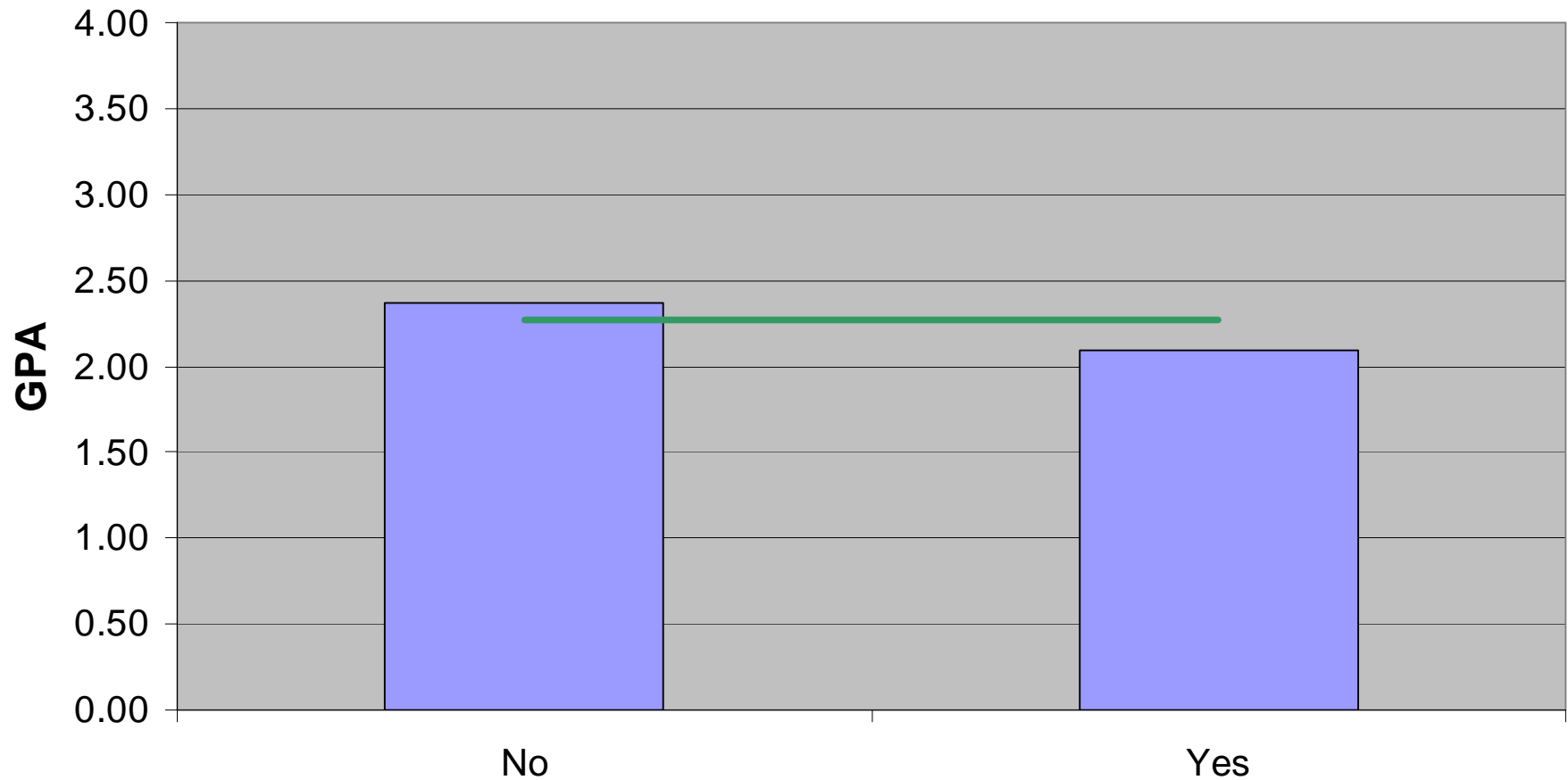
Q14: Did student cram for exams (save nearly all studying for day/night before exam)?

Cramming Compared to Other Courses



Q15: Did student cram in other courses during current quarter?

Relationship Between Course GPA & Student Cramming



Q14: Did student cram for exams (save nearly all studying for day/night before exam)?



JiTT Effectiveness on Class Preparation & Cramming

- Large percentage of students report being more prepared for JiTT classes than others
- Fewer students report cramming in JiTT classes than other classes they are taking



Conclusions

- JiTT tools work
 - Help instructor focus class time on current student needs
 - Students report more complete preparation & perceive JiTT as part of the reason
 - Students report significantly less cramming in JiTT courses
- Enhances traditional learning tools
 - Problem sets still most effective tool in courses assessed
- Current LMS (BlackBoard, WebCT, etc) make JiTT implementation relatively easy
- Doesn't work well for 8:00 am classes



Resources

■ JiTT Gurus

- Gregor Novak, Indiana Univ-Purdue Univ Indianapolis
- Evelyn Patterson, US Air Force Academy
- Eric Mazur, Harvard

■ Print

- *Just-In-Time Teaching: Blending Active Learning with Web Technology*, Novak et al, 1999, ISBN: 978-0130850348

■ Web Base

- www.Jitt.org
- http://134.68.135.1/JiTTDLwiki/index.php/Main_Page
- www.teachingdvd.com