

Clickers: assessing their effects  
on student learning  
in biology lectures

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(6 courses, 892 students; ½ TA line)

# What are clickers?

Present m.c. question

Individual student wireless response units (clickers)

Present chart of distribution of student answers

Record of individual participation & answers.

# Intended Benefits

Enhance

Active student learning  
improve student attitudes  
& content acquisition

Research Questions:

Do clickers improve student  
attitudes?  
content acquisition?

# Experimental Design: Content Acquisition

*Treatment:* # of clicker questions

|         | <u>Monday</u> | <u>Wed.</u> | <u>Friday</u> |
|---------|---------------|-------------|---------------|
| Week 1: | Low           | Med.        | High          |
| Week 2: | Med.          | High        | Low           |
| Week 3: | High          | Low         | Med.          |
| Week 4: | Exam          |             |               |

*Response:* Performance on exam questions derived from L, M, or H clicker lectures.

# Experimental Design: Student Attitude

Survey (IRB) of Student Attitudes

General Value 

Specific Benefits 

Technical Problems

Specific Recommendations

Stratify by:

Course 

Indv. vs. Group Study Preference

Student Grades

# Course Descriptions: Biology

101 Non-majors issues-based intro biology.

130 / 236; M. Shuster.

111 (2 sections) Science majors & professional;

190 / 318; R. Preszler.

211 Science majors & professional; 68 / 127; M. S.

219 Intro Micro. for allied Health; 40 / 56 M. S.

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311 Intro Micro.; 71 / 91; A. Dawe.

377 Cell Biology (mostly Biol & Biochem seniors);

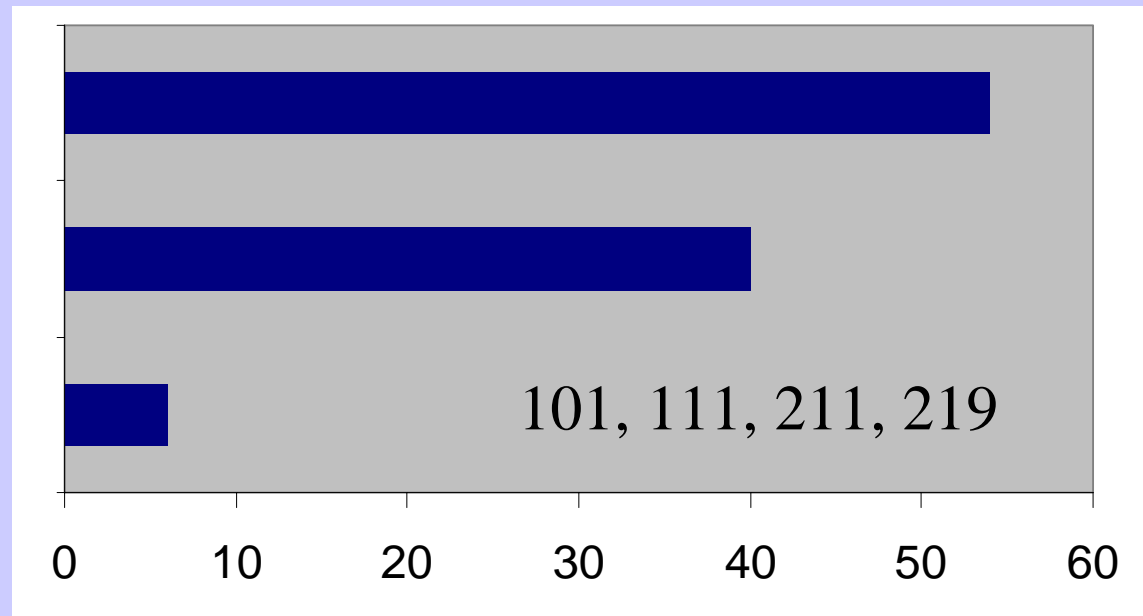
50 / 64; C. Shuster

## Overall, I found the clickers to be

A) a great addition to the class

B) an OK addition..

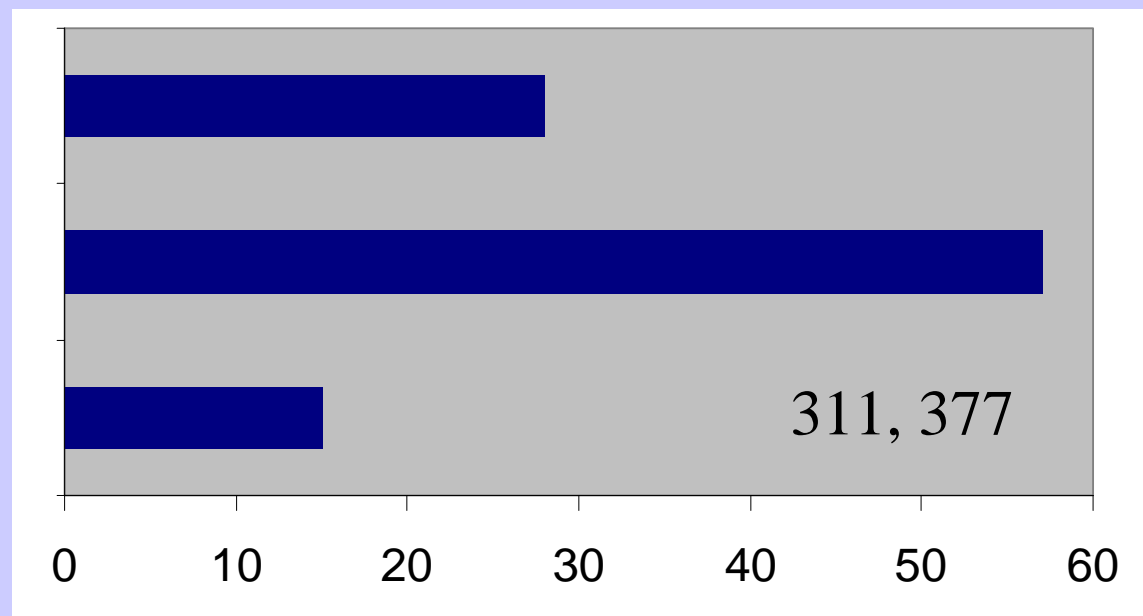
C&D) a distraction...  
very detrimental...



A) a great addition to the class

B) an OK addition..

C&D) a distraction...  
very detrimental...

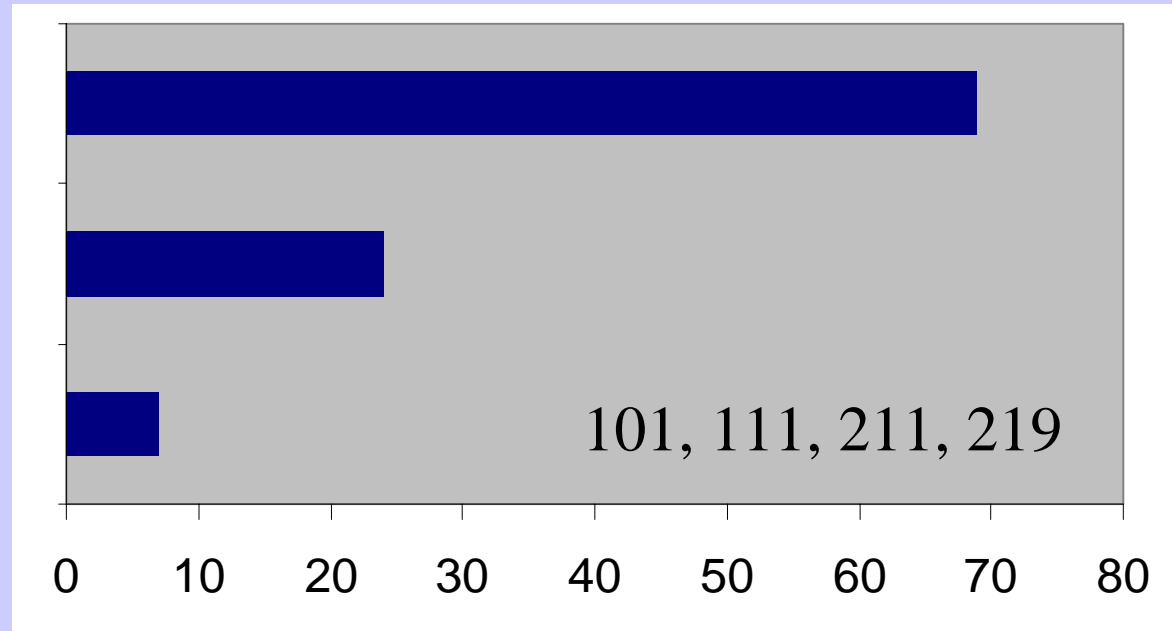


## I would recommend a clicker class...

A) yes, absolutely

B) clickers don't matter

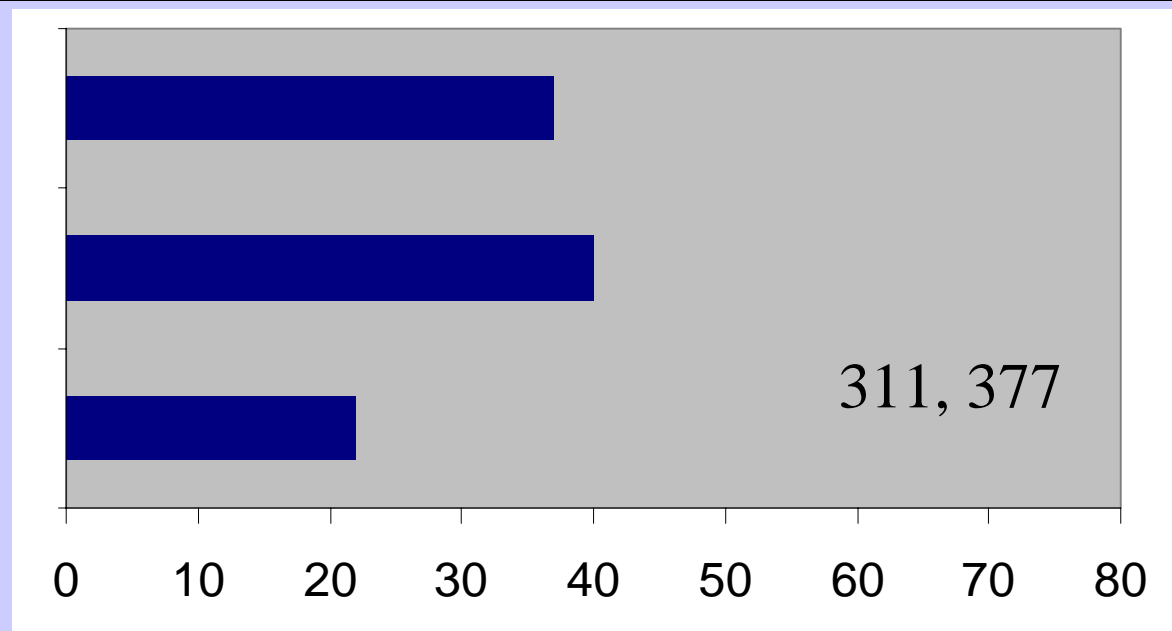
C) avoid clickers



A) yes, absolutely

B) clickers don't matter

C) avoid clickers

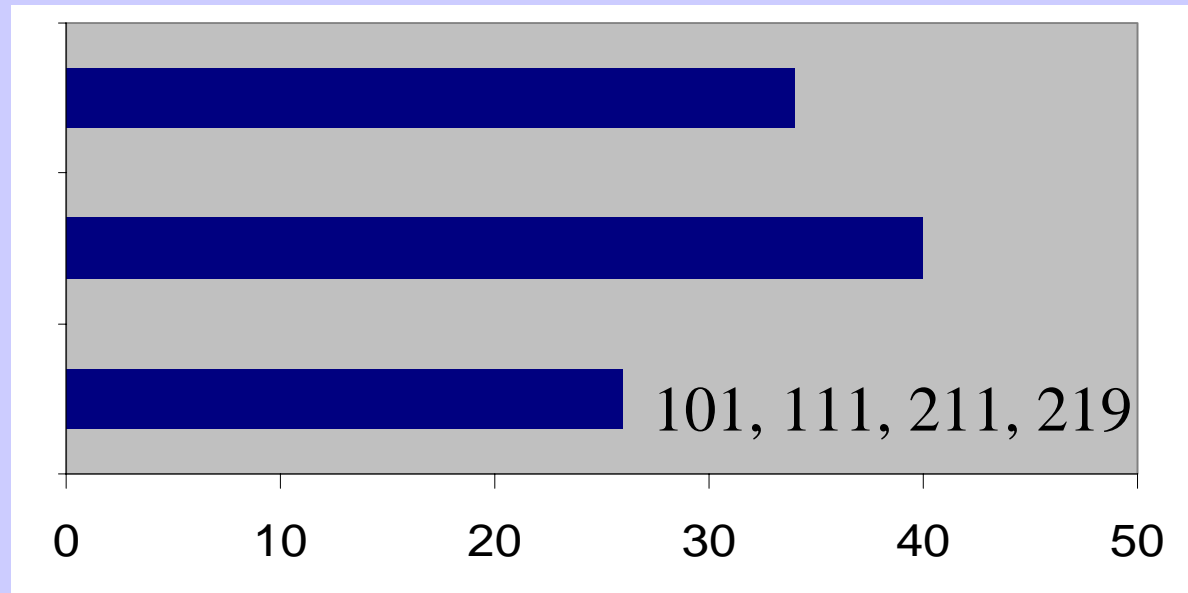


The cost of ... the clicker was worth it.

A) yes

B) probably

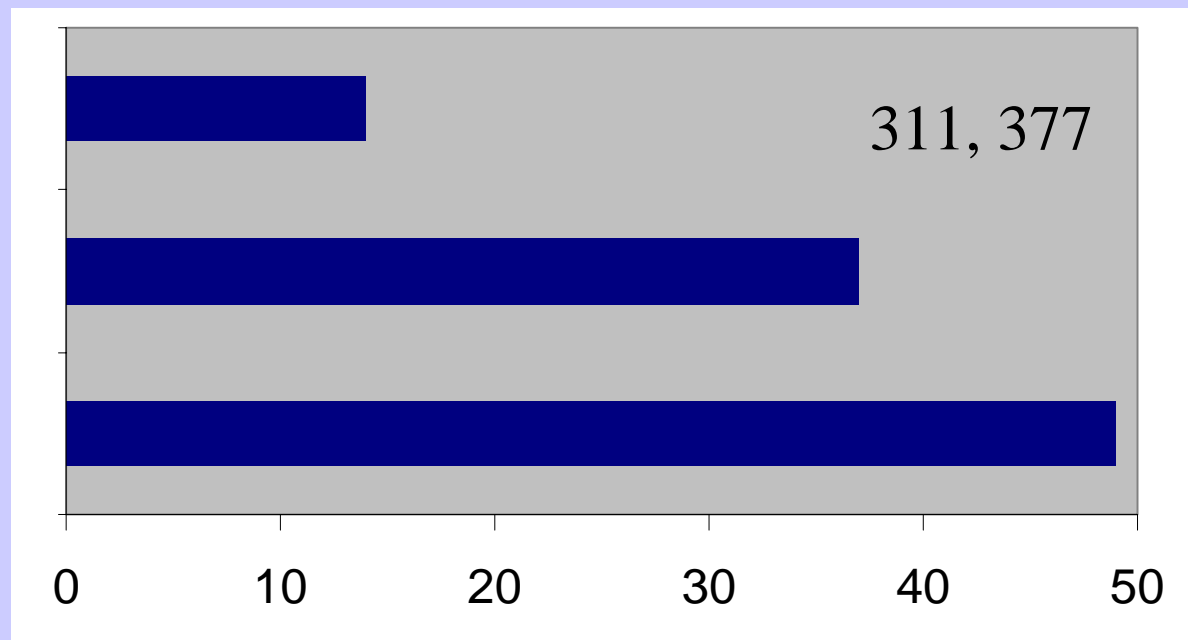
C) no



A) yes

B) probably

C) no



# Summary of Students' Impression of the General Value of Clickers

Lower division & nonmajors courses

94% overall benefit was great to OK;  
54% great.

Upper division biology majors

85% overall benefit was great to OK;  
34% great.

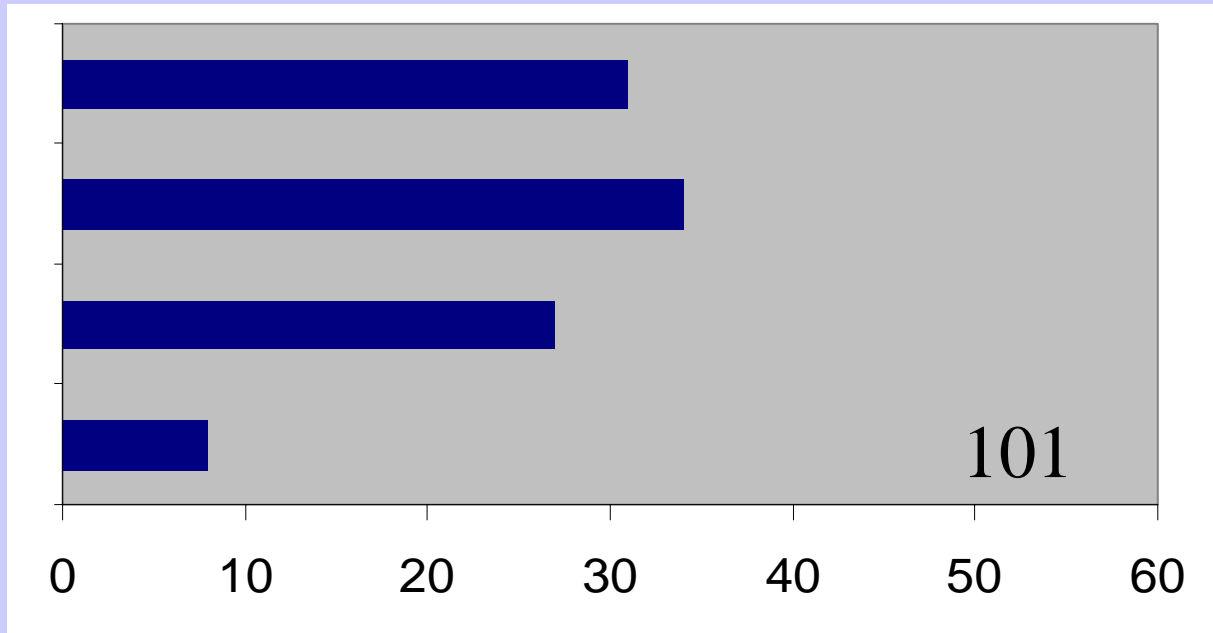
# Clickers made it more likely that I would attend class.

A) Strongly agree

B) agree

C) no,  
I would have come

D) no, they did not  
motivate me

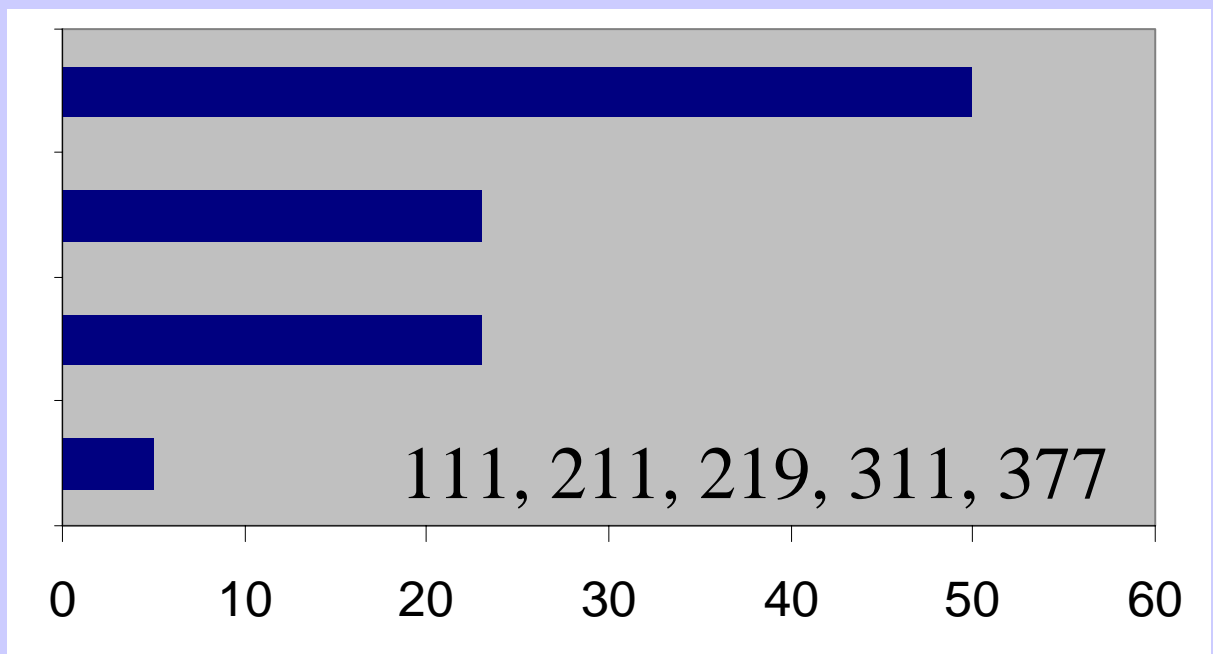


A) Strongly agree

B) agree

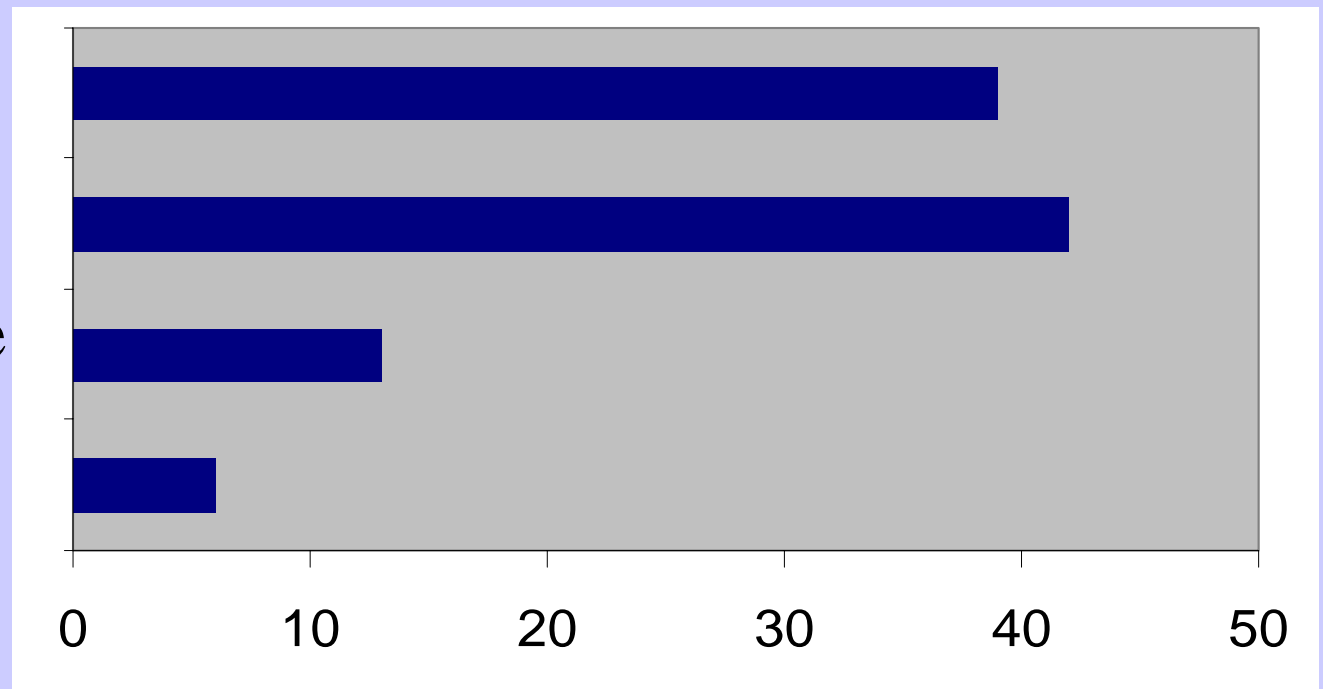
C) no,  
I would have come

D) no, they did not  
motivate me



## Benefits: clickers kept me more interested

- A) strongly agree
- B) agree
- C) Neither agree nor disagree
- D) disagree



The same for all classes

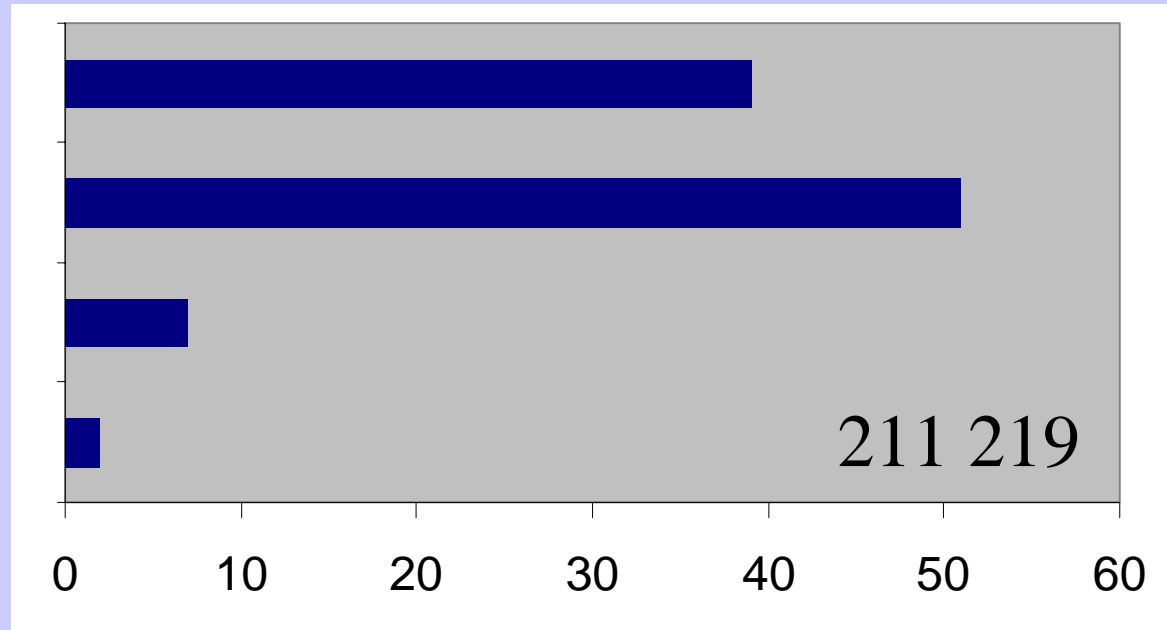
# The clickers helped me understand and/or learn...

A) Strongly agree

B) agree

C) neither agree  
nor disagree

D) disagree

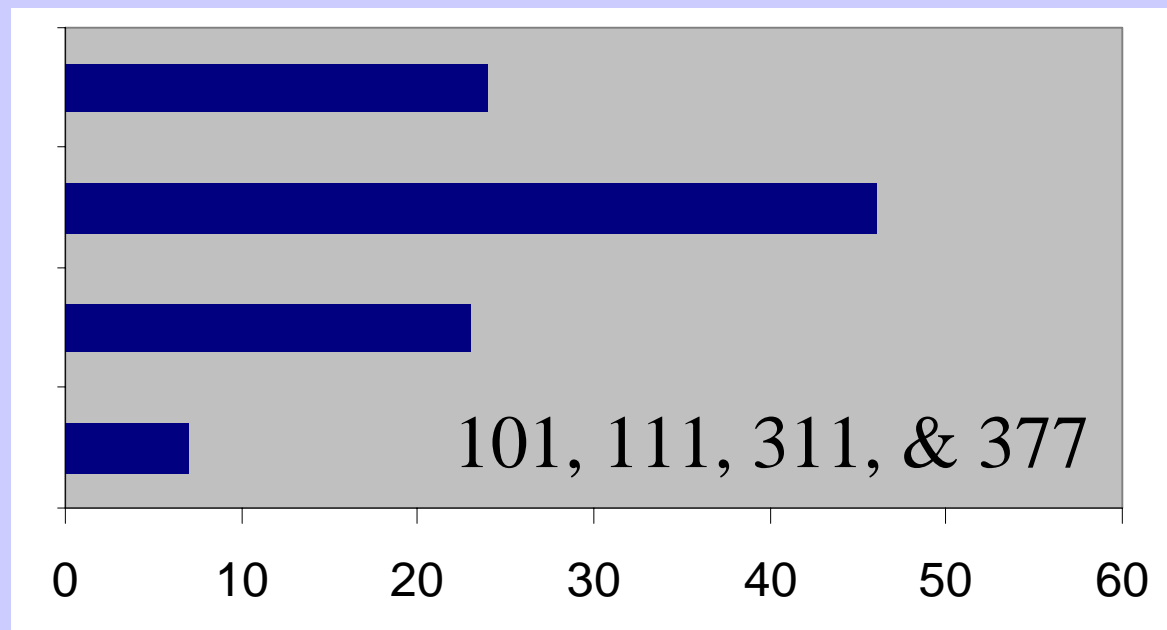


A) Strongly agree

B) agree

C) neither agree  
nor disagree

D) disagree



# Benefits

Students strongly agree or agree that clickers  
improve attendance,  
app. 70%;  
enhance interest, 81% all classes;  
improve understanding & learning,  
90% of 211 & 219,  
68% other courses.

# Summary

Students' overall assessment of clickers is positive

More so for lower-division courses

Although, upper-division students acknowledged specific benefits

Strongest perceived benefit,

improved understanding by 211 & 219 students

strong extrinsic motivation &

low self-efficacy relative to learning biology.