



Clickers in the High School Biology Classroom

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Focus Question

Does the implementation of clickers improve students engagement and content acquisition?



Secondary Questions

- How do students attitudes change towards science with the implementation of clickers?
- Do students view clickers as beneficial to their learning?

Conceptual Framework

Classroom response systems such as clickers have been shown to increase test scores and engagement, lower failure rates, and turn students into participants rather than observers (Preszler et. al., 2006). Clickers will not inherently bring about all of these changes, but their correct usage allows the teacher to address misconceptions and design more engaging and interactive learning experiences with instant feedback (Beatty, 2004).

Data and Analysis

- Normalized gains for all six units, both treatment and non-treatment, fell approximately between the range of 0.3 and 0.6, indicating medium growth in learning (Figure 1).
- The Student Engagement Likert Survey maintained the overall trend of the study by displaying only small variances between pre and post surveys
- The Clicker Attitude Survey questions revealed one of the only significant data points and dealt with the aspect of clickers helping students examine their own learning (Figure 2).

Abstract

Students were exposed to handheld response clickers as a means aimed to increase engagement and content retention as well as help with metacognition. Data collection tools included a pre- and post-science engagement survey, pre- and post-unit content surveys, a clicker attitude survey, and a qualitative final student interview. Results showed small to negligible normalized gains in treatment versus non-treatment units of study. Similarly, students' science engagement pre- versus post scores were generally unchanged. The Clicker Attitude Survey and post student interview though, showed that when clickers were used in the classroom, students generally did have a positive opinion of clicker use and were anecdotally more likely to examine their own learning.

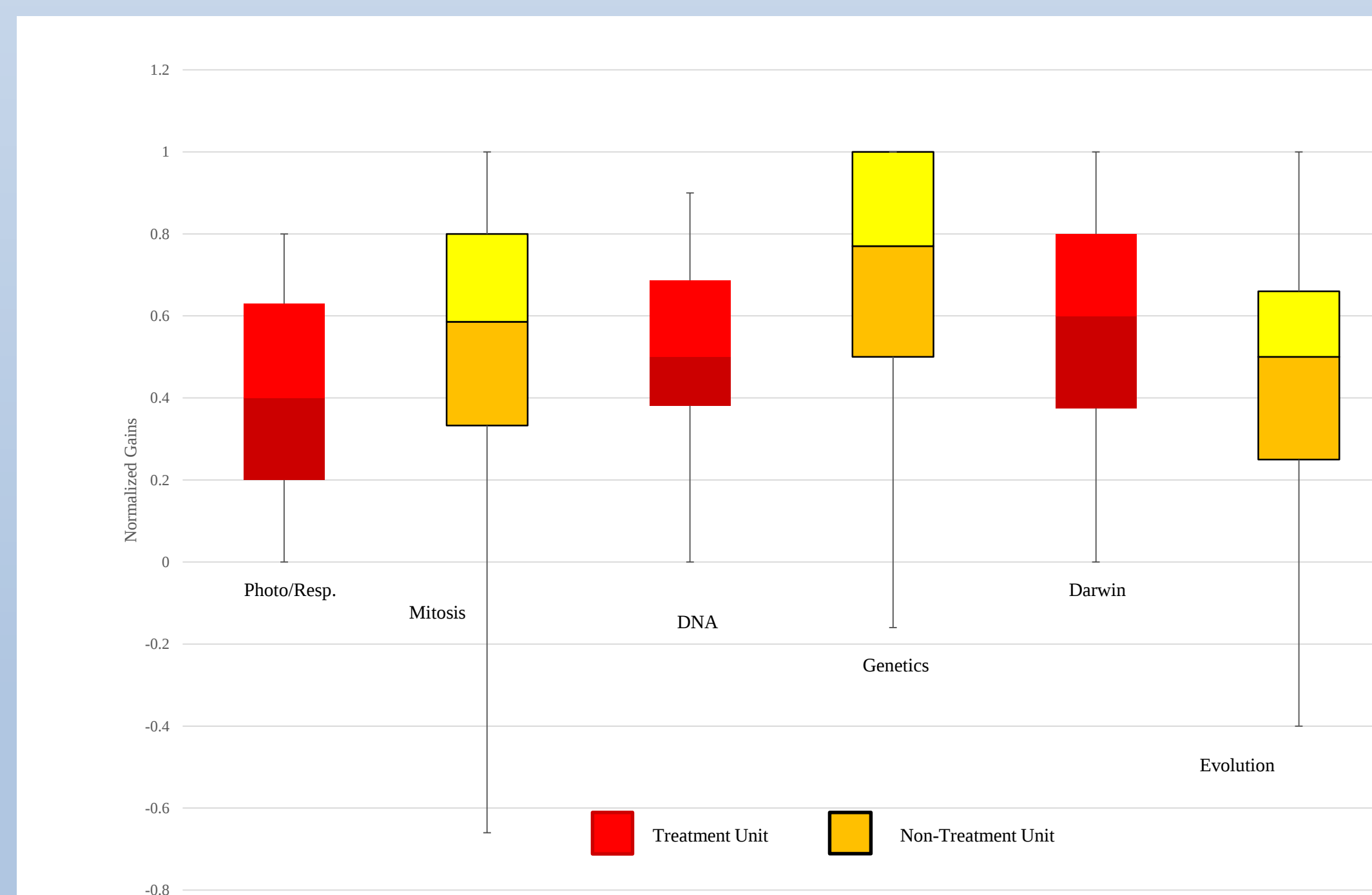


Figure 1. Normalized gains from the pre- and post-content quizzes for both treatment and non-treatment units.

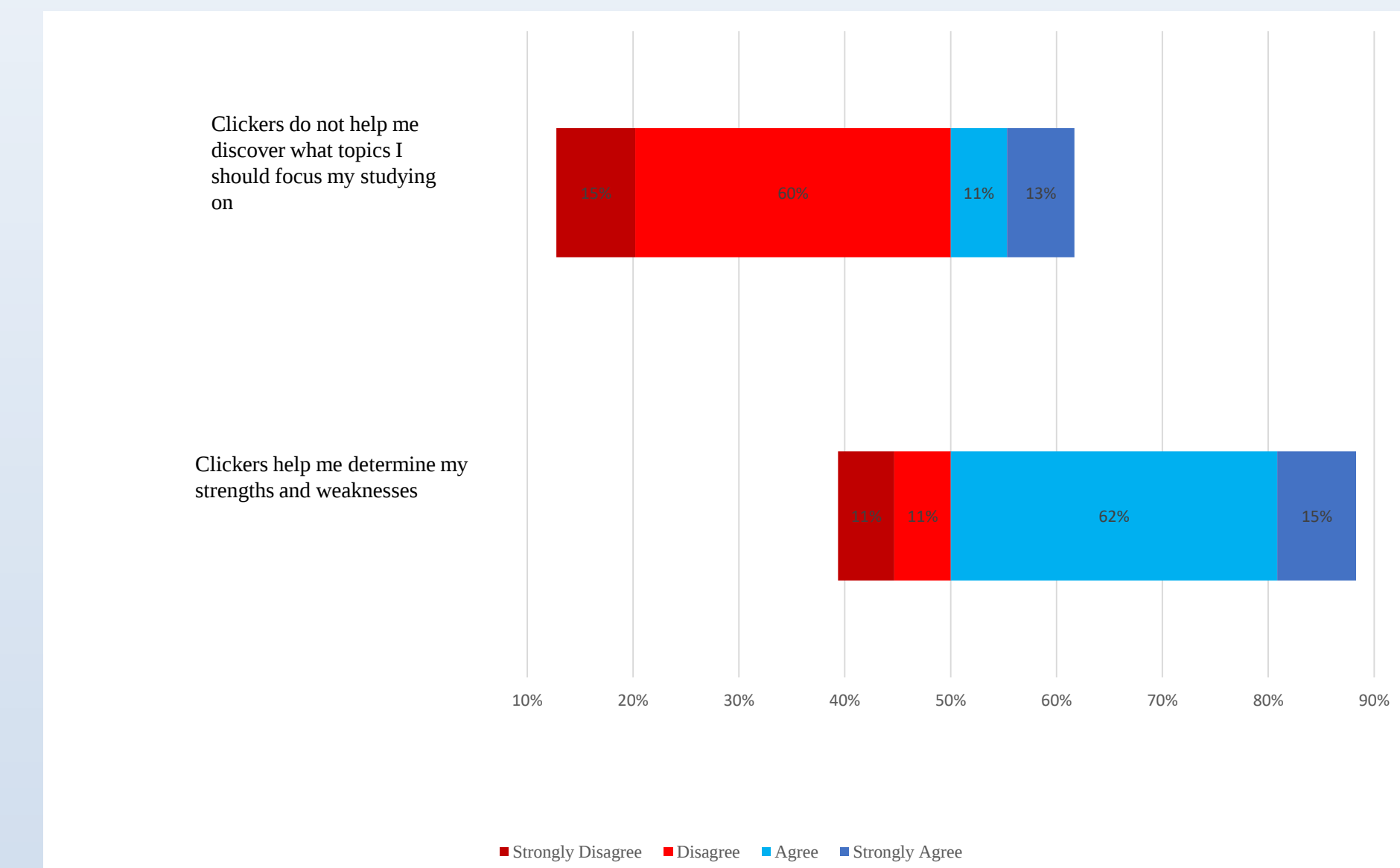


Figure 2. Results to the second positively stemmed and fourth negatively stemmed statement from the Clicker Attitude Survey regarding whether clickers help students elicit their current content mastery, (N=47).

Discussion

- I felt the negligible differences in normalized gains could be contributed to the complexity of the unit.
 - The treatment units included some of the traditionally “harder” material and, in my opinion, would have had even lower normalized gains without the use of clickers
 - The non-treatment units were some of the traditionally “easier” units
- The success of this action research wasn’t measured in tangible data, but more in the student’s reflections and survey responses.

Value

Regardless of nominal normalized gains, I viewed this classroom action research project as a success for both the students and myself as it was a springboard for further study and learning. I am empowered as an educator not only to try new techniques but to be able to quantitatively and qualitatively record and report my findings in the most professional way. I now have a vast array of tools and insights to determine when a teaching method is aiding my students and when it is not.

References

Preszler, R. W., Dawe, A., Shuster, C. B., & Shuster, M. (2007). Assessment of the Effects of Student Response Systems on Student Learning and Attitudes over a Broad Range of Biology Courses. *CBE—Life Sciences Education*, 6(1), 29–41.
Beatty, I. (2004). Transforming student learning with classroom communication systems. *Educuse Center for Applied Research Bulletin* (3), (pp. 2-13).