



# The GMO debate and role playing in the classroom

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## Introduction

Socio-scientific issues, such as genetically modified organisms (GMOs) can be challenging for students to understand and discuss given strong feelings they might have and the complexity of the subject (Figure 1). This teaching and learning project tested if a structured classroom debate (SCD) exercise incorporating role playing is effective for improving student confidence and understanding of a controversial subject in a course covering the science, regulation and controversy of GMOs (Hort/Agtron 360).

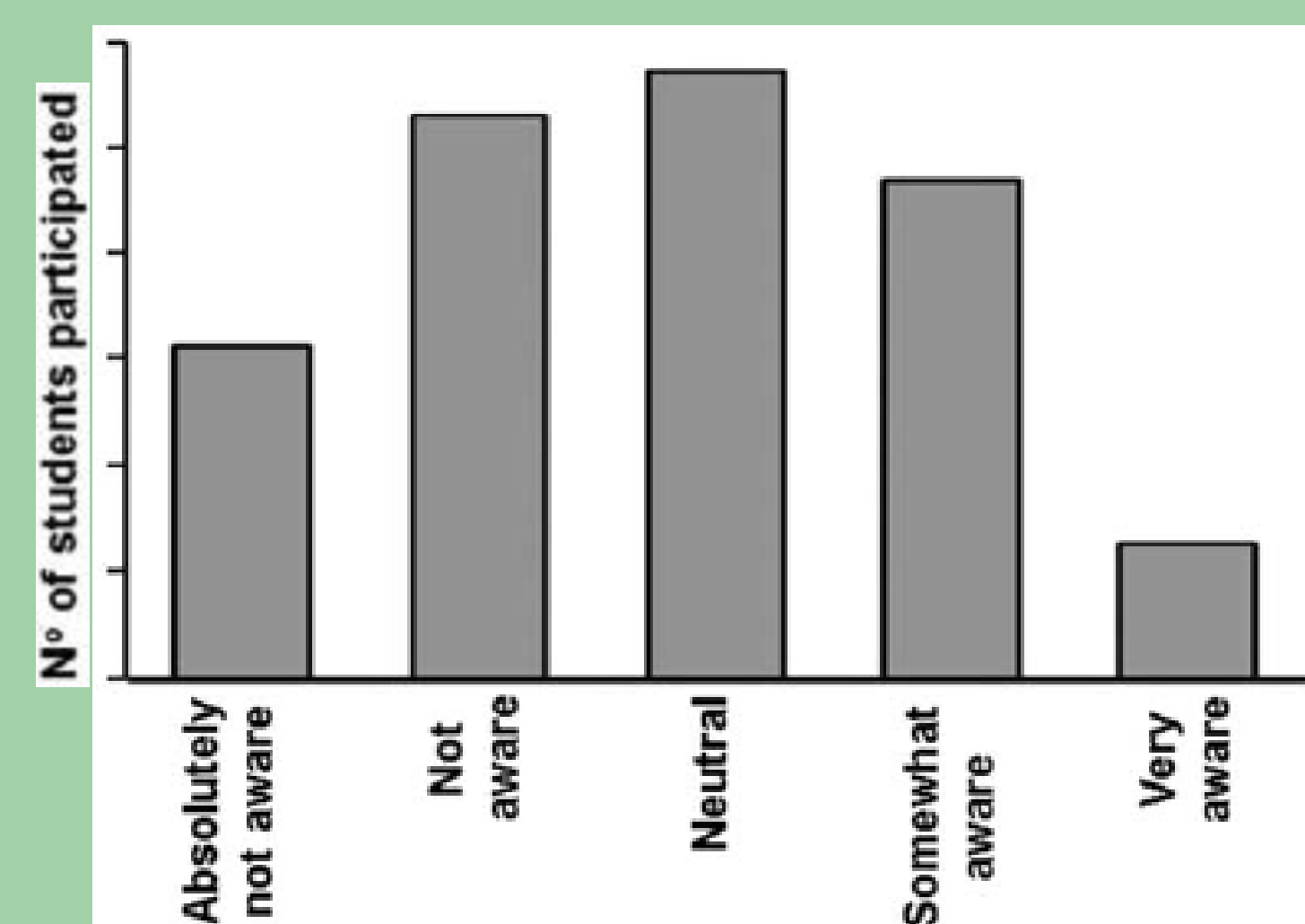


Figure 1. Overall self-assessment of educational biotechnology awareness. n= 1,104 undergraduate students (AbuQamart, et al., 2015).

The SCD activity incorporated role playing where students were assigned to groups on either side ("For" or "Against") of a structured debate to minimize personal feelings and possibly give the students a new perspective (Figure 2). Topics for the debate (white circles, Figure 2) were broken down into "expert" areas (black circles, Figure 2) and used as a focus for the students to develop written and oral arguments that integrated materials from the course and other sources ("Investigation reports," Figure 3). "Experts" were assigned within groups ("Groups organize," Figure 3) and given opportunities to discuss the research they had conducted between themselves (black arrows, Figure 2) and to prepare for the debate with "experts" from the other side of the debate (blue arrows, Figure 2) ("Group discussions/preparation for SCD," Figure 3). Students reflected through final reports.

Pre- and post-surveys were taken to collect data about the student's understanding, confidence, and ethical stance on course material before and after the SCD activity ("Pre-survey," "Post-survey," Figure 3).

## References

AbuQamart S., et al. (2015). *Biochem. Mole. Bio. Educ.* DOI 10.1002/bmb.20863

Bal S., et al., (2007). *Eurasia J. of Math., Sci., & Tech. Educ.* 3(2), 119-126.

## Methods

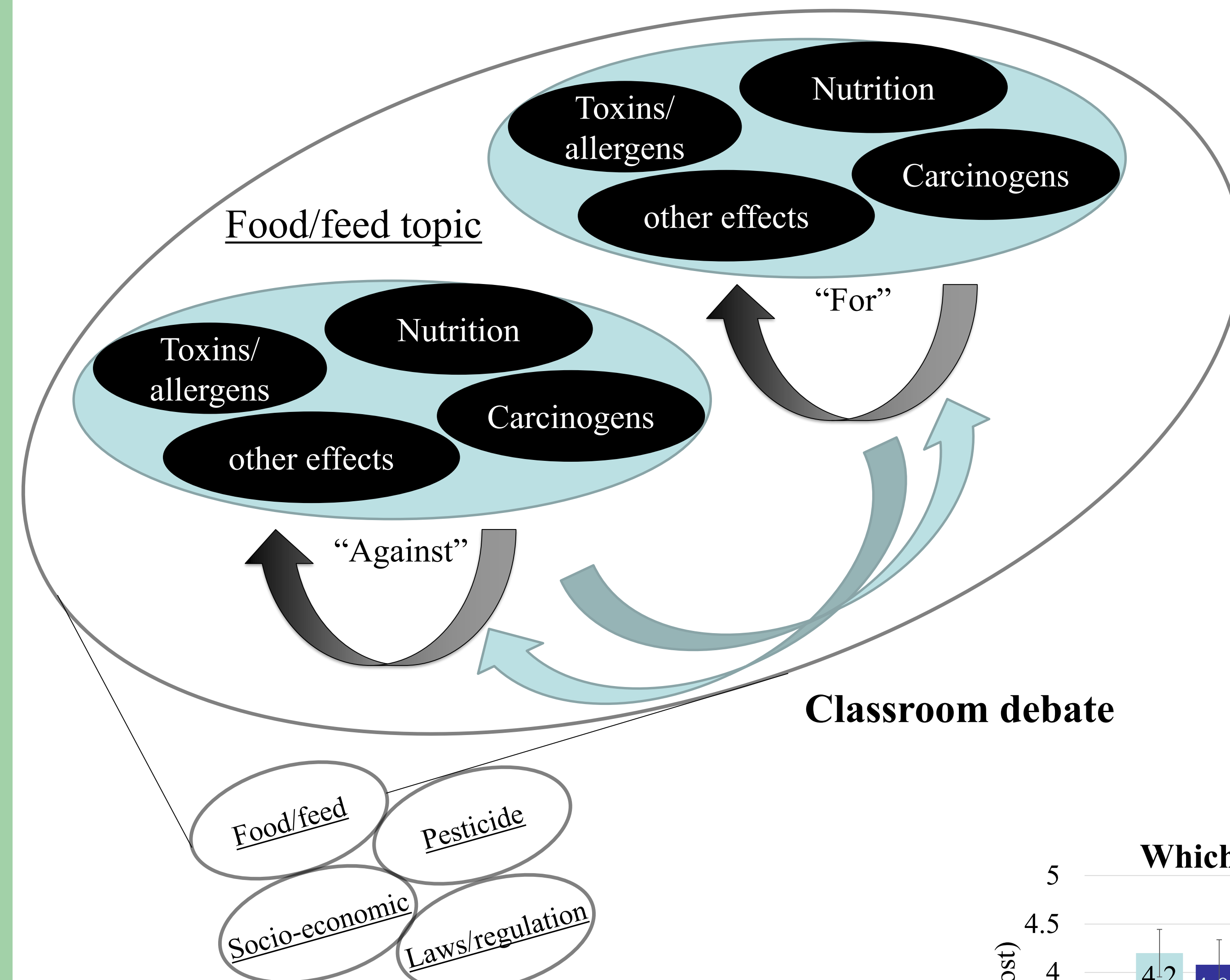


Figure 2. Schematic of structured classroom debate (SCD).

## Results

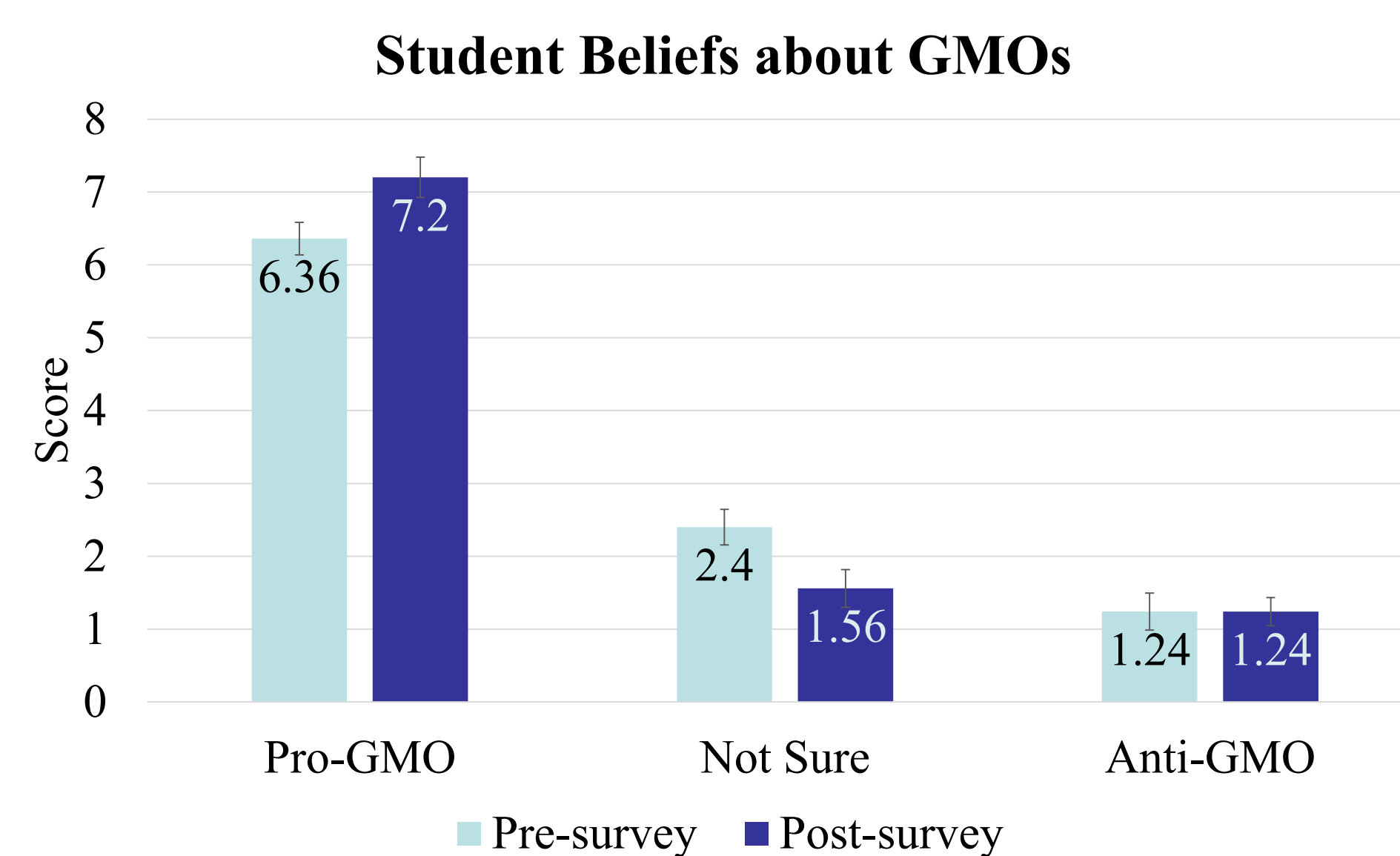


Figure 6. Student beliefs about GMOs before (pre-survey) and after (post-survey) the SCD activity. Error bars=standard error. n=25. Survey test questions adapted from Bal et al., 2007.

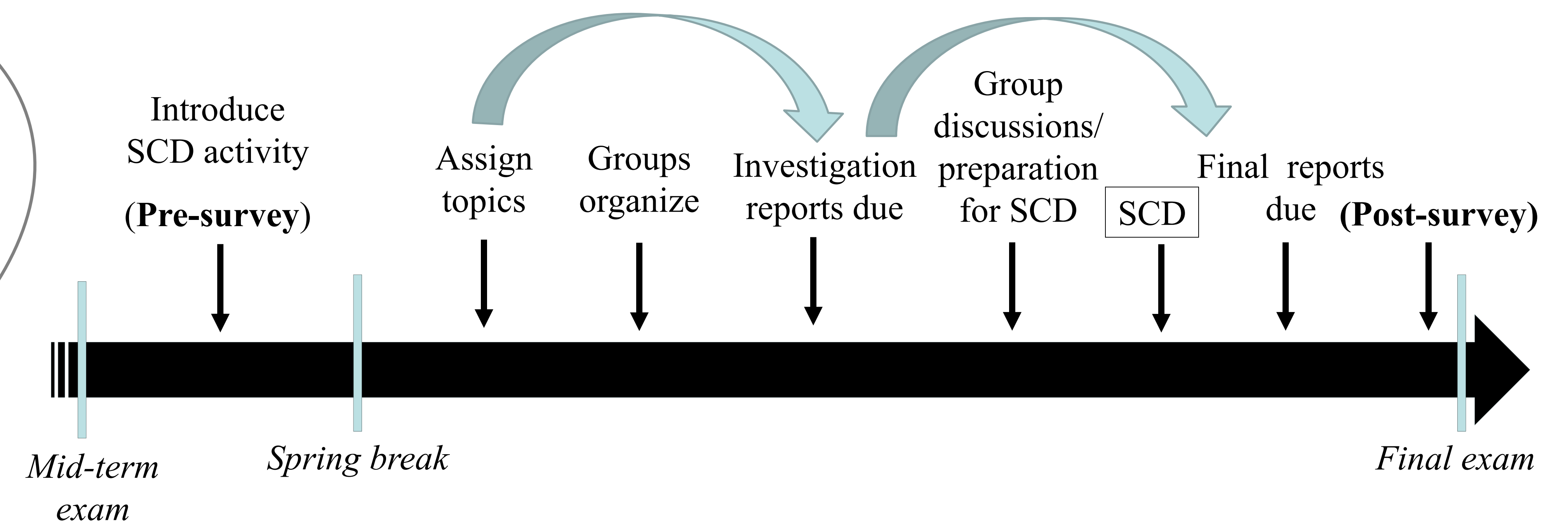


Figure 3. Timeline for project implementation and structured classroom debate (SCD).

### Which activity is most effective at promoting learning?

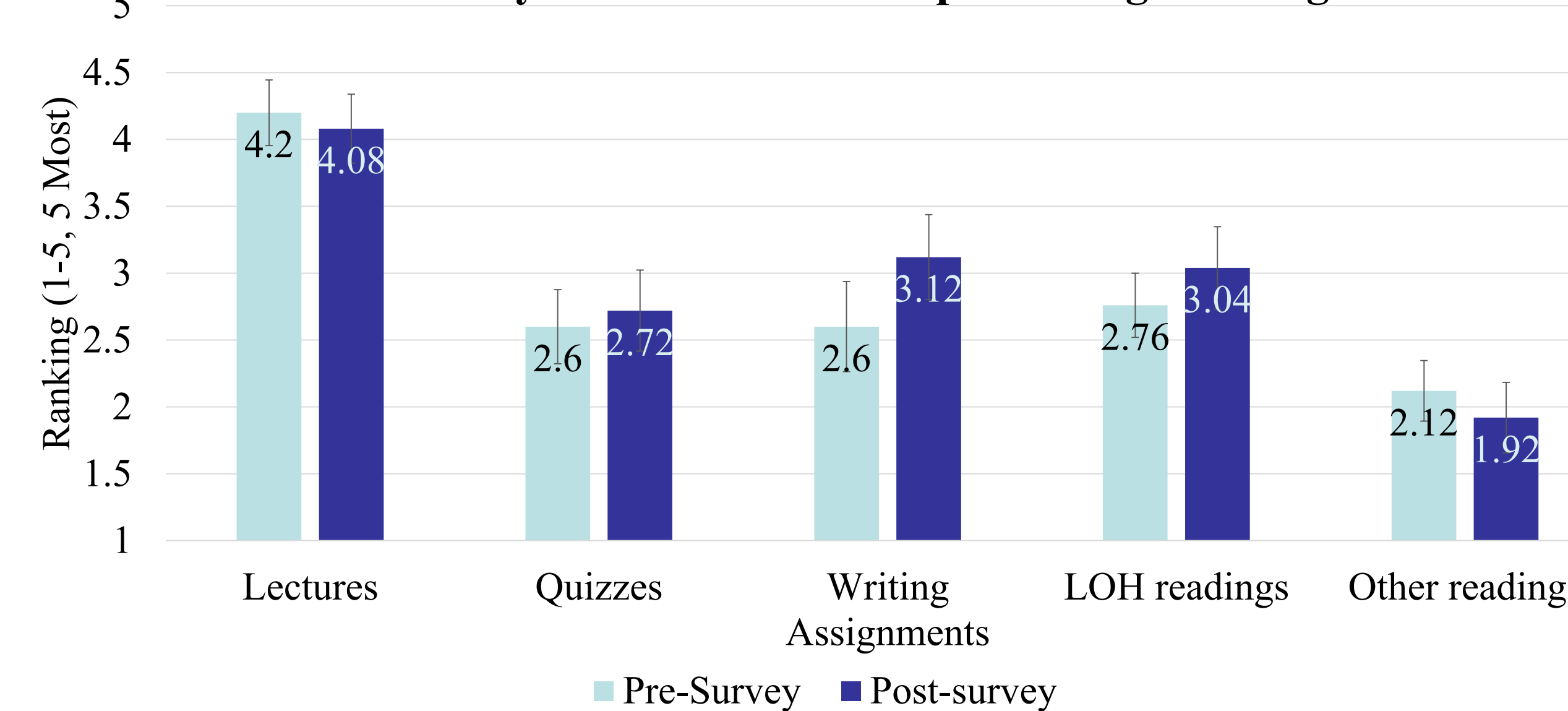


Figure 4. Student feedback of most effective learning activities before (pre-survey) and after (post-survey) the SCD activity. Error bars=standard error. n=25.

### Student Confidence with Course Objectives

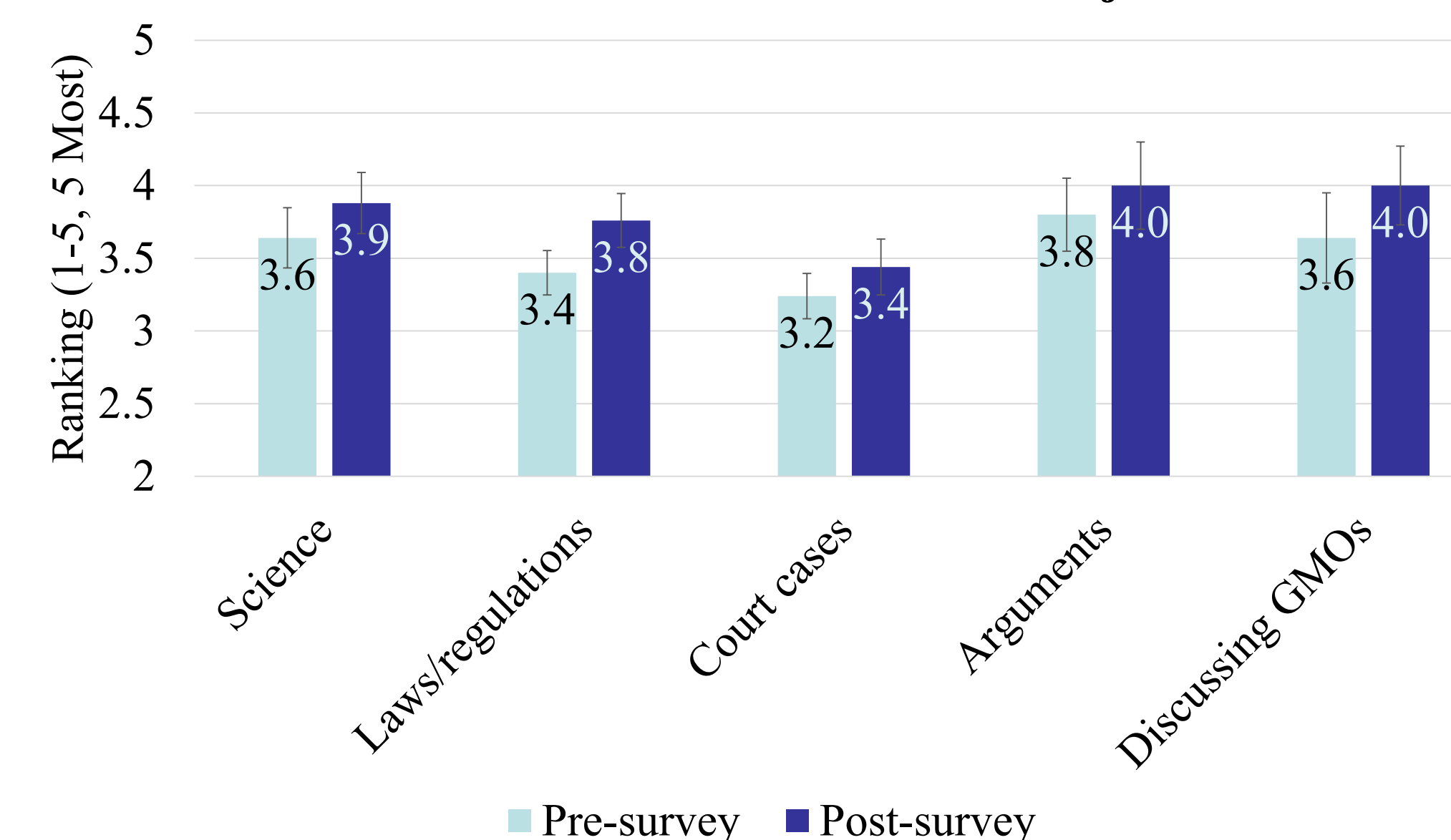


Figure 5. Student confidence with course objectives before (pre-survey) and after (post-survey) the SCD activity. Error bars=standard error. n=25.

## Conclusions

Structured classroom debates (SCDs) are useful activities to engage students and allow them to explore, explain, elaborate, and evaluate course material. The increase in student support for "writing assignments," which included the SCD after the SCD was implemented indicates students valued this activity for learning course material (Figure 4).

Student confidence in course objectives also improved following the SCD, suggesting the activity was effective for helping students connect debate topics from the SCD to course objectives (Figure 5).

Interesting, the SCD seemed to influence student opinion in support of GMOs. This was reflected in a shift in student support from undecided to in support of GMOs before and after the SCD (Figure 6). This observation was supported in voting conducted during the SCD where the majority of students supported pro-GMO arguments.

Overall, SCDs are effective activities for engaging and teaching students controversial subjects.

## Acknowledgements

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Delta Internship Project

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