

Students inaccurately estimate test performance despite feedback from active learning

Catherine Steele and Suann Yang
Biology Department
State University of New York at Geneseo

Introduction:

Having two-stage testing in an active learning pedagogy allows students to interact with their peers during a summative assessment to aid in their content knowledge and confidence. The literature states that high achieving students tend to underestimate their knowledge and low-achieving students tend to overestimate knowledge (e.g., Bol et al. 2005; Walker et al. 2011). *We hypothesize an active learning pedagogy and two-stage testing may lead students to be able to more accurately estimate their grade on summative assessments due to feedback from formative assessments.*

Methods:

We created a survey to gather their opinions about their confidence in their knowledge and predicted scores. We distributed the post assessment survey to a 200-level ecology course at a medium-sized, public undergraduate institution through the course management system. During the fall semester of 2019, the class began with 62 students, and during the semester three students withdrew from the course. We did not exclude the withdrawn students from our analyses. The survey was distributed through the course management system after each assessment and on the paper final exam during the fall semester of 2019. When a student completed the survey, they received compensation through participation points. We conducted Chi-square and Fisher's Exact analyses to detect associations between students predicted grade range and satisfaction with their predicted grade range or achieved grade range. To visualize our results, we created alluvial flow diagrams to better understand the possible associations from the Chi-square and Fisher's Exact analyses. All analyses were conducted using the R Programming Environment, the alluvial diagrams were constructed with *ggalluvial* (Brunson 2020; R Core team 2020). The investigation of summative assessments (n = 62) was approved by IRB #201920032.

Acknowledgements:

We would like to thank the students in the fall 2019 200-level biology class for their participation in the study.

Main Takeaway:

We have found that while some students can accurately estimate their assessment score, we also found that the higher- and lower-achieving students are under and overestimating their assessment score, respectively.

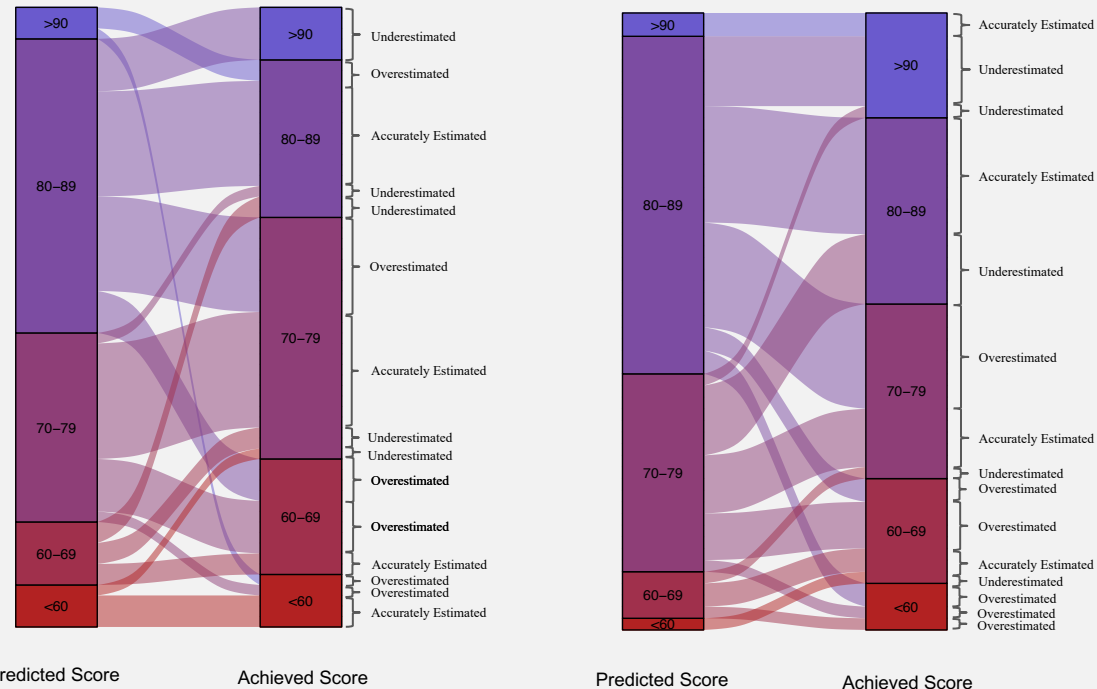


Figure 1. We found an association between students' predicted grade range and students' achieved score grade range for all assessments combined ($X^2 = 132.72$, $df = 16$, $p\text{-value} < 0.0001$), revealing that the proportions of each grade category predicted does not equal the proportions achieved. For the second assessment (left diagram), students who achieved a score between 80-89 accurately estimated their achieved score, while students who achieved a score of >90 underestimated their score and <69 overestimated their achieved score. For the third assessment (right diagram), students who achieved a score >90 and between 80-89 underestimated and accurately estimated their score. Students who achieved <80 tended to overestimate their score.

References:

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Implications:

While we see the over and underestimation patterns consistent with the literature, we have also found that students across achievement grade ranges can accurately estimate their summative assessment scores. This could be because of the consistent feedback students are receiving from the active learning environment and two-stage testing with their classmates. Even though an active learning environment allows students the opportunity to interact with content and two-stage testing allows students to confirm their knowledge during an assessment, it does not create an environment where students are consistently able to accurately estimate their achieved score.

Future Directions:

We are continuing to study student perception of their achievement and accuracy of predicted scores. We have added open-ended response questions to our survey to allow us to have a detailed reasoning for a student's confidence levels. We expect that this additional information will provide a better understanding of how students perceive their knowledge is in an active learning classroom.