Blue & Blue Data Crew - Riley Harper, Thomas Bland, and Michael Puglise

The Interplay of Student Engagement & Feedback with Performance

Given data collected from students using CourseKata's introductory statistics e-books as part of Duke DataFest 2024, the Blue and Blue Data Crew conducted the following analysis. The goal was to compare how the different textbooks CourseKata offers affected student proficiency, ratings, and engagement. The findings on said textbooks were grouped into three topics:

1. Exploring Chapter Proficiency and Pulse Check Rating

In the first section, the relationship between student average pulse check rating and average chapter proficiency was analyzed across offered textbooks. Cost was the only pulse check rating that was inversely scored, with a lower rating being better than a higher one. For all four of the pulse check ratings, average chapter proficiency increased as average pulse ratings went up. However, the increase was relatively marginal, and there was no variation in the relationship when split across the four pulse check question types. This suggests that student feedback on the pulse check questions does not strongly relate to their true performance on each section. Across the board, student's using the High School textbook had the lowest average chapter proficiency, regardless of average pulse check rating.

2. Exploring Median Chapter Engagement and Institution

In the second section, the relationship between median chapter engagement and academic institution was explored. The data suggested there were several institutions with similar or identical distributions of student engagement despite a vertical shift. This clearly demonstrates which chapters possessed a low level of interest within students across both institutions and professors–indicating a gap in what the students are learning. Engagement dropped during specific chapters, suggesting these chapters ought to be analyzed and potentially reworked due to students' decreased interest compared to other chapters. Notably, the median was chosen as the metric of scoring engagement rather than the mean due to several chapters possessing outliers which initially led to skewed results. Future data scientists are advised to do the same to ensure accurate findings and avoid misleading conclusions.

3. Exploring Student Proficiency and Engagement

For the third section, the relationship between chapter proficiency and average chapter engagement was analyzed across the different textbooks. In the first visualization, it was made apparent that there was a moderately strong relationship between student engagement and proficiency across all three textbooks. However, after analyzing the two variables individually, it was made apparent that the distribution of scores from the High School textbook trailed the other two in both chapter proficiency and student engagement. For example, the High School textbook had an average engagement of 288,832.3 ms whereas the College and Advanced College statistics textbooks had average engagements of 326,382.8 ms and 297,364.5 ms respectively. The students using the High School textbook had a far lower mean score, as seen in the second visualization.