DataFest Write Up

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In hopes of reducing inefficiencies in introductory statistics, CourseKata strives to maximize student learning. Their online textbooks utilize multi-modal exercises to provide students with the opportunity to apply their learning. Our team, the Sticky Notes, analyzed specific sections that can be altered to maximize student engagement and overall learning outcomes.

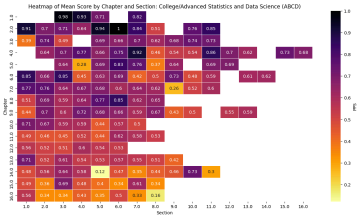


Figure 1

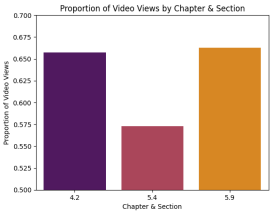


Figure 2

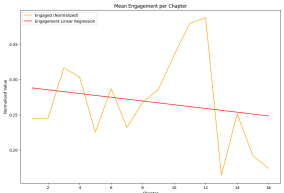


Figure 3

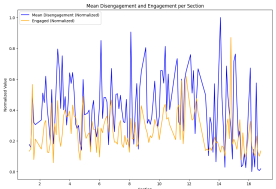


Figure 4

We analyzed student engagement and performance using different metrics. Our heatmap (Figure 1) provides a color-coded visual gradient of the mean scores received by students across chapters and sections. The lighter, yellower colors indicate sections where students struggled with the material whereas the darker purple and black colors represent a high understanding of the section questions. Our graph shows that on average, student performance decreased as section number increased. We also looked specifically at student engagement for sections where videos were provided (Figure 2). As shown, the engagement proportion for section 5.4's video was by far the lowest. This corresponds to what is shown in the heatmap, where section 5.4 has a mean score of 0.28 points per section. Conversely, sections with high video engagement correlate with increased scores. In Figure 3, we plotted the mean disengagement per chapter and section by taking into account the provided idle and off-page times. By comparing this with the engagement levels per chapter and section, we are able to see when students were actively engaged in the material when they weren't. Engagement decreases over time. Finally, Figure 4 shows that engagement is significantly higher at the beginning of each chapter, so CourseKata could maximize student engagement by splitting content into multiple chapters.

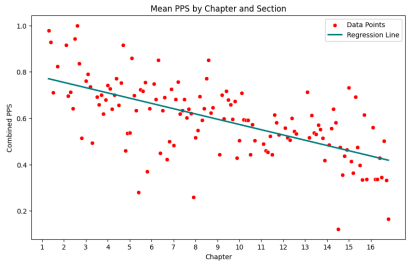


Figure 5

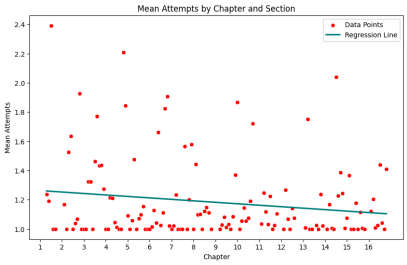


Figure 6

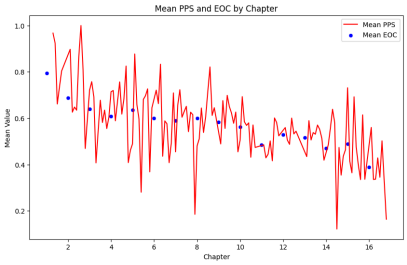
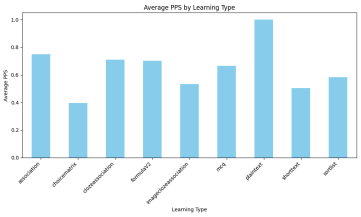


Figure 7

To analyze student retention, we plotted the average Points per Section (PPS) and chapter number. Figure 5 demonstrates a downward trend in points earned as the chapters progress, meaning that student learning started out high and got progressively lower as the textbook went on. Figure 6 is a representation of the number of times students attempted questions as the chapters progressed. Since our previous graph shows that mean PPS decreased as the chapters went on, it can be concluded that one reason why student performance decreased over time is because students attempted the questions less. Additionally, taking into account that engagement decreases throughout the textbook indicates that another factor in poor student performance is the decrease of student engagement. In Figure 7, we compared PPS to the mean points earned by students in the End of Chapter summative questions (EOC). The graph shows that there is a strong correlation between mean PPS and mean EOC, indicating that the End of Chapter summative questions provided are a good measure of student retention and performance.



Finally, we analyzed the learning types provided in the textbooks and compared those with the average points earned by students per section. We found that plaintext learning types resulted in the most positive student performance while choice matrix questions were when students performed the most negatively. We suggest that learning types with poorer PPS be changed to learning types that provide higher PPS scores.