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Enhancing Education with CourseKata: Summary

When approaching this problem, we began by going through all the random sample datasets and brainstorming questions that could be investigated with them. Listing out potential questions for all these datasets helped us realize what information would be most useful for our analysis. We decided that the page_views, checkpoint_eoc, and checkpoint_pulse datasets would be helpful in our understanding, so we decided to begin our analysis by focusing on these variables. We saw that the end-of-chapter questions would be helpful in understanding how the students felt about the content of the chapter and where their confidence stood. Additionally, the pulse questions allowed us to see how the students felt about the previous chapter. We saw that the types of questions (learnosity, learnosity-activity, or code) played a part in the student's confidence levels. We also noticed that videos did not seem to hold that much significance. After completing other similar analyses, we came to the question: Is it questions, content, or media that is affecting students' learning outcomes?

The general goal of this project was to understand how students can best learn and engage with the content. The psychologists who created CourseKata were primarily focused on improving students' learning experiences with statistical content. We believe we found ways that can be suggested to teaching professionals in order to enhance their learning environments and captivate their attention. While investigating this, we looked into whether or not videos impacted students' engagement, type of question (MCQ, short answer, code, etc.), and how this varied between chapters.

We decided that using a Shiny App would be the best and most efficient way to display our findings on what changes should be implemented into the interactive textbook. We formatted this app in a way that mimics a virtual textbook, including our introduction to the question at hand, the analysis, the visuals (graphs, tables, etc.), and the conclusions we reached from our analysis. Using an ANOVA test we concluded that a more diverse and variable type of questions in an interactive textbook would engage students more. Chapters in which there was primarily one type of question, mostly multiple choice questions, were the chapters in which students generally performed worse. Having a more diverse range of questions, such as short answers, matching, etc, would allow students to practice different skills and ensure the material sticks to their minds. Additionally, too much repetition of the same type of question may make it harder for students to stay engaged throughout the lesson and actually understand what is being taught. For example, chapters such as 7, 10, and 12 had the highest proportion of questions as multiple choice questions, and they also had the worst performance in the book by students. Our findings emphasize the significance of using a diverse range of teaching methods to create engaging learning environments. They also showcase how interactive textbooks have the potential to transform the way statistics is taught.