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FIRST MILESTONE

Exploring the Influence of Font Style, Size, and Medium on Text Comprehension: A 2^3 Factorial Design Experiment

This study, employing a 2^3 factorial design, aims to examine how font style, font size, and medium influence the comprehension of educational materials. Our factors are defined as follows:

Factor A - Font Style: This factor pertains to the typeface used in presenting the text. We explored two distinct font styles: Calibri and Times New Roman. Calibri, known for its modern and clean appearance, was contrasted with the more traditional Times New Roman.

Factor B - Font Size: This factor relates to the size of the text characters. We examined two font sizes: 10 and 12 points. Font size can significantly impact readability, with smaller sizes potentially posing challenges for comprehension compared to larger sizes.

Factor C - Medium: This factor refers to the platform or medium through which the text is presented. We investigated two mediums: paper and digital (computer). While traditional paper notes offer a tactile experience, digital notes on a computer screen provide convenience and easy accessibility.

To conduct the experiment, we recruited participants who are students at Miami University from diverse cultural backgrounds and academic levels. We had participants go through the experiment simultaneously at King Library, where we could access the same model of computers for our experiment and prevent potential biases. There were a total of 8 texts covering various topics including health, environment, history, exercise, relationships, mindfulness, current affairs, and social media for the participants to read. For each text, each participant was randomly assigned a unique combination of font size, font style, and medium. The participants had 5 minutes to read the text and another 5 minutes to complete a set of 10 multiple-choice questions as a means of assessing their comprehension of the text. The participants' scores were scaled to 100 to facilitate robust data analysis. Between each round of text, they would be given short breaks to mitigate the effect of fatigue on their comprehension ability. After collecting the data, we organized it in Excel for easy use.

We utilized SAS for the data analysis stage. From the output provided by SAS, we realized that the normality assumption was satisfied, but the constant variance assumption was violated because the Residuals vs Predicted Value plot showed a fanning trend. To address this issue, we used the Box Cox transformation which resulted in a selected lambda of 5. After the transformation, we discovered that the constant variance assumption was satisfied together with the normality assumption. As the model assumptions were satisfied, we examined the factor effects. Factor A and the interaction terms AB, BC, and ABC had larger effect values, which suggests that these could be significant and thus by the hierarchical principle, B, C, and AC are also significant. The probability percentage plot also showed that all the factors and their interactions lie away from the straight line, hence A, B, C, AB, AC, BC, and ABC are all significant.