**R Script for ESTOPA Methodology Analysis**

This repository contains the R script and supporting files used to analyze the student achievement and perception data for the **ESTOPA** (Expedited Study of Teaching-Learning Processes in Applied Science) active learning methodology.

The analysis covers:

1. **Achievement Data:** Comparison of student performance (MarkRelated) between the ESTOPA and Pre-ESTOPA groups, including analysis by **Bloom's Taxonomy Level** (B1-B6).
2. **Perception Data (Survey):** Reliability analysis (Cronbach's Alpha) and calculation of frequency distributions by score range across three dimensions: **Teaching and Learning Process (TLP)**, **Activity Structure and Suitability (ASA)**, and **Activity Characteristics (AC)**.

**Repository Contents**

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| File Name | Description | Used in Script as |
| ESTOPA\_Analysis\_Script.R | The main R script that executes all data cleaning, statistical tests (Mann-Whitney U, Cohen's d, Cronbach's Alpha), visualization generation, and report creation. |  |
| 1\_SupportingInformation1\_SurveyResults\_ESTOPA.xlsx | Raw student perception data from the Likert-scale survey (Q1-Q10). | survey\_file |
| 2\_SupportingInformation2\_TestData.xlsx | Raw student achievement data, including performance by question, final grades, and group classification. | data\_file |
| BloomData.xlsx | Mapping file linking specific assessment questions to their corresponding Bloom's Taxonomy Level (B1-B6). | bloom\_file |

**Requirements**

**Software**

This script requires **R** (version 4.0 or higher recommended) and **RStudio**.

**R Libraries**

The following R packages must be installed before running the script:

# Install packages if you haven't already

install.packages(c("readxl", "dplyr", "tidyr", "ggplot2", "rstatix", "ggpubr", "stringr", "psych", "scales"))

**How to Run the Analysis**

1. **Download Files:** Clone or download the entire contents of this repository to a local folder on your computer.
2. **Set Base Path:** Open the ESTOPA\_Analysis\_Script.R file in RStudio.
3. **Modify Line 14:** **Crucially**, you must update the base\_path variable (Line 14 in the original script) to point to the local folder where you saved the files.

# Change this line to your local directory path:

base\_path <- "C:/path/to/your/local/folder/ESTOPA\_repo"

1. **Execute:** Run the entire script (Ctrl+Shift+Enter or Source in RStudio).

**Output**

The script will automatically create a subfolder named ESTOPA\_analysis within your base\_path directory. This folder will contain:

* **Quantitative Results:** ESTOPA\_Analysis\_Report.txt (a full text report summarizing all statistical outcomes, Cronbach's Alpha values, and key interpretations).
* **Achievement Plots:** 01\_Bars\_ESTOPA\_vs\_PreESTOPA.png, 02\_Trend\_Bloom\_Annual.png, and 03\_Boxplot\_Bloom\_Achievements.png.
* **Perception Plots:** 04\_Bars\_Perception\_TLP\_Questions.png, 05\_Bars\_Perception\_ASA\_Questions.png, and 06\_Bars\_Perception\_AC\_Questions.png.