**P-TISTRY: A WORD PROCESSOR CONFIGURED FOR STUDENT PAPERS IN APA FORMAT**

A Research Proposal Submitted in Partial Fulfillment of the Requirements in Research III

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**The Problem and Its Background**

***Overview of Research Paper***

Research papers are academic documents that allow students, researchers, and experts of different fields to report their findings and studies to the world. This consists of presenting a discovery or solution on a specific question or problem that is backed up by evidences and data, to fill in unsolved problems or gaps (Yam & Sharma, 2022). When writing research papers, there are several guidelines about writing styles and formats that must be strictly followed for researchers when conveying their ideas. Ihe most popular of which is the APA format.

***Benefits of Using APA format***

The American Psychological Association (APA) style is a format mainly used for both academic and professional writing. It is used within psychological, educational, and social sciences, giving out a standardized format for citing sources and writing papers. The APA style serves as a foundation for a more effective scholarly communication as it supports and guides authors to present their ideas in a more clear, precise and inclusive manner. It goes over different types of elements when writing a paper, such as title pages, citations, basic formatting, etc. Therefore, by following these set guidelines, writers can deliver professionalism through the enhancement of the readability and credibility of their work (American Psychological Association, 2020).

***Problems Students Face with Using APA format***

However, the advantages of using the APA format in writing papers also come with disadvantages as well. Once such that is the difficulty students face in mastering the APA format itself. The complexity associated with this format — ranging from citations, level headings, and even how the data needs to be presented — can cause difficulties for students to comply with it with certain precision and accuracy (Demir, 2022). This causes students, instead of focusing more on presenting their research, to struggle tediously with navigating through the complexity of the APA format guidelines (Doherty, 2023).

***Existing Approaches and Solutions***

To solve them, there have been several approaches and solutions people have come up with in addressing the issue. One of which are citation generators like Scribbr, Zotero, Mendeley, etc. For parametric, non-parametric, and hypothesis testing, a widely popular web application called Statistics Kingdom is being used, and for grammar checking, it’s Grammarly. There are also learning seminars and courses used to specifically provide guidance and support in navigating the complexities of research and writing. Additionally, generative AI tools, such as ChatGPT and CoPilot, are now being leveraged to further address these challenges.

***Unsolved Gaps***

While existing solutions excel in individual areas like grammar checking, citation management, or basic formatting, they leave unsolved gaps, specifically the need to integrate tools into a single app that combines writing, formatting, learning, real-time APA formatting, and offering feedbacks and insights seamlessly. These gaps frequently impede students' ability to craft high-quality research papers and effectively communicate their findings, as they still need to grapple with the intricate guidelines of the format (SOURCE).

***P-Tistry: A Comprehensive Solution for APA Formatting***

Therefore, the researchers will propose to develop and test a word processor, P-Tistry, that will be configured for student papers in APA format. This platform will provide built-in tools to assist students in creating their papers, including the integration of citation management, statistical testing, and generating sources based on the topic of choice, grammar checking, and the formatting of the APA style itself, regardless of knowledge and experience in writing one. By implementing such tools in the application specifically designed for student papers in APA format, it presents a proactive approach to overcoming the challenges associated with academic writing and writing research studies.

**Statement of the Problems**

This research aims to develop a word processor to assist students in creating their papers, whilst ensuring adherence and consistency of the research papers with the APA format. Specifically, this study aims to answer the following questions:

1. How will the user experience of the users of the application from both high school and college students be described in terms of usability?

2. What is the error rate incurred in the research papers from both high school and college papers when using the application in terms of consistency with the APA format?

3. What is the relationship between the user experience of the application and output of research papers from both high school and college in terms of:

3.1 usability; and

3.2 consistency with the APA format?

4. What is the difference between the output of the research papers from both high school and college students with and without utilization of the application in terms of consistency with the APA format?

**Research Paradigm**

**Figure 1**

*Input-Process-Output*

PROCESS

INPUT

OUTPUT

• scanning and parsing of the document, such as references, statistics, and grammar

• the revised document in compliance to the APA format

• main document of the user's thesis or research paper

**Hypotheses**

H0: There is no significant difference between the user experience of the application and overall output of research papers.

H0: There is no significant difference between the overall output of the student papers with or without utilization of the application.

**Significance of the Study**

The results of this research will benefit the following:

***Students***

With the students being the primary beneficiary for this, the proposed application will help simplify the possible workload of students for formatting papers accordingly to the APA guidelines.

***Teachers***

Teachers can benefit from this as they themselves have it easier by having a standardized tool to enhance students' consistency within students' submissions, with this, it makes it easier for them to check and assess the works of the students.  
***Researchers***

This study can benefit researchers as it can save them time and assist them to prepare papers for publication.

**Scopes and Limitations**

The study aims to evaluate the effectiveness of P-Tistry configured to assist students in writing research papers while navigating the complex APA format guidelines. The scope is limited to pilot testing with high school and college students from selected schools and universities. This selection allows for better control during pilot testing. Participants within each cluster will be randomly assigned to either the experimental or control group, ensuring equal chances. Both groups, however, will have unrestricted approaches to writing their papers. This design enhances external validity by simulating real-world conditions, though may affect internal validity extent — the extent to which this study can establish a causal relationship between the independent and dependent variables, free from the influence of confounding factors.

Additionally, there are several delimitations concerning the application itself, including the engineering scale and complexity, as well as ensuring a robust infrastructure against cyber-attacks. The platform will focus on providing tools to assist students, such as citation management, statistical testing, source generation based on topics, grammar checking, and APA style formatting. The pilot testing is projected to last 2-3 months. Further studies extending beyond this scope are not included in this research.

**Definition of Terms**

For clarification of unfamiliar terms, this section tends to describe the following:

***Usability test***   
 It is a method of testing the functionality of a website, app, or other digital product by observing real users as they attempt to complete tasks on it.

***Error rate test***

It is a coined phrase used in this study to describe a test developed to evaluate the frequency and severity of errors in students' research papers.

**Methodology**

**Research Design**

This study employs a Cluster-Randomized Trial (CRT) design to investigate the effects of using P-Tistry and the adherence and consistency of the research papers in accordance to the APA guidelines. It is chosen for its ability to mimic real-world educational settings by grouping participants naturally into clusters, such as high schools and colleges/universities. This design enhances the study’s internal validity by controlling for potential confounding variables through random assignment within clusters.

**Figure 2**

*Cluster-Randomized Trial (CRT) Design*

**Research Method**

This study employs a quantitative research method, utilizing experimental and statistical analysis to collect and analyze data necessary, through a Cluster-Randomized Trial (CRT) design, to answer the research questions. The independent variable is the use of P-Tistry with features and tools configured for APA format, while the dependent variable is the adherence and consistency of the research papers in accordance to the APA guidelines.

The proposed methodological approach qualifies the study as experimental research by systematically investigating the causal relationship between the use of P-Tistry and overall output of the students’ research papers, while the cluster-randomized trial design reflects real-world educational settings.

***Development Tools and Languages***

The development of the application will require downloading and utilizing the following tools and programming languages:

**Integrated Development Environments (IDE).** The application will be programmed through the use of IDEs, including Visual Studio Code and PyCharm.

**Web Technologies.** These include HTML, CSS, and JavaScript for the development of the application itself.

**Programming Languages.** These programming languages are crucial for running the application itself. These includes C++, R, and Python.

**Frameworks and Libraries.** These frameworks provide a wide range of features and functionality that help streamline application development. These include React and Node.js, a component from JavaScript, and Bootstrap, a component of HTML and CSS, for web designing.

***Programming of the Word Processor***

**Figure 3**

*Wireframe of P-tistry User Interface*

**Design and Architecture.** Start by making an easy-to-use graphical user interface (GUI) that further helps users' format papers and/or documents suitably to the APA style. Then, begin with incorporating a robust database to configure user data efficiently.

**Coding and Implementation.** Make use of front-end technologies HTML, CSS, and JavaScript to create a dynamic and responsive user interface. Employ C++, R, and Python for back-end processes, ensuring an ideal integration with React and Node.js to handle server databases.

**Testing and Quality Assurance.** Conduct comprehensive testing at various stages. Start with unit testing to verify individual components, followed by integration testing to ensure modules work together seamlessly. Finally, perform user acceptance testing to collect feedback and make necessary adjustments.

**Deployment and Maintenance.** Roll out the application using a phased deployment strategy, allowing for initial feedback and optimization. Schedule regular maintenance for updates and bug fixes, and provide user support resources to assist users in navigating the application effectively.

***Pilot Testing***

**Sampling Technique.** The sampling technique involves cluster sampling combined with random assignment within clusters, consistent with the CRT design. Selected high schools and colleges/universities will serve as clusters, with students from these institutions participating in the study. Within each cluster, students will be randomly assigned to either the experimental or control group. This approach ensures randomization, giving each participant an equal chance of being placed into either group.

***Subjects/Participants.*** The participants for this study will be high school and college students who are using the APA Format for writing their research papers or theses. Before selection, all potential respondents will be informed about the study and asked for their permission to participate.

***Data Gathering***

The proposed pilot study will collect data through usability and error rate tests. For the usability test, participants will complete a series of tasks, and their success rate will be measured based on the number of attempts needed. For the error rate test, students' research papers will be evaluated for accuracy and APA formatting adherence. If feasible, peer reviewers and existing applications will also verify the papers.

***Measuring Tools***

This study will use the following tools to collect and measure the data:

**Usability Test.** The researchers will plan to create a program that will give participants a series of tasks, and measure the success rate based on the number of attempts needed.

**Error Rate Test.** A program will also be proposed for evaluating the students' research papers for accuracy and adherence to APA formatting standards.

***Statistical Treatment of Data***

After the data is collected during the proposed study, the researchers will first utilize the Shapiro-Wilk test to test for the distribution of the data; this test will assist the researchers in

deciding whether to apply a parametric or non-parametric test. Afterwards, the researchers also propose testing the data to answer the Statement of the Problems with the following statistical treatments:

**Measuring User Experience (UX).** Measures of central tendency, such as mean, median, and mode, will be used to analyze the UX of the experimental group using the application.

**Measuring Error Rate.** Measures of central tendency, such as mean, median, and mode, will be used to analyze the error rate in research papers of the experimental group using the

application.

**Correlation of UX and Output of Research Papers.** For parametric testing, Pearson correlation coefficient will be used to test for the aforementioned correlation for both experimental groups. If the data is non-parametric, Spearman’s rank correlation coefficient will be used.

**Difference Between Output of Research Papers Using** **With or Without Application.** For parametric testing, t-test independent will be used to test for the aforementioned difference between the experimental and control groups from both the high school and college student category. If the data is non-parametric, Mann-Whitney U test will be used. We also propose testing all 4 groups with the use of One-way ANOVA — Kruskal-Wallis if non-parametric — to further evaluate the differences among them.

***Risk and Safety***

The risks in cybersecurity and other forms of adversaries that may threaten the data, accounts of participants and researchers, and also the system of the app itself are factors the researchers will need to consider. To mitigate this, the researchers will plan to create robust measures in the application to mitigate the threat and ensure the safety of the participants' personal data.

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