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Lab Report Analysis

Writing for Engineering

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Title

As mentioned in the textbook, the main purpose of the title is to summarize the research topic in a brief statement. This allows researchers to quickly know if the topic of the article is what they are looking for, and a topic they want to learn more about. It is also supposed to only include topic-related jargon that people in the field can easily understand.

The first lab has a title of “Evaluation of Pedestrian Infrastructure as a Strategy for Reducing Traffic Congestion at the Main Gate of Chukwuemeka Odumegwu Ojukwu University”. This matches exactly what the textbook lays out for a title. It contains the purpose of the research, and includes the specific location of the study.

The second lab has a title of “EFFICACY OF THE VETIVER GRASS SYSTEM IN TREATING TEXTILE INDUSTRY WASTEWATER IN GAZIPUR, BANGLADESH”. This title also matches the textbook definition, and includes the precise purpose of the lab, and its location.

The first title is a little more specific, as it includes the “Main Gate”, while the second title only includes the fact that it is in Gazipur, a city.

Abstract

The textbook describes the Abstract as a summary of the entire report, to the extent of mirroring its order. Due to the great constraints placed on gathering the entire report in one abstract, each portion of the report is only described in one or two sentences. Readers commonly read the Abstract to understand which parts of the report to read. Researchers have a wide range of papers to read to fully understand a topic, so they may not require reading the entire report. Common questions readers look for answers to in the Abstract include the motivation for the study, discoveries, and implications. Another common use of abstracts is to keep professionals up to date with research in the field without spending much time.

The first lab details the Abstract section using independent sections, while the second lab simply includes all of the aspects of the abstract in one block of text. This allows for more organization in the first lab, and makes finding specific aspects of the lab easier to find for the reader than the second lab. Despite this, both labs include the main aspects of the Abstract, and answer the most important questions. An interesting point to note is both labs include a secondary section within the Abstract dedicated to keywords relating to the topic. This was not mentioned in the textbook, however it easily allows for readers to pick up on the jargon researchers use. This makes the lab especially easier for non-specialists, which may mean both labs are designed for the general public, or non-specialized researchers.

Introduction

The purpose of an introduction is to briefly relay to the reader the required information for understanding the content of the research. Researchers should briefly introduce previous research in the field, and explain how their own research expands what was previously known. By this, the author is able to answer another important aspect of the introduction, the significance

of the research. In this section, the author should also introduce any equations relied upon in the research, or specialized information needed before reading and understanding the research (Markel).

Both articles include the main components listed in the textbook, as they establish prior research in the field of study, and their significance. However, from this main basis, both papers stray. Paper 1 cites a large amount of sources in their introduction in comparison to paper 2. This indicates the authors of Paper 1 likely have more true, grounded knowledge in the field, and speak with decisive knowledge.

Materials and Methods

The main objective behind the Materials and Methods section of the lab is to demonstrate the scientific aspect of the lab. Since a research paper offers scientifically proven results and implications in the real world, the lab itself must follow the scientific process. The main idea behind the methods is to detail the experiment enough to the extent another researcher could repeat the experiment. Any information that may result in different results must be included. This ensures the research in the paper follows the scientific method, and any results deduced are proper, and can be relied upon in the field (Markel).

Both textbooks include enough detail for the reader to be able to scientifically repeat the experiment, which fulfills the main goal of the section. With this, the second research includes all relevant formulas for the reader to see and use. This completes the section, as the reader would not be able to replicate results without knowing the relevant formulas. The first research document does not detail the exact formulas used. Despite this, both documents provide extensive analysis of their materials and methods. They both include visual elements, which

allow the reader to understand the context of where both researchers base their results on. The first research document details values for each chemical used, as well as provides photos of the setup. This enhances their section, as words alone may not be specific enough to detail how to replicate the experiment. With photos, the experiment can be replicated exactly, as the reader can visually analyze the elements presented. The second research paper also includes details about the materials and methods. The researcher provides numerous sections, breaks down percentages, and includes tables to allow the reader to easily register the information presented. The second document does not provide any photos of the setup, likely since the topic at hand relates to statistics, while the first document related to plant filtration. Despite this, the choice to exclude photos creates a more professional image for the second research paper. The second research paper also includes more detail in this section, giving a Bill of Quantities, and detailing the dimensions of all aspects involved.

Results

The Results section concerns itself with presenting the mathematical data collected from the experiment. The data must be relevant to the Hypothesis, or to the main concern of the research, and will be used to support that which has been deduced in the conclusion. When presenting data, the author must also point out trends or patterns found, in order to convince the reader of the author's conclusions.

Both research papers include incredible detail in their research sections. A feature presented in both throughout the entire document, however especially here, is their breaking down of each major section (Results, Discussion, etc) into subsections. This allows for a much greater amount of organization of the researchers' ideas, as well as easing the research on the

reader. If the reader wants to refer back to a specific portion of results, or understand specific implications, they are able to easily locate them and access them. In the first document, the results are presented briefly in word form, and then their exact values are detailed in tables and diagrams. This allows the researcher to effectively convey the exact results found. The researcher breaks down different factors that play into congestion, and then provides the aforementioned visualization and detail. After mentioning these factors, the researcher then compares their results to others (Camara et al., 2021). This increases their reliability, and reinforces their implications. In the second document, the number of subsections is substantially less. Even then, the results are presented in a neat manner, allowing the reader to understand what was found. The researcher included their table, a picture of what was found from treated wastewater, then pointed out, in words, important notes regarding the data. From this, it is clear the scope of the second lab was not as wide as the former, however both provide their results in an easy-to-understand manner.

Discussion

The discussion portion of a lab report is designed to interpret the results of the experiment. This is where the author goes over whether the data agrees with that proposed in the Hypothesis, or contradicts. The author gives reasons, or attempts to, for why his data produced the results it did. The author points out important findings, including but not limited to trends and outlying exceptions. Data which is “problematic”, meaning it contradicts that which has been proposed in the hypothesis, is brought to light. This can allow further researchers room to conduct future experiments, and expand the field of research.

Both labs chose to integrate their Discussions section with their results section. This may be for numerous reasons. One of them is that the data presented will not make sense without discussing the implications, and discussing the implications of the data without having the data along with it will cause the reader to move back and forth within the text. The researcher may also not want the reader to parse over any portion of the lab report, except while understanding what they are looking at. This decision appears to be very effective, as their data is presented in a clear manner. Even though there is no independent section for a Discussion in Lab 1, there is a separate section labeled Key Observations. Even then, this section is very short, and seems to be a shortened version of the implications presented in the Results section.

Conclusion

The purpose of the Conclusion is to summarize the entire experiment. The author reiterates the importance of the research, and the hypothesis, whether it was supported by the experiment's data or not. The author then points out to the reader the real-world implications of the research. However, the author should never introduce any new information in the Conclusion.

Both researchers fulfill the basic purpose of the conclusion. They briefly summarize that which was found in their experiment from the angle of data and science, as well as the implications that come along with their results. Both research papers have an extremely short conclusion, which is likely due to the intention of the Conclusion itself, summarization. Despite this, Lab 1 seems to have part of its conclusion in the Key Observations section, which may cause partial confusion amongst the readers. The first research paper also adds a section, "Limitations of the Study". This adds a layer of truthfulness to the first experiment, as they

understand their research may include a type of bias, due to unintentional limitations. The first paper also includes an extra section dedicated to Further Research, which, while brief, can guide researchers to future steps while progressing in the field.

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Both papers include brief acknowledgements to peers who aided them in their research. An interesting point to note is the existence of “Competing Interests” section in both papers. This ensures the research was carried out in a purely scientific manner, without any bias to begin with. This ensured the results determined from the experiment were not due to corruption, or being paid for by a company.

References

The purpose of the References Section, like in other writing styles, is to convey to the reader any work that does not belong to the author. The only sources that should be included here are those cited, not merely consulted. Both research papers include references, in proper form.