

B Comparison of Lab Report Elements

Mohammed Oguntola

City College of New York

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Professor Jacobson

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Knowledge of the elements of a lab report is essential for any science or engineering student or researcher and applying it effectively can influence the audience's view on the experience, and therefore credibility and perceived impact of a scientist's work. Moreover, the elements are immensely beneficial in that they provide a structure in which to best present findings for increased persuasiveness and to maximize impact, and this is simply the accepted format to create a lab report. It is therefore of the utmost importance to format a lab report according to the conventions. In this paper, two lab reports were analyzed to observe how they used the elements, compare their use in both papers, and determine the effectiveness, both of their use and of their reports. The reports used in this paper are two recent papers pertaining to the pandemic, and more specifically, the COVID-19 virus. These reports were selected for their relevance to current issues and their relation to one another, and it is to be hoped that in analyzing papers such as these, a great insight can be had both into the formatting of the lab reports and into the world situation and scientists' work to alleviate it.

The title of the first lab report, "*A five-day course of ivermectin for the treatment of COVID-19 may reduce the duration of illness*", hereon referred to as lab report #1 is indicative of the directives of Chapter 19 in which the author/s is supposed to provide an informative title which might lead to a longer title than is standard in other writing formats (Markel, 2017, p. 519). The title is interesting in that it is more of a description than a title. The title of the second lab report, "*Cognitive deficits in people who have recovered from COVID-19*", hereon referred to as lab report #2 is very similar to the first and provides a succinct description of the discussion in the paper, however, a major difference between the two is that while lab report #1 is more a claim than a statement, the title of lab report #2 is worded simply as a statement suggesting a

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discussion into a finding in the report, which in this case would be the cognitive deficits of COVID-19 survivors.

The next aspect discussed in Chapter 19 is the abstract. Lab report #1 follows the structure of the abstract described by Markel in which the authors summarize the introduction, methods, results, and conclusions in a short sentence. Lab report #1 presents the major findings in a way that facilitates a quick grasp of the research being done and falls under Markel's description of an informative abstract because much of it is dedicated to the findings. For example, in the sentence, "Virological clearance was earlier in the 5-day ivermectin treatment arm when compared to the placebo group (9.7 days vs 12.7 days; $p = 0.02$)," it is shown that the authors use data values which is also present in other parts of the abstract which shows the focus on the findings and warrants the classification as an informative abstract. Lab report #2 provides an abstract that describes the introduction, methods, and findings in full like the abstract in lab report #1. However, differences exist in that the abstract in lab report #2 is not as numbers/values oriented as lab report #1 and that lab report #2 is separated into different subsections, background, methods, findings, interpretations, and funding that while succeeding in describing each component in detail, is not indicative of the few short sentences of each section that an abstract should be comprised of as described in Chapter 19 (Markel, 2017, p.520). Although this format is unorthodox it makes the abstract easier to read and presents the different components of the abstract in a more digestible manner, although it may not be well-received by readers searching for a short but detailed abstract. Overall, though, both are detailed and well written abstracts.

The titles and the abstracts are merely hooks in any lab report, but the introduction is where the paper becomes more involved. Lab report #1 provides the background quite finely, detailing the context and delineating the purpose of the experiment. It gives context into the two main subjects of the experiment, COVID-19 and Ivermectin, describing the developments that have taken place, the response to the virus, and the impacts of the virus. It then goes on to describe the way Ivermectin functions, results from previous studies, why the findings from this experiment are important, and how the experiment is distinguishable from previous studies (Ahmed 2021). Lab report #2 builds on the strong background it had already provided in the abstract providing context into the cognitive deficits patients face and evidence that the pattern of survivors facing mental challenges exist. Then it pointed out the weaknesses in previous studies and explains the way the method in which the experiment was conducted addresses those concerns. Overall, both lab reports again satisfy the criteria set in Chapter 19 by providing a background and a context into the circumstances surrounding that allows the reader to understand their experiments and the need for it.

The methods section is the next section that is explained in Chapter 19 and is the next section that appears in both lab reports. Lab report #2 employs the use of subsections which makes for an easier read and navigation through the information while lab report #1 opts for the more standard format and presents the methods in a logical format. Despite the differences in structure, both present the information in a chronological manner and extremely detailed manner that allows for replicability. Both reports clearly state how the experiment was conducted and the reasons for certain choices are explained. Both reports heavily rely on acronyms, which is reasonable considering that this part of the report is a highly technical section and there's some

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level of field knowledge that is expected from the reader in this section. Phrases such as “C-reactive protein (CRP), ferritin, lactose dehydrogenase (LDH), and procalcitonin” and “RNA was tested for SARS-CoV-2 by rRT-PCR targeting ORF1ab- and N-gene specific primers” (Ahmed 2021) are bandied around in lab report #1 while “All processing and analysis steps were conducted in MATLAB by AH with assistance from WT. Visualization was conducted in R (v4.0.2) by JMB and AJ,” and “Values more than 5 standard deviations from the mean were winsorised” were used in lab report #2 (Hampshire 2021). Words and phrases such as these in both lab reports will leave the tyro confounded. While the methods section in both reports are highly technical, they differ in their level of technicality with lab report #1 being more technical due to the nature of the experiments: lab report #1 is a biomedical experiment involved in the natural sciences while lab report #2 is a social research-based experiment.

The results section for both papers are incredibly similar. The only major difference is the use of more tables, graphs, and graphics in lab report #2. Lab report #1 includes only one graph and relies more on equations while lab report #2 includes both an ample amount of data in the form of text and tables and graphs to aid the audience in greater visualization. Although the presentation of data in lab report #1 is sufficient in terms of effectiveness, lab report #2 overtakes lab report #1 due to its ease of access to a wider range of people with a balance in the text and illustrations.

In both lab reports, the discussion is conflated with the conclusion. Lab report #1 exults the affordability and availability of the drug Ivermectin with doxycycline and the statistical significance in reducing COVID-19 viral loads in infected patients, however, it also acknowledges its limitations regarding the sample size and suggests that further study is needed

that includes a greater sample size for greater validation of results. However, the report claims that the purpose of the study was not to prove the efficacy of Ivermectin, but to its success in curtailing infections and its potential in combating the COVID-19 virus. The favorable and optimistic outlook of the authors on this drug of the conclusion seems to imply that some emergency-use authorization be approved for this drug. In fact, a section reads, “The drugs are affordable (the full 5-day cost ranges from US\$ 0.60 to US\$ 1.80 for 5-day ivermectin) and readily available in Bangladesh, and thus are a highly attractive alternative for treating COVID-19 patients,” (Ahmed, 2021) which in no subtle tones expresses the authors partiality for the drug and their desire to see it used. The conclusion seems to say: although the benefits shown in the study of this drug are worthy of note and would be invaluable in the developing world where there isn’t full access to vaccines, further experimentation should be conducted swiftly to determine effectiveness and approve its use. The conclusion in lab report #2 discusses the results, their significance, and speculates about certain unexpected or unreasoned information drawn from the experiment. Subsequently, the authors go on to exult the statistical significance of its results and its success in achieving an unbiased sampling through a single-blinded study which provides veracity to the results and validates its hypothesis that COVID-19 does indeed have a correlation with cognitive deficits in patients. Finally, the report offers possibilities for further study in the consideration of factors that had not been explored in their experiment and states the benefit of the study in assisting in “post pandemic recovery” (Hampshire 2021). Overall, both lab reports follow the criteria for the discussion in this section and although the conclusion is conflated with the discussion, it does not take away from the development of either section.

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All in all, the structure used in both lab reports were indicative of the elements described by Markel in Chapter 19 and lent the authors of both reports effectiveness in presenting their information. Lab report #2, however, slightly deviated from the structure which made the reading clearer and more accessible but still took away from the short descriptions that were conventional in certain sections and would provide a quick glance to the hurried reader. Therefore, while lab report #1 used the elements more effectively in its report, lab report #2 was better in its presentation of data.

References

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