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Lab Report Assignment

In following the scientific method, studies in the fields of science are represented using a proven and rigid outline called a lab report. However, even with the rigidity, every lab report has a multitude of differences that separate them from all other reports. Although all include the basic eight sections: title, abstract, introduction, material and methods, results, discussion, conclusion, and references, these sections' structures vary drastically between authors and fields of study. Looking at two lab reports, one focused on neural cell repair and the other on the effects of cochlear implants on a child's vocabulary, there are a large amount of differences in each section of the reports based upon the variation of intended audience, purpose, and area of study.

First, directing attention to the titles of both lab reports shows a great variation in purpose. The neural cell report, titled *Cytokines Induce Monkey Neural Stem Cell Differentiation through Notch Signaling*, has a very technical nature making it harder to understand for the common person. The author took into account that their audience would include mostly other professionals in their field, making them opt for a more technical title so as to better display the main purposes of the study to their peers. Focusing also on using technical keywords, the author allowed the title to be better categorized in large databases. Also, the title expresses the results of the study to make it even easier for professionals trying to find lab reports to support their own studies. The second report, titled *Pairing New Words With Unfamiliar Objects: Comparing Children With and Without Cochlear Implants*, drastically differs from the first report's structure because of its individual purpose. Realizing a report about cochlear implants and children would

garner an audience of concerned parents of children with cochlear implants, the title is written in layman's terms, diverging greatly with the heavily technical title of the first report. As the cochlear implant report was too small for definitive conclusions, the results are not reflected in the title as with the first report. The first report had enough data to support a large statement while the second report needed further study. These vast differences in purpose and results produced the differences in the title sections of the two labs.

Following the title section, each abstract of the two reports varies due to purpose as well as intended audience. Having the structure of a continuous paragraph, the neural cell report's abstract was much shorter than the second report's abstract. The authors were aiming for conciseness, as they realize that their audience would want to quickly decide whether or not this report would help them in their own studies. Differing greatly from the single paragraph structure, the second report's abstract is divided into the sections, purpose, method, results, and conclusion. With the authors knowing their audience includes people from non-scientific backgrounds, they include this longer and sectioned abstract to ease readers into the scientific method and make their report easier to understand through division into smaller parts.

After the abstract section, both reports have a detailed introduction with structures varying from their individual purposes and intended audiences. Firstly, both label the introduction section differently, with the neural cell report calling it an "introduction" and the cochlear implant report not using a main title for the section and opting instead to divide into smaller components (Wang et al. 1). Due to the difference in intended audience, the neural cell report knows its readers are familiar with the structure of a lab report and would understand the meaning of the introduction, whereas the second report has many unfamiliar readers and thus divided the introduction as a way to make the information contained more understandable. Intent

differs in both reports also due to audience, as the neural cell report's introduction's main goal is to inform the reader of the chemicals and cells specific to their report with little regard for explaining why each chemical and cell, such as "phogenic protein (BMP) gene families", are named and the background of these cells and chemicals (Wang et al. 2). That differs greatly from the cochlear implant report's introduction, which explains every piece of background information in great depth. Also, the writing of this introduction uses many layman's terms while explaining background information, such as when they defined the word, "...Disambiguation, or the ability to connect a novel word with a referent..." (Lund E., 2327). This contributes to the fact that the cochlear implant report's introduction is a good two pages longer than the first report's introduction.

The materials and methods section following the introduction is where the greatest number of similarities are found between the two reports as this section is largely based on the scientific method. However, there are still a large number of structural differences in both of these reports' materials and methods section. First, each report labels the materials and methods section differently, as the neural cell report calls their section the usual "Materials and Methods" (Wang M. et al, 2) as their readers are accustomed to, while the second report identifies their section as "Methods" (Lund E., 2329) due to their experiment having little materials to list. Both sections opt to organize their materials and methods section into paragraphs, leaving out materials lists as they value ease of reading over ease of replication. Creating a step by step numbered list of paragraphs, the neural cell report's section is concise and focuses on the general methods used instead of a step by step procedure, such as listing "...2.5. Cell Proliferation Assay..." and then explaining that procedure in a paragraph afterwards (Wang M. et al, 3).. From the extensiveness of their study, they are able to steer away from a step by step procedure

as they have little need for others to repeat their experiment. Similar in both reports, each materials and method's section outlines that their procedure was approved by ethics committees. The second report divides their section into seven parts, "participants", "procedure", "development of experimental task 1", "task 1", "task 2", "reliability", and "statistical analysis" (Lund E., 2329-2331). Including a table of the characteristics of the participants as well, the second report is geared to allow the common person to understand every thought that went into creating this study. These points are further reflected by the size of each reports' section as the cochlear implant report's materials and methods section is almost four pages long, while the first report's section just barely fills a page.

Once the methods are described, each report then details the results of the study in the next graphic-heavy section called "Results", each report having a differing structure based on intended audience and their individual methods for data collection. Holding true to the usual results section structure, both reports start by repeating their study questions. However, due to the difference in intended audience, the neural cell report is categorized into a numbered list with a new sub number for each question, for instance "...3.1. BMP4 Inhibited Monkey NSC Proliferation and Monkey NSCs Maintained Sox2 Expression..." (Wang M. et al, 3), to reflect a more scientific approach to writing, whereas the second report is in an unnumbered continuous essay structure to increase readability. Furthermore, the neural cell report supports or disproves the study questions through data analysis directing after the question is stated (Wang M. et al, 3). Differing in this respect, the cochlear implant report includes the statistical analysis at the very end of the section and follows each study question with an explanation of the methods used to answer it (Lund E., 2332-2333). Stemming from the different data collection methods, the neural cell report contains numerous color pictures and numerical graphs (Wang M. et al, 4-10), while

the second report, due to its psychological nature, has no picture at all and only contains two graphs (Lund E., 2332-2333). Also, though this doesn't exactly fall under structure, both reports include analysis of the variables they had forgotten to consider before the experiment in this section.

Similar to the results section, the next section, called discussion, starts with a restatement of the purpose and study questions in each report, yet vary in structure due to the differing intended audiences and type of experiment. Since the cochlear implant report is intended for common audiences, the section is divided into smaller components again, contrasting with the long continuous essay of the neural cell report's section meant for scientific minds. Divided into four sections, the first two focused on each study question and called "Passive Disambiguation" and "Proactive Disambiguation" and the last two focused on the implications and limitations of the study and named "Implications" and "Limitations", the cochlear implant report makes it easy for anyone to discover the main points that should be included in a proper discussion section (Lund E., 2333-2336). Including similar points to the cochlear implant report, the neural cell report authors feel no need to divide their section into parts as the readers will be skilled enough to pick apart their continuous discussion essay into its main components (Wang M. et al, 11). Also, as social experiments often contain too many variables to standardize, the cochlear implant report's discussion section has outlined many more limitations than the first report.

Next, comes the conclusion section of the lab reports, in which both are quite similar with tiny differences due to purpose. Including a summary of the main points and implications of the study on the real world in one short paragraph, both reports followed the standard conclusion section guidelines. However, because the purpose of the neural cell report was specific to the medical field, their implications were on a much smaller scale than that of the cochlear implant

report, with implications reaching every person with hearing difficulty. The neural report's biggest implication from their study was that "...NSCs might initially serve as a potential source of transplant cells to treat neurological degenerative diseases..." which only reaches those who have neurological degenerative diseases (Wang M. et al, 11). A large amount of people and children are deaf and have cochlear implants, making the implications of the cochlear implant report, that it is "...a first step toward helping children with cochlear implants take advantage of word- learning opportunities..." is a much bigger impact on society today (Lund E., 2336).

Finally, the last section in each lab report is the references, in which the two reports differ in citation style due to their fields of study. As the cochlear implant report is in the realm of psychology, its citations are in APA format. Breaking the usual APA format used in biology reports, the neural cell report cites its sources in MLA format. To allow other scientific readers to easily find where each source is cited, the neural cell report numbers and lists their citations by the order in which they appear in the report. The cochlear implant report opts to list its citations in alphabetical order by the first name of the author as per the APA format. Also, as the cochlear implant was much less in depth with their examinations in their experiment, they cite about twice as many sources as the neural cell report as they needed much more background information to come up with valid conclusions with their limited data.

The variation of lab reports, especially between reports in different areas of study as is such with the reports, *Cytokines Induce Monkey Neural Stem Cell Differentiation through Notch Signaling* and *Pairing New Words With Unfamiliar Objects: Comparing Children With and Without Cochlear Implants*, is large enough to astound. Although there may be many differences, each abide by a strict set of rules and are divided into eight distinct sections created through the scientific method. Even in science, with all its regulations, creativity still reigns supreme.

References

- Lund, E. (2018). Pairing new words with unfamiliar objects: Comparing children with and without cochlear implants. *Journal of Speech, Language, and Hearing Research*, *61*(9), 2325-2336.
- Wang, M., Yu, L., Zhu, L. Y., He, H., Ren, J., Pan, J., ... & Chen, L. (2020). Cytokines Induce Monkey Neural Stem Cell Differentiation through Notch Signaling. *BioMed Research International*, 2020.

Self-Reflection

This assignment was the first time I had ever read a lab report completely through with no skimming. Because of this, I learned that lab reports are very unique to each writer, and that there is truly a lot of individuality that one can put in such a refined document. I often hated writing my own smaller lab reports in science classes, as I felt very restricted to the subject and found the process quite grueling. Everyone in the class would basically have to write out the same things, and no one would learn anything but exactly what was supposed to be covered in the lab report. This is very different from the free and expansive writing in both lab reports I covered. In them, I can see the passion for knowledge and excitement that stirs each scientist to continue their experiments. I can tell they almost enjoy the opportunity to share their knowledge with others in their field through their individual lab reports. Also, even though they followed the scientific guidelines so as to not seem biased, these lab reports have much more voice than I ever thought could be put in a lab report. I now realize that a large part of why I disliked science classes was because of my own misjudgments. I had seen all scientific articles as written by robots and wanting to enjoy my writing and express myself through it, avoided writing lab reports as much as possible. However, after breaking apart these two lab reports, my mind has changed and I have seen the truth; lab reports can be just as fun to write as poetry.

One thing I would have improved about my work process would be to start reading my lab reports earlier. I did not expect each lab report to take one to one and a half hours each to read and fully annotate, which led to me having a much longer night than usual. Also, I would have organized a better way to annotate the lab reports, as just using preview was very challenging and resulted in me accidentally handing in unannotated lab reports at first.

Although I did have some shortcoming while writing this piece, I feel that I grew as a writer immensely. I learned a truth about lab reports I had never known and now feel more able and less apprehensive to the idea of writing a lab report of my own. Also, I discovered how to best annotate, not just for content, but for style and structure (something I have never really done before).