**Lecture 4&5: How to write bachelor work?**

Your bachelor work should have many conditions such as:

1. The content has to be good and your findings must make a contribution to science.
2. The results should not be had difficulty in understanding.
3. It must be readable, that is not only easy to understand but also enjoyable to read (or at least only requiring a minimum effort by the reader).

You can improve the readability of your paper by:

1. having a clear and logical structure.
2. putting key information at the beginning of the paper, at the beginning of sections, paragraphs and even sentences.
3. reducing the amount that you write, and consequently reducing the amount the reader has to read.
4. only writing what the reader really needs to know (not everything that you know), and limiting the amount of background information.
5. using short sentences.
6. check your English.

What are the contents (the structure) of bachelor work?

Most scientific papers generally follow this structure:

1. Title (we will discuss this when talking about being concise)
2. Abstract
3. Introduction, ending with outline of the structure of the paper
4. Review of the literature (this section may be part of the Introduction)
5. What you did, your findings etc (Materials and Methods, Results and Discussion)
6. Conclusions - including plans for the future
7. Acknowledgements
8. Bibliography or references

**Abstract:**

An abstract is a mini version of your paper. It is your 'product', which you have to 'sell' to a referee. It is generally a very brief summary of each of the main sections (background, objective, materials and methods, results and conclusions). It is probably the most important part of a paper because if you want to publish it, it should enable:

1. a potential publisher to make a quick decision on whether the paper is relevant to his / her journal (without having to read the whole paper). Remember that referees have to review a lot of abstracts and papers. So, it is important to make your abstract stand out from the others in terms not only of scientific quality but also of how it is organized and what information it does and does not include
2. a reader to identify quickly what the paper is about, to judge how relevant it is to their interests, and so to decide whether they should read the whole paper or not.
3. you to see whether you have really covered all the main points and whether your conclusions are substantiated and justified.

An abstract will be judged in isolation from the paper, so it is vital for it to create a strong impression.

Write a very rough draft before you start writing the paper itself as this may help you to decide what to include in the paper and how to structure it. But experienced writers always write the Abstract (and often the Introduction too) last, ie when they have finished the rest of the paper.

An alternative, less traditional, structure:

1. Introduce the abstract with one or two sentences saying what you did + one key result, i.e. begin with info that the reader does NOT already know
2. Introduce the background by connecting in some way to what you said in your introductory sentence.
3. Use the background information (which the reader may or not already know) to justify what you did. Ensure that background details are not more than 40% of the abstract.
4. Provide some more information on your results. So, put statistics in your abstract. They give the idea of something specific and that you have done your work well. Avoid words like many / several / few when you could write something more specific.
5. Tell the reader the implications of your results and what you plan to do next.

EXAMPLE

Read this abstract

Hydroxychloroquine (HCQ), the antimalarial drug, has been proposed as an effective treatment for Covid-19. In April 2020, the Food and Drug Administration warned service providers against using it because of its serious heart rhythm effects in the Covid-19 patients, but does HCQ cause heart rhythm just in Covid-19 patient or in every one? And why?. So, this research aimed to demonstrate the impact of HCQ treatment on heart function by determined CK-MB and acetylcholine (ACH) levels in the healthy mice. Thirty adult male albino Balb/C mice, aged 2-3 months, were used in this study. These mice were divided randomly into three groups (n=10): (T1) treated with the high dose of hydroxychloroquine (8.1mg/kg body weight, 2-times for 10days), (T2) treated with the low dose of hydroxychloroquine (6.4mg/kg body weight, 2-times in the first day and then 1-time for 4days), while (C) is left without treated and served as a control group. Mice were sacrificed in different time points by cervical distraction. The blood sample is collected from the eye and the Serum is separated to be used for CK-MB and Ach level determinations. Brain, spleen, and kidney were taken and homogenized to be used for Ach level determinations. The results showed significantly higher CK-MB level in the T1 group compared to T2 and C groups and significantly higher ACH level in all studied tissues of both treated groups compared to control. These results indicate that HCQ could dangerously raise the heart rate even in non-Covid-19 patients, so caution and monitoring while using it are advised.

Now read an analysis of the structure of the abstract. Look the matching of the explanations of what the author is doing with the extracts from the paper.

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| --- | --- |
| **GOOD TRADITIONAL STRUCTURE** | **SENTENCES FROM THE ABSTRACT TO MATCH TO POINTS 1-5** |
| 1) The problem that this paper is trying to resolve. Why did you carry out your project and why are you writing this paper? | Hydroxychloroquine (HCQ), the antimalarial drug, has been proposed as an effective treatment for Covid-19. In April 2020, the Food and Drug Administration warned service providers against using it because of its serious heart rhythm effects in the Covid-19 patients, but does HCQ cause heart rhythm just in Covid-19 patient or in every one? And why? So, this research aimed to demonstrate the impact of HCQ treatment on heart function by determined CK-MB and acetylcholine (ACH) levels in the healthy mice. |
| 2) New solution given by authors of the paper. What is the innovative contribution of your work? What did you do? What makes it different from previous research? | Thirty adult male albino Balb/C mice, aged 2-3 months, were used in this study. These mice were divided randomly into three groups (n=10): (T1) treated with the high dose of hydroxychloroquine (8.1mg/kg body weight, 2-times for 10days), (T2) treated with the low dose of hydroxychloroquine (6.4mg/kg body weight, 2-times in the first day and then 1-time for 4days), while (C) is left without treated and served as a control group. Mice were sacrificed in different time points by cervical distraction. The blood sample is collected from the eye and the Serum is separated to be used for CK-MB and Ach level determinations. Brain, spleen, and kidney were taken and homogenized to be used for Ach level determinations. |
| Does HCQ really do what you say it does? | The results showed significantly higher CK-MB level in the T1 group compared to T2 and C groups and significantly higher ACH level in all studied tissues of both treated groups compared to control. |
| What does this all mean? What are your conclusions and recommendations?  What do you plan to do next? (option) | These results indicate that HCQ could dangerously raise the heart rate even in non-Covid-19 patients, so caution and monitoring while using it are advised. |

**Introduction and literature review:**

It is the next part of your bachelor work or paper. A possible structure for it (though not necessarily in this order) is:

1. The introduction which should has essential background information, where appropriate, so that readers can understand and assess the results of your work without having to refer to the literature. NB this should be no more than 3-5 sentences long if you write paper but if you write bachelor work it could 3-5 paragraphs, otherwise readers will get frustrated because they want to understand what the contribution of your paper is and what new things they will learn.
2. definition of the problem: why did you choose it? why is it important? what is the aim of the paper / what is your contribution to the problem? NB make sure you use the key phrase ‘this paper describes’ or ‘the aim of this paper is’ as near as possible to the beginning of the Introduction (i.e. within the first few sentences)
3. review the literature (though this may be a separate section if you write bachelor work not paper)
4. method of investigation and why this was chosen.

This section should be

1. not too long
2. not just a cut and paste from the Abstract
3. Objectives should well defined and the problem you are addressing or trying to solve should be clear.
4. The background information should relate to the objective
5. The reason for choosing a particular approach / methodology should be given and clear, so the reader can expect in the rest of the paper (i.e. main results and conclusions) and how this information will be structured (i.e. into the various sections)

If the review of the literature is separated, it should be:

1. has made it clear why some references are mentioned - references must give support to what you are saying, they should not be there just to make your paper longer and seem more important
2. has done a sufficiently wide literature search
3. is aware of the state of the art
4. has many references from work carried out in your own country

**How to make reference to other authors?**

There are various ways of making reference to other authors. Style 1 is the shortest and easiest to read. The most tedious is Style 4.

**STYLE 1**: Evans (5) studied the differences between Italian and English.

**STYLE 2**: In (5), Evans studied the differences between Italian and English (Evans, 2012).

**STYLE 3**: The differences between Italian and English have been studied (5).

**STYLE 4**: A study of the differences between Italian and English is presented by Evans (5).

**How to write a paragraph**

A paragraph is a group of related sentences that introduces and develops one single thought or main idea. Paragraphs are the building blocks of writing. They indicate that a writer has move from one main idea to another.

A Paragraph structure and sentence order as a fallowing:

1. First sentence of paragraph should introduce main topic. Next sentences should be a logical extension of first sentence. The last sentence should conclude the paragraph.
2. Vary the length of your sentences, but generally keep them short.
3. Avoid semi colons. Instead, begin a new sentence.
4. Provide examples / support for what you say and for your findings.

EXAMPLE

Read the paragraph carefully:

Termites, sometimes called white ants, do a big job as master builders1. Termites build their homes from bits of soil and mud cemented together with saliva, liquid form their mouths2. This home, called a termitary or termite mound, may rise above the ground as high as six meters! Its walls are hard and sunbaked. Inside, there is a system of tunnels and chambers. Thousands of termites live within each mound and rarely leave it. In fact, when they do, they can only live in the open air for a short time. Therefor, termites build a home that provides for all their needs within its wall.

Look, the first sentence gives the reader an idea that the paragraph is about the termites’ buildings. All the rest sentences are logical extension of the first one. All these sentences talk about the termites’ buildings. The last sentence concludes the paragraph

**Materials and Methods:**

The title of this section varies from discipline to discipline. But in nearly all papers there is some description of a methodology, procedure or approach. In this section you should:

1. Describe the experimental design, include the exact technical specifications and quantities and source or method of preparation.
2. Provide enough detail so that the experiment can be repeated.

Ideally, there should be no more than a 60:40 ratio between describing what you did (your methodology, approach) and the results + discussion of the significance of what you did. If you have written about the methodology / process / procedure in incredible detail it may be because you don't really have much to say about the implications of what you have done and that you are simply trying to make the paper seem to have substance by making it long.

**Results and Discussion:**

This is one of the most important sections in the paper but is often neglected by authors.

1. Give overall description of the experiments, providing the 'big picture', without repeating the experimental details of the Materials and Methods
2. Present the data, but be selective.
3. Present the principles, relationships and generalizations shown by the Results.
4. Discuss the results, don't repeat them.
5. Point out any limitations, exceptions or any lack of correlation and define unsettled points
6. Show how your results and interpretations agree or contrast with the literature
7. Discuss any theoretical or practical applications
8. State your conclusions
9. Summarize your evidence for each conclusion

One 'rule' is that you should never sound arrogant or 100% certain of what you state. So, particularly in the Discussion and in the conclusions, you need to use words and expressions that are not too direct and seem more tentative.

**How to state conclusions in a more indirect way**

**Possibly arrogant Soft and tentative**

This means that x = y. This may mean that x = y.

We believe that x probably equals y.

Our tests would seem to show that x = y.

It seems likely that x = y.

This would appear to indicate that x = y.

This is a good method for doing x. In our opinion this is a good method for

doing x.

We believe that this is a good ...

Our results would seem to highlight that

**Conclusion:**

Not all types of scientific paper have a Conclusions section. The conclusions may be better located in the Discussion. The Conclusions section is not just a summary. Don't merely repeat what you said in the Introduction. It should not be more than a couple of paragraphs long. A possible structure is:

1. A three-four lines summary of what you did. Keep this as short as possible.
2. The importance / significance of what you found and how it might impact on current knowledge of the field, including possible applications. You may also want to include the limitations of your work.
3. Possible areas for future work for you and suggested directions for the community in general.

It differs from the Abstract as it gives more emphasis to points 2 and 3 (significance and future work), and gives no background details.

The Conclusions may be the last thing that the referee reads, so they must be clear and concise thus leaving the referee (and readers) with a good impression.

**Acknowledgments:**

What to include in the Acknowledgements

1. Sources of funds.
2. People who gave significant technical help.
3. People who gave ideas, suggestions, interpretations etc.

NB Don't acknowledge anyone without letting them see the exact wording of how you want to acknowledge them - they might think it is too effusive (or occasionally, insufficient).

**References:**

The references style differs from journal to other, so if you want to publish your paper, you should read the author instruction in the journal website before sending it to them. Whoever, in the bachelor work, you could write the references in two ways:

If you insert the references manually, you should write them as the following:

1. Write the authors names (the family name, the first letter from the first and middle names). Put a semicolon between the authors until you reached the last author, put (and) before it. If the authors’ number more than 6, write only sex and put (and *et al.*)
2. Write the year of reference publishing between brackets.
3. Write the title of the reference.
4. Write the journal name in Italic font, then semicolon before you write the number of volume and issue number between brackets, after that put (:) and write the page number of the reference.

EXAMPLE

1. Hassan, T.; Veerakumar, D. and Anandhi, N. (2019). Hepatoprotective activity of some medicinal plants. *Int. Res. J. Pharm*; 10 (5): 9-16.

If you use Google Scholar, you can get citation from articles in the search result list:

1. Write the topic you want to search a paper on it in the Google Scholar engine.
2. Choose the paper which you need after reading the abstract
3. Click on the Cite link next to your item.
4. Select your citation style
5. Paste the citation into your working document
6. Double to match and adjust formatting as needed to match your selected citation style

 

