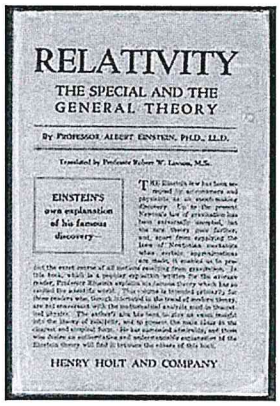
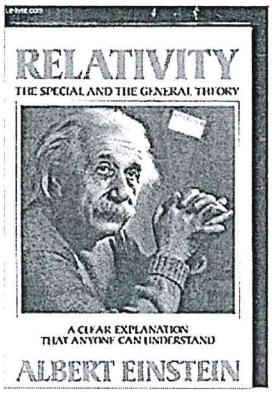
Istituto Zooprofilattico Sperimentale del Lazio e della Toscana *M. Aleandri*

Istituto Zooprofilattico Sperimentale del Lazio e della Toscana – Provider Organizzatore:733

Progetto formativo aziendale

"Writing to Publish Scientific Work"





3, 6 e 10 dicembre 2019

16,5 crediti ECM per veterinari, biologi, chimici, tecnici di laboratorio biomedico

IZSLT M. Aleandri
V. Appia Nuova, n. 1411 - Roma

Destinatari: veterinari, biologi, chimici, tecnici di laboratorio biomedico e personale interno dell'Istituto coinvolto nella ricerca e interessato alla produzione scientifica

Numero massimo di partecipanti: 20 - Numero minimo per attivare il corso: 10; il corso sarà tenuto in lingua inglese; prerequisito per ammissione al corso:conoscenza della lingua livello B1

Obiettivi ECM nazionale: *Acquisizione di competenze tecnico professionali* per la produzione di contributi scientifici

Obiettivi didattici:

Al termine dell'evento formativo i partecipanti avranno acquisito conoscenze e aggiornamenti su:

- la preparazione e l'elaborazione di un contributo scientifico in lingua inglese
- i risultati della ricerca: come renderli idonei alla pubblicazione
- la struttura di un articolo scientifico
- lo stile della pubblicazione scientifica

- i dati e i grafici
- la revisione tra pari

Metodologia didattica
- Lezioni frontali
- esercitazioni individuali o in sottogruppi e in plenaria

Strumenti di verifica
- Due prove pratiche durante il corso
- Questionario di valutazione della qualità percepita

Responsabile organizzativo
Dott.ssa Patrizia Gradito (IZSLT, Coordinamento attività di Documentazione - Ufficio di Staff Formazione)

Responsabile scientifico
Dott.ssa Eda Maria Rodas Flores (IZSLT, Dirigente Veterinario, Ufficio di Staff Ricerca e Innovazione - Progetti finalizzati e cooperazione internazionale)

Docente
Prof. Thomas Meredith Brown (Università degli Studi di Roma Tor Vergata, Dipartimento di Ingegneria Elettronica)

Verifica a distanza/efficacia:
non percorribile per la materia trattata

Criteri di validazione: standard previsti dalla PG FOD 004 "Progettazione degli eventi formativi"

PROGRAMMA

I GIORNATA
3 dicembre 2019

08.30 Registration

09.00 - 10.00 Are you ready to publish? Scientific Journals, understanding the publication process for peer-reviewed scientific articles

10.00 - 11.00 Submission, cover letter, manuscript, peer review

11.00 - 11.15 *coffee break*

11.15 - 12.15 Response to reviewers, revisions and editorial process. What makes a good paper?

12.15 - 13.15 Structure of the article, IMRAD format, title, abstract

[1] Strumento interno alla Struttura Formazione, Comunicazione e Documentazione dell'IZS Lazio e Toscana, Certificata ISO 9001:2008

II GIORNATA
6 dicembre 2019

09.00 - 10.00 Class exercise on abstract and title writing.

10.00 - 11.00 Key words, introduction, experimental (materials and methods)

11.00 - 11.15 *coffee break*

11.15 - 12.15 Results, discussion, conclusions, acknowledgments, references

12.15 - 13.15 Outlines and points of style in writing

III GIORNATA
10 dicembre 2019

09.00 - 10.00 Class exercise on graphing

10.00 - 11.00 Graphing and images

11.00 - 11.15 *coffe break*

11.15 - 12.15 Examples of effective and poor figures and captions

12.15 - 13.15 Writing an abstract for conferences. Elements of carrying out good publishable research

ABSTRACT

The main aim of this course is to provide participants with the understanding of the publication process in scientific peer-reviewed journals, what can make research work publishable and have impact, and how to design and write a scientific article (title, abstract, introduction, results, discussion, conclusions, graphing and images with class exercises, and style).

MATERIALE DIDATTICO
Il materiale didattico sarà messo a disposizione dei soli partecipanti

CRITERI DI SELEZIONE
Il corso sarà tentuto in lingua inglese, prerequisito è la conoscenza della lingua inglese a livello B1 secondo il Quadro Comune di Riferimento Europeo (esempio di test di autovalutazione: https://www.efset.org/it/free-english-test/)

MODALITÁ DI ISCRIZIONE
La partecipazione è gratuita.
Iscrizione tramite portale della Formazione al sito www.izslt.it; Termine ultimo di iscrizione: **29 novembre 2019**; conferme tramite **e – mail entro 2 dicembre 2019**

MODALITÁ DI CANCELLAZIONE

Si prega di comunicare tempestivamente la rinuncia per iscritto alla segreteria organizzativa.
La mancata comunicazione della rinuncia sarà tenuta in considerazione per l'ammissione a successivi eventi formativi.

Attestato di partecipazione con indicazione dei crediti formativi ECM:
è indispensabile la frequenza del 90% delle ore di formazione e il superamento della prova finale.

Segreteria Organizzativa
Ufficio di Staff Formazione
tel. 06.79099421/309; fax 06.79099459
E-mail: patrizia.gradito@izslt.it
www.izslt.it

L'organizzazione si riserva di annullare o modificare le date dell'evento formativo previa tempestiva comunicazione agli iscritti.

Lecture course on Scientific Writing

Writing a Scientific Article

Thomas M. Brown

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C2-07

remember

- Remember what makes good publishable research. Always keep that in mind when you are planning and carrying your research. It's a continuous process.
- Lay the ground work for transferring the results into a good publication all the time you are conducting your research

At the start

- What is the central message of your paper? Write it down in one sentence or two.
- What are the 3 or 4 main and/or secondary points of your paper? Write them down

First Step

Once you are confident that you have **original research**, solved an important problem or completed a set of experiments **and analyzed the results, and done a thorough literature search**, it is time to decide what to include in your manuscript and how to present it.

Spend some time brainstorming about your research. **What are the three or four fundamental points** you want readers to understand and remember once they have finished reading your work [3, 4]?

Decide **which methods and what data support each of those messages. Which references help** you make the case that your work is new and significant? **What conclusions can you draw** from your research? This exercise will help you decide what information to include.

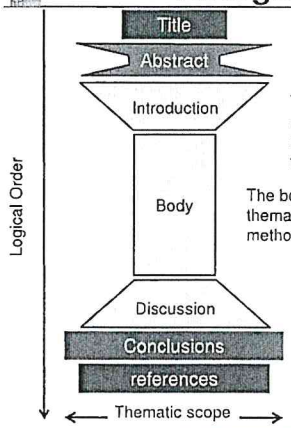
[3] R .J. Gladon, W.R. Graves, J.M. Kelly. Getting Published in the Life Sciences. Hoboken, NJ: Wiley-Blackwell, 2011.
[4] M. Cargill and P. O'Connor, Writing Scientific Research Articles: Strategy and steps. Chichester, UK: Wiley- Blackwell, 2009.

Journal Article

The thematic progression in a paper should be the following (hourglass model)

General ⟹ Particular ⟹ General

Hourglass Structure



The structure of a paper comprises three core parts, namely introduction, body and discussion

The introduction leads the reader from general motivations and a broad subject to a particular research question that is tackled in the body of the paper.

The body of the paper stays within a tight thematic scope and describes the research methods and results in detail.

Eventually, the discussion part aims to draw general conclusions and present implications from the results.

IMRAD Format

- I = Introduction, what question (problem) was studied
- M = Methods, how was the problem studied
- R = Results, what are the findings
- A = and
- D = Discussion, what do these findings mean

Organization of a scientific paper

- The most common is the IMRAD
- If a number of methods were used to achieve directly related results:

  M + R = Experimental section
- The results are so complex that they need to be immediately discussed:

  R + D = Results and Discussion section

Structure of a scientific paper

- **Title** – the subject area and what aspect of the subject was studied.
- **Abstract** – a summary of paper: the main reason for the study, how it was done, the primary results, the main conclusions.
- **Introduction** - *why* the study was undertaken and what were the aims/objectives.
- **Materials and Methods** - *how* the study was undertaken
- **Results** - *what* was found.
- **Discussion** - *why* these results could be significant (what the reasons might be for the patterns found or not found).

R. Quinn, EGM302 Ulster University

- **Conclusions** – *wraps up the article.*

Some important Language points:

- Poor experimentation cannot be masked by brilliant writing; however, poor writing can mask brilliant experimentation
- Avoid complex sentence structure
- Use simple and clear English
- Always keep in mind that the paragraph is the essential unit of thought

Style

Simplicity is the ultimate sophistication.
Leonardo da Vinci

Style

Any fool can make things bigger, more complex, and more violent. It takes a touch of genius-and a lot of courage-to move in the opposite direction.
Albert Einstein

Style

Making the simple complicated is commonplace; making the complicated simple, awesomely simple, that's creativity.
Charles Mingus

Essential Ingredients

- Good organization
- Appropriate language within the organization

D. Lund. Editor in chief IFT Journals, D. Min, Ohio State University

A good design of a scientific manuscript and a lucid writing style are of extreme importance for getting one's work published in a scientific journal

www.sfedit.net

Excellent Advice: Start with an Outline

- I emphasize the central place of an outline in writing papers. It is most efficient to write papers from outlines. You should think of an outline as a carefully organized and presented set of data, with attendant objectives, hypotheses, and conclusions, rather than an outline of text.
- An outline itself contains little text. If you and your supervisor can agree on the details of the outline (that is, on the data and organization), the supporting text can be assembled fairly easily.
- It can be relatively efficient in time to go through several (even many) cycles of an outline before beginning to write text; writing many versions of a full text is slow.

G. M Whitesides, Writing a paper, Adv. Mat. V6 (2014)

Outline

- Concentrate on organizing the data. Construct figures, tables, and schemes to present the data as clearly and compactly as possible. This process can be slow (figures can be sketched five to ten times in different ways trying to decide how it is most clear (and looks best aesthetically).

G. M Whitesides, Writing a paper, Adv. Mat. V6 (2014)

Remember the main messages of your research must come through the paper. Often the messages become more apparent or even change during the outline writing process. Write the main bullet points for what will become the introduction (remember a thorough state of the art search is essential in order to help you give the right slant/cut to the paper), results and discussion and conclusions sections when you will pass on to writing the full manuscript.

Outline

- When you are satisfied go through or send the outline to your supervisor. After feedback or brain storming prepare an improved outline. It can take quite a few iterations (often with additional experiments and/or data analysis) to agree on a satisfactory outline. Upon agreement, data are usually in (or close) to final form (figures, tables, schemes in the outline will be those that will go in the final manuscript).
- You can then start writing the manuscript
- NB. Start exchanging outlines early in the project (when you have sufficient data). Don't wait till you think the data set is "complete". The effort, even if done well before collection of additional data, will help guide research efficiently.

G. M Whitesides, Writing a paper, Adv. Mat. V6 (2014)

- Of course if you have regular meetings with your supervisor then you can decide when the right time is to seriously consider writing an outline for manuscript writing.

Writing a Scientific Paper

- Scientific writing is primarily an exercise in organization.
  - Scientific writing is highly stylized with distinctive components.
  - Scientific paper should have the proper order of components.
- Research work should be communicated effectively and clearly using simple words of known meaning.
- The best English in scientific writing is to make the point in the fewest possible words.

Writing Scientific Paper

- Use simple and short sentences instead of complex and long sentences. Divide long sentences into two or three simple short sentences.
- Enjoy the sheer beauty of a simple declarative sentence using clear, precise words.
- If the components are properly organized, the paper will almost write itself.

Characteristics of good scientific writing

The next few slides in this lecture are adapted from 'Writing for Science', available online from the University of Leicester

Good scientific writing is:

1. clear - it avoids unnecessary detail;

2. simple - it uses direct language, avoiding vague or complicated sentences. Technical terms and jargon are used only when they are necessary for accuracy;

3. impartial - it avoids making assumptions (Everyone knows that ...) and unproven statements (It can never be proved that ...). It presents how and where data were collected and supports its conclusions with evidence;

Characteristics of good scientific writing

4. structured logically - ideas and processes are expressed in a logical order. The text is divided into sections with clear headings;

5. accurate - it avoids vague and ambiguous language such as about, approximately, almost;

6. objective - statements and ideas are supported by appropriate evidence that demonstrates how conclusions have been drawn as well as acknowledging the work of others.

Characteristics of good scientific writing

Developing good scientific writing

To reflect the characteristics of good scientific writing in your own work, you need to think about the way that you write and the language that you use.

A good scientific author will have given consideration to the following choices in writing, making decisions that improve the effectiveness of the writing.

Characteristics of good scientific writing

Choosing the words

To make your writing clear, accurate and concise you should consider carefully the words that you use, and the ways in which you use them.

Technical terms

In most scientific writing you will need to use some scientific or technical terms in order to be clear and unambiguous. However, use such terms only when you need to do so and do not try to impress the reader by using unnecessary technical jargon or lengthy words.

Abbreviations

Abbreviations can be a very useful way of saving time and avoiding repetition, but they can be confusing and might not be understood by everyone. Use standard abbreviations where these exist, and reduce your use of abbreviations to an absolute minimum; they are rarely essential.

Characteristics of good scientific writing

Use objective rather than subjective language
Objective language is language that is impartial and states a fact or process; subjective language is open to question or interpretation as it implies personal thought or belief. For example:

objective *The car travelled at 38 kilometres per hour*

is a clear, objective statement of fact.

However:

subjective *The contents of the test tube turned a beautiful blue colour*

uses *beautiful* in a way that is subjective because it cannot be measured or accurately explained to the reader. Always use language that is concrete and specific rather than vague and personal.

Characteristics of good scientific writing

Using tenses

Scientific writing frequently uses the past tense, particularly when the main focus of the writing is to describe experiments or observations that took place prior to the time of writing, for example:

The data were analysed.

The solution was decanted.

The temperature was recorded.

However, the past tense may not be appropriate for everything that you write and sometimes you will need to combine different tenses in the same piece of writing.

Characteristics of good scientific writing

For example, the use of different tenses can help to clarify what happened or what you did in the past (past tense), what you conclude (present tense) and what will be an issue for the future (future tense).

The following sentences show how different tenses can be used to achieve clarity in your written work.

The experiment was carried out in a sterile environment (past tense for a statement of what happened).

It is particularly important to avoid contamination (present tense for a statement that is a general 'truth').

It will be necessary to ensure that the same conditions are replicated in future experiments (future tense for a recommendation for the future).

Characteristics of good scientific writing

Sentence length

Sentences that are too short and poorly connected can be irritating to read.

Conversely, sentences that are too long and rambling are difficult to follow and are likely to be confusing.

Use a sentence length that allows your thoughts to flow clearly.

As a general rule there should be no more than 20-25 words in any one sentence.

Full Article Structure

- Title
- Authors
- Abstract
- Key words
- Introduction
- Experimental (Methods)
- Results and Discussion (even separate)
- Conclusions
- Acknowledgments
- References

Title

- To describe the nature and content of research concisely and accurately.
- Concise to describe the content of study with the fewest words – 20 words.
- Clear and informative.
- Capture the importance of the study and the attention of the reader.
- Describe actual findings that can be supported in the manuscript.

D. Lund, Editor in chief IFT Journals, D. Min, Ohio State University

- It should contain the keywords that reflect the contents of the paper.
- It should be meaningful and not general
- It should be concise, specific and informative
- It should capture the fundamental nature of the experiments and findings

K. Gaafar, Cairo University

- It should be searchable

Title

This provides the first impression to the reader, so selecting the most appropriate title requires some thought. The title influences whether a reader is interested in reading the manuscript. It should include all essential words in the right order such that the topic of the manuscript is accurately and fully conveyed (e.g. clearly related to the purpose of the study). Avoid long titles (the recommended length is 10 - 12 words) and those which begin with redundant words such as "A study of..."

How to write a paper for a scientific Journal, S. Jenkins

Use words that help the reader understand why your work is different from previous studies. You may want to develop a list of possible titles as you develop your article, then select the best one.

M.M. Pierson, B.L. Pierson, "Beginnings and Endings: Keys to Better Engineering Technical Writing," IEEE Trans. Prof. Commun., vol. 40, no. 4, pp. 299–304.

J.R. Matthews and R.W. Matthews, Successful Scientific Writing: A step-by-step guide for the biological and medical sciences, Cambridge, UK: Cambridge University Press, 2008

IEEE Authorship Series, How to Write for Technical Periodicals & Conferences

Do not use abbreviations unless they are very well known by the target audience (think also of which search terms they will be using)

Abstract

- The abstract is the last section of your article to be written because it is a condensed version of the entire article.
- Readers will use the abstract to decide if your article is relevant to them. Use keywords and index terms in your abstract to capture reader interest and improve the likelihood of your article appearing in relevant searches

J. Gladon, W.R. Graves, J.M. Kelly, Getting Published in the Life Sciences, Hoboken, NJ: Wiley-Blackwell, 2011.

Abstract

- Enable readers to identify the basic contents of a paper quickly and accurately.
- State succinctly what was done and how it was done
- Conclusions should be justified by the results in the text
- Information in the abstract should be presented in the main text
- Not exceeding 100-200 words

Abstract

The thematic scope of an abstract is similar to that of the complete article (general-particular-general) and is a brief summary of its content providing the main highlights.

- 1 *Problem/motivation*: What problem is the paper trying to solve and why is it import and what is the scope of the work? (present verb tense)
- 2 *Research Solution*: What was done to solve the problem? (past verb tense)
- **3 *Results/findings*: What are the most important results, evidence or answer to the problem (past verb tense)?**

If appropriate and there is enough space (word limit) you could add (don't if not meaningful or true) :

- 4 *Implications*: What implications does the answer/work bring about? (present verb tense)

How to write a paper for a scientific Journal, S. Jenkins

M. Derntl, Int. J. Technology Enhanced Learning, Vol. 6, No. 2, 2014

Abstract – another approach

The thematic scope of an abstract is similar to that of the complete article (general-particular-general) and is a brief summary of its content providing the main highlights.

- **1 *Results/findings*: What are the most important results, evidence or answer to a technical/scientific problem (past tense)?**
- 2 *Problem/motivation*: What problem did the paper solve, how and why is it of importance? (present verb tense)
- 3 *Implications*: If applicable, what are the implications of the article's findings? (present verb tense)

Abstract

It must make sense when read in isolation for those who read only the abstract. This is especially important given that many computerized searchers only retrieve the abstract. The abstract must also provide a clear and accurate recapitulation of the manuscript for readers who read the entire manuscript (Zeiger, 1991). For example, an abstract must not contain data which are not included in the results.

The abstract is usually written as one or two paragraphs and it is important that the text flows and does not resemble a collection of disjointed sentences. The choice of words should be simple, jargon avoided and abbreviations omitted except for standard units of measurement and statistical terms. Citations are not usually included. Excessive detail such a long lists of variables, large amounts of data or an excessive number of probability (p) values is not acceptable. The trick to producing a clear abstract is to provide just enough detail to demonstrate that the design of the study was good and that the evidence of the answer to the question is strong.

Key Words

- journals require three to five key words that reflect the contact of the article. These are used for indexing purposes and often must be selected from an Index during the submission process (e.g. IEEE). Use key words that you think readers would use to find an article with content like its.

Introduction

- Provide the readers with sufficient background information to evaluate the results of the research
- No more than 2 typed pages usually
- Focus on the main subject
- Brief and well integrated review of pertinent work
- Cite key and current literature

Introduction

- Extensive review of the literature is not needed
- Explain the importance of your research
  - What new or important scientific information is needed to advance knowledge in the subject area?
  - State clearly why the research is needed and worth doing
- State the objectives of your work

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- How does your research bring significant new understanding to the field?

IEEE author guide

Introduction

- The objectives of the work
- The justification for these objectives. Why is the work important?
- Background: who else has done what? How? What have you/your group done previously?
- Guidance to the reader: What should the reader watch out for in the paper? What are the interesting high points? What strategy did you use?
- Summary/conclusions: what should the reader expect as conclusion?

Introduction

Background to the topic (past verb tense)

- **What is known or believed about the topic**
- **What is still unknown or problematic**
- **Findings of relevant studies (past verb tense)**
- **Importance of the topic**

Statement of the research question

- **Several ways can be used to signal the research question , e.g.,**
- **"To determine whether ....."**
- **"The purpose of this study was to ....."**
- **This study tested the hypothesis that ....."**
- **"This study was undertaken to ....."**

Approach taken to answer the question (past verb tense)

Introduction

- Some editors think that the principal results and conclusions should be summarized in the Introduction
- Most disagree, arguing that such a summary appears in the abstract and should not be repeated in the Introduction. You should avoid the practice except when writing for a journal that requires it.

Experimental (Materials and Methods)

- Provide sufficient analytical information so that work can be repeated.
- Use appropriate experimental design to answer the research question.
  - Cite and use the accepted and current methodology.
- If a published method is modified, such modifications must be described in detail.
  - Describe new methods in detail.
  - Describe statistical analysis of data if appropriate.
  - Use subheadings as needed for clarity.

Results

- Present research data concisely and interpret the data scientifically.
  - Short and sweet with no excess verbiage.
- Work consistent with the objectives stated in the Introduction.

Results

- Reproducibility and sensitivity of methods
- Report representative data rather than endless repetitive data
- Numerical data with the correct number of significant digits

Results

- Significance of your data
  - Plan your experiments so that the number of samples or measurements for each sample gives you the standard deviation, maximum experimental error, etc. associated to your average data point. Estimate experimental errors. Differences in data become significant only when the differences between averages do not overalap with the error bars.

Results

- Significance of your data
  - Show only significant data. If you have spent 95% on your time on one experiment and 5% on the other and the latter has yielded more significant results you should focus your article on this latter set of results, not the former.
  - Do not present data in the chronological order you produced them. Present them in the most logical way. Tell a story.

Results

- Present results concisely using tables and figures as needed.
- Table and figure legends should be accompanied with sufficient information to make the main point so that minimal text is needed.
- Do not present the same information in both tables, figures, and the text.
- All tables and figures must be numbered in the order in which they are mentioned in the text.

Results

- The function of this section is to summarize general trends in the data without comment, bias, or interpretation. Statistical tests applied to your data are reported in this section although conclusions about your original hypotheses are saved for the Discussion section.
- The text should be understandable and describe the main trends of the figure even for those who have not looked at the figures or tables.

Example:
Incorrect: The results are given in Figure 1.
Correct: Temperature was directly proportional to metabolic rate (Fig. 1).

1. All results should be presented, including those that do not support the hypothesis.

2. Statements made in the text must be supported by the results contained in figures and tables.

Results

The two functions of this section are to report the results (past verb tense) of the procedures described in the methods and to present the evidence, that is the data (in the form of text, tables or figures), that supports the results.

After deciding which results to present, attention should turn to determining whether data are best presented within the text or as tables or figures. Tables and figures (photographs, drawings, graphs, flow diagrams) are often used to present details whereas the narrative section of the results tends to be used to present the general findings. Clear tables and figures provide a very powerful visual means of presenting data and should be used to complement the text, but at the same time must be able to be understood in isolation.

The text should guide the reader through the findings, stressing the major points

Discussion

- Show the relationships among observed facts.
- Point out any exceptions or lack of correlations, and define any unsettled points.
- Discuss the discrepancies between new results and previously reported results in similar studies.
- Discuss the research limitations and identify future research.
- Discuss the theoretical implications and possible practical applications of your research.

Discussion

The function of this section is to analyze the data and relate them to other studies.

1. The Discussion should contain at least:
- the relationship between the results and the original hypothesis, i.e., whether they support the hypothesis, or cause it to be rejected or modified.
- an integration of your results with those of previous studies in order to arrive at explanations for the observed phenomena.
- possible explanations for unexpected results and observations, phrased as hypotheses that can be tested be realistic experimental procedures, which you should describe.

2. Trends that are not statistically significant can still be discussed if they are suggestive or interesting, but cannot be made the basis for conclusions as if they were significant.

3. Avoid redundancy between the Results and the Discussion section. Do not repeat detailed descriptions of the data and results in the Discussion. In some journals, Results and Discussions are joined in a single section, in order to permit a single integrated treatment with minimal repetition. This is more appropriate for short, simple articles than for longer, more complicated ones.

4. End the Discussion with a summary of the principal points you want the reader to remember. This is also the appropriate place to propose specific further study if that will serve some purpose, but do not end with the cliche' that "this problem needs more study."

Discussion

- **Answers to the question(s) posed in the introduction together with any accompanying support, explanation and defence of the answers (present verb tense) with reference to published literature.**
- **Explanations of any results that do not support the answers.**
- **Indication of the originality/uniqueness of the work**
- **Explanations of:**
- **How the findings concur with those of others**
- **Any discrepancies of the results with those of others**
- **Unexpected findings**
- **The limitations of the study which may affect the study validity or generalisability of the study findings.**
- **Indication of the importance of the work e.g. clinical significance**
- **Recommendations for further research**

Conclusion

- Identify key findings and application to your field
- Conclusion should not be a summary of the work done or a virtual duplication of the abstract.
- Conclusions should be justified by the experimental design, methods, and results.

Conclusions

- Tells how your work advances the field from the present state of knowledge!
- Without clear Conclusions, reviewers and readers will find it difficult to judge the work, and whether or not it merits publication in the journal.
- Do NOT repeat the Abstract, or just list experimental results.
  - Trivial statements of your results are unacceptable in this section.
- Provide a clear scientific justification for your work, and indicate possible applications and extensions.
  - You should also suggest future experiments and/or point out those that are underway.

Acknowledgements

All important contributors should be acknowledged, for example persons who provided statistical or technical advice and assistance; personnel who helped with the preparation of the manuscript. If the research was supported by a grant, then the name of the funding body must be included.

References

References demonstrate to the reader that you have done your homework. They show that you have researched the work that has been done. They support your argument that you have found a new and significant approach to a problem. They help you make a case for the importance of your research question.

References

References demonstrate to the reader that you have done your homework. They show that you have researched the work that has been done. They support your argument that you have found a new and significant approach to a problem. They help you make a case for the importance of your research question.

IEEE author guide

- Cite current and key pertinent references.
- Consider references from the journal itself.
- Reference citations must be accurate and complete.
- The number of references should be appropriate without a complete historical bibliography

D. Lund, Editor in chief IFT Journals, D. Min, Ohio State University

References

- Follow reference style
- Order numerically as they are cited in the paper
- Ensure that all references in the list are used in the text and vice versa

References

- More mistakes are found in the references than any other part of the manuscript.
- It is one of the most annoying problems, and causes great headaches among editors...
  - Cite the main scientific publications on which your work is based
  - Do not inflate the manuscript with too many references – it doesn't make it a better manuscript!
  - Avoid excessive self-citations
  - Avoid excessive citations of publications from the same region

Traps for young players in Writing

- Describing methodology in the Results section
- The Results section is for **results**
- Making the article too long
- Introduction too long
- Trying to include too many results
- Writing style too verbose
- Not clearly defining the problem
- Not making the novel contribution(s) clear
- Conclusions too broad
- Conclusions must be supported by results
- Getting the tense wrong or mixed up

Tense for the Verbs?

- General rule of thumb:
- When describing established knowledge: use present tense
- e.g. "PET imaging of small animals enables longitudinal studies of the disease process (Phelps 2000)"
- When describing unpublished work (e.g. your methods) or previous studies: use past tense
- e.g. "The phantom was placed in the field of view",
- or "A dual-ended readout scheme for DOI estimation was reported by Yang et al [1]

Scientific Language - Tenses

- Present tense for known facts and hypotheses:
  "The average life of a honey bee is 6 weeks"
- Past tense for experiments you have conducted:
  "All the honey bees were maintained in an environment with a consistent temperature of 23 degrees centigrade..."
- Past tense when you describe the results of an experiment:
  "The average life span of bees in our contained environment was 8 weeks..."

A Word about Your Words

This is NOT creative writing class.

Journal space is precious.

Be concise.

If clarity can be achieved in *n* words, never use *n+1*.

More difficult than you imagine!

Points of Style

- Do not use nouns as adjectives:

Not:
ATP formation; reaction product
But:
formation of ATP; product of the reaction

- The word "this" must always be followed by a noun, so that its reference is explicit.

Not:
This is a fast reaction; This leads us to conclude
But:
This reaction is fast; This observation leads us to conclude

- Describe experimental results uniformly in the past tense.

Not:
Addition of water *gives* product.
But:
Addition of water *gave* product.

Points of Style

- Use the active voice whenever possible.

Not:
It was observed that the solution turned red.
But:
The solution turned red. *or*
We observed that the solution turned red.

- Complete all comparisons.

Not:
The yield was higher using bromine.
But:
The yield was higher using bromine than chlorine.

G. M Whitesides, Writing a paper, Adv. Mat. V6 (2014)

Correction of Papers

The are websites/companies who edit/correct papers for a fee.

Examples are:

http://www.sfedit.net.

http://www.papercheck.com

Cover letter – your chance to speak to the Editor directly

- View it as a job application letter; you want to "sell" your work...
- WHY did you submit the manuscript to THIS journal?
  - Do not summarize your manuscript, or repeat the abstract
  - Mention what would make your manuscript special to the journal
- Mention special requirements, e.g. if you do not wish your manuscript to be reviewed by certain reviewers, and any conflicts of interest.
- Albeit that most editors will not reject a manuscript only because the cover letter is bad, but a good cover letter may accelerate the editorial process of your paper.

A. Newman, Elsevier

How to Write a Thesis

- A PhD thesis in the science is supposed to present the candidate's original research i.e. it is a scientific paper
- Unlike the scientific paper, the thesis may describe more than one topic, and it may present more than one approach to some topics.
- The thesis may present all or most of the data obtained in the student's thesis related research.
- Thus it is more involved and longer than a scientific paper. But the concept that a thesis must be a bulky 200-page tome is wrong, dead wrong. Most 200-page theses I have seen contain maybe 50 pages of good science. The other 150 pages comprise turgid descriptions of insignificant details.
- Think of a thesis as a good thriller, and write in a logical way so that a reader will find it interesting and will not be bored.

How to Write & Publish a Scientific Paper, R. A. Day, ORYX PRESS, 5th Edition
K. Gaafar, Cairo University

PhD Thesis Writing

- The thesis has a similar structure overall compared to an article. It should have an abstract, one or more introductory chapters, a methods or experimental structures, and chapters dedicated to results.
- I recommend writing the chapters dedicated to original results like those of an article, without repeating unnecessary work already covered in the methods or experimental (e.g. explaining a technique in detail which has already been covered in the experimental or methods section). In this way you can then use the chapter for publication of an article or viceversa. You can also include additional figures and data which you have not managed to included in an article for constraints on space (do not however include insignificant or un-interesting data just because you produced it).