TECHNICAL ASPECTS OF WRITING

by

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Writing a Scientific Paper is an aspect of research activity. It fits into a sequence with other aspects such as recording of observations and data processing. When seen in this light, the technical aspects of writing naturally fall into a place along with style, graphics, and structuring.

In this presentation an attempt will be made to bring into focus the relationship between the technical aspects of writing with the other aspects of research, to draw attention to what can be spoken about it, and to indicate some ways in which your effectiveness as an author can be improved.

A scientific paper, in contrast to the actual research activity that is associated with it, is a 'polished,item. The type-setter, block-maker and printer also play roles in determining its quality. In the message it carries, as a printed item it conforms to the principle "the medium is the message".

A paper is really the "tip of an iceberg". The submerged portion of this iceberg is made up of the more meaningful part of the intellectual property of the research worker. This property includes the experience gained by him in overcoming the pitfalls encountered during the research and the know-how and skills that have been sharpened in the solution of the many technical problems

which form an integral part of the work. It also contains the 'entropy' that accumulates at every stage of the programme. These aspects cannot be expressed through the medium of the paper, but a worthwhile paper really rests on these hidden submerged details. The way in which the research worker absorbs and handles them in the key to producing a quality paper.

In narrow sense, the technical aspects of wiriting may seem to be the typing of the manuscript, the composing of the text on a word processor, the preparation of art-work and other such items connected with the act of producing the paper. On the contrary the creation of a paper is the direct consequence of many 'technical aspect' amongst others which precede it during the totality of the research programme. For instance, attention to detail in recording data will make the writing of a paper an easier task.

Leaving aside the not-so-trivial personal goal of publishing avoid perishing in the academic and institutional context, research activity is often a response to a significant problem or a deeply felt need. The goal, that is, the form of the expected results or the conclusion, is known at least in general terms at the outset. From the identification of the goal, the next step is the statement of the problem.

To make a problem statement with an acceptable degree of detail, a literature survey has to be done. In this there are technical aspects that must be given due attention. Use of cards for recording titles and other information regarding sources, extracting relevant details

from papers, and gathering information regarding experimental methods must be done with due regard to the usefulness of these details when writing a paper. Proper filing of all notes and extracts is essential. Very successful research workers use bound note-books for keeping such records.

With the ready availability of photocopying facilities, there is a tendency to collect files of copies of entire papers with the intention of extracting information later. It is a good practice to extract the necessary information and to store the papers in a systematic manner as soon as the papers are found. If this is done, the retrieval of other connected information on later occasions will be facilitated.

The recording of theory, details of mathematical models and standard practices will be easier at the time of working out the research methodology. Neatness, attention to details and making complete jobs of each item will increase the effectiveness of all subsequent activities. The actual procedures will inevitably evolve and get refined as research progresses. Therefore, the keeping of records in detail and preferably the maintenance of a diary will contribute immeasurably to the success of the project.

Writing on the backs of envelopes and scraps of paper, and relying on the memory for any length of time must be avoided. The untidy collection of paper, the material and effort that is needed to find the information later and transferring it from the makeshift jottings, all go to make up the 'entropy' of the research. The better researcher is the one who minimizes the production of this entropy.

Computers have their specific and limited uses. They cannot create knowledge. Knowledge is a creation of the human mind as it interacts with the world and with its own contents. In this regard computers have a valid but restricted use in extending the senses of man in information gathering and data processing. The mathematical modelling of natural phenomena with the aid of computers can by its very nature be a constraint to creativity and insight. Computers when used in modelling will always impose the limitations of language and mathematics, and increasing dependence on these will distract man further and further from the creative state of the free mind.

As the collection of observations and data progresses, their sifting, manipulation and processing will result in values, lists, tables and illustrations of various forms. It is worth paying as much attention to production and recording of all such items because sloppiness and vagueness at this stage will make the writing correspondingly difficult. The time spent on methodical and neat work at this stage is well spent. Any careless work simply increase the entropy of your research.

A good paper does not come to being in one piece. It is almost always assembled together from well prepared building blocks. Above all it results from a well conceived set of objectives and a sound conceptualization. Like any other human achievement, it is the result of seeking a goal. The paper will get organized and executed better if the goal is identified more clearly.

The researcher's personal aspect of the goal need not be emphasized because it is so obvious. The other aspect of meeting the needs of a specific readership can never be stressed enough. A research paper forms a part of the raw material of subsequent research projects. Hence every detail must be subject to scrutiny on the basis of clarity, meaningfulness, coherence and adequacy from the point of view of the reader who has not gone through the totality of your own experience when doing the research. Apart from the use of precise language, the use of symbols and technical terms, numbering of equations, labelling and naming of figures, listing of references, and sequencing of sections are some of the features that need much attention if the reader is considered important.

In summary, we may stress the following points regarding the technical aspects of writing a research paper:

1 Keep systematic and coherent records of all activities connected with the research.

2 Get into the habit of writing iterim reports and notes at various stages of your work.

3 Theory, mathematics, data recording forms etc. must be produced in their proper and final forms and not done in a makeshift or haphazard manner initially and later redone.

4 Graphs, tables, lists etc. must be done in their final presentable forms as they are being produced the first time.

5 Arrange the data, theory, data processing details, tables, graphs, values formulate results, conclusions etc. in their proper form and sequence before beginning to write the text of the paper.

A GUIDE TO PROOF READING

INSTRUCTION	TEXTUAL MARK	MARGINAL MARK
Reduce space between words*	| between words	less #
Equalize space between words	| between words	eq #
Add space between letters*	''''' between tops of letters requiring space	letter #
Transpose	⌊⌐ between characters or words	trs
Place in centre of line	Indicate position with ⌜ ⌝	centre
Indent one em (or two ems)	⊏ (or ⊏⊐)	□ (or □□)
Move matter to right	⊏ at left of group to be moved	⊏
Move matter to left	⊐ at right of matter to be moved	⊐
Move matter to position shown	[ ] at limits of position shown	move
Take over character(s) or line to next line or page	⊏	take over
Take over character(s) or line to previous line or page	⊐	take back
Raise lines*	⌒ over lines to be moved	raise
	⌣ under lines to be moved	

INSTRUCTION	TEXTUAL MARK	MARGINAL MARK
Lower lines*	⌒ over lines to be moved	lower
	⌣ under lines to be moved	
Correct vertical alignment	||	||
Straighten lines	= through lines	=
Push down space	Encircle space concerned	⊥
Begin new paragraph	[before words of new paragraph	n.p.
No fresh paragraph here	⁀ between paragraphs	run on
Spell out the abbreviation or figure	Encircle abbreviation or figure	spell out
Insert omitted portion of manuscript	⋏	out see copy
Substitute or insert punctuation mark	/ through character to be deleted	Encircle full stop, colon and solidus. Follow other marks by /
	or ⋏ for insertion	
Refer to appropriate authority	Encircle words and sections of doubtful accuracy	(?)

* Amount of space and/or length of re-spaced line may be specified

INSTRUCTION	TEXTUAL MARK	MARGINAL MARK
Insert matter indicated in margin	⅄	New matter followed by /
Delete	Strike through items to be deleted	ꝺ/
Leave as printed	.... under characters to remain	*stet*
Change to italics	___ under characters	*ital*
Change to small capitals	≡ under characters	*s.c.*
Change to capitals	≡ under characters	*caps*
Use capitals for initial letters, and small capitals for rest	≡ under initial letters and = under rest of words	*c. & s.c.*
Change to bold type	∿ under characters	*bold*
Change to lower case	Encircle characters	*l.c.*
Change to roman type	Encircle characters	*rom*
Wrong fount. Use letter of correct fount	Encircle character.	*w.f.*
Invert type	Encircle character	ꝺ

INSTRUCTION	TEXTUAL MARK	MARGINAL MARK
Change damaged characters	Encircle characters	X
Substitute or insert character(s) in superior position	/ through characters to be deleted or ⅄ for insertion	⅄ under character to be introduced, as in x/
Substitute or insert character(s) in inferior position	/ through characters to be deleted or ⅄ for insertion	^ over character to be introduced, as in x̂
Underline	___ under characters	*underline*
Use ligature (ﬃ etc.) or diphthong (œ etc)	⁀ enclosing letters to be altered	⁀ enclosing item required
Substitute separate letters for ligature or diphthong	/ through ligature or diphthong to be altered	Write out separate letters followed by
Close up	⁀ linking characters	⁀
Delete and close up	Strike through characters to be deleted and use close up mark above	ꝺ⁀
Insert space between lines*	> between lines to be spaced	#
Reduce space between lines*	(connecting lines to be closed up	*less* #
Insert space between letters*	⅄	#

Note: These mark[illegible] broadly confo[illegible] British practice. For de[illegible] British and Indian stand[illegible] practices refer