

Integrating and Editing Information for Science and Engineering Research Papers **Using Electronics and Classroom Techniques**

Katherine Nelson Tanizawa Center for English Language Education in Science and Engineering (CELESE) Waseda University, Japan katherine@aoni.waseda.jp



ABSTRACT

* Writing for technical purposes is a crucial skill for science and engineering students to master. Researchers' methodology and results are not only recorded as data, but are also explained and interpreted. Therefore, being able to express oneself with precision and accuracy is of utmost importance for those in such exact sciences. By learning and understanding techniques for editing, revising, and integrating information, students can confidently refine their research papers to meet the highest standards needed for publication.

* Some of the common shortcomings of editing and revising which have been encountered while instructing university students in Japan, from integration of no corrections and

An example from one final submission illustrates the failure to properly synthesize * information learned from the course, as shown in Figure 2. (The name and e-mail address have been changed to respect the student's privacy.) Surprisingly, despite explicit explanation both in class and via track changes of how to utilize capitalization in titles, and including the affiliation, this type of error appeared in several students' work.

> Taro SHIBUYA Life science and Medical bioscience WASEDA University, Japan t.shibu.tokyo@gmail.com

Figure 2. Author's affiliation shown using incorrect capitalization in three words: Science, Bioscience, Waseda.

improvements to incorrect amalgamation of suggestions, will be described. Possible reasons for these oversights will be explored and tenable solutions for implementation to assist the students will be offered, allowing immediate and direct application of what is learned when polishing technical papers for publication.

I. INTRODUCTION

- Technical reading and writing are skills that require the ability to analyze, define, explain, * and interpret data and ideas. In addition to understanding what one reads, being able to express oneself with precision in fields requiring exactness such as science and engineering is of utmost importance. In order to accomplish this, not only is a thorough understanding of vocabulary and grammar necessary and conducive to clarity, but also consistent adherence to conventional layout is required to gain acceptance for publication.
- * In this presentation, we will explore students' performance when given opportunities for assistance and three examples of editing shortcomings that were evident in research papers, which were designed and written over the course of one semester in my technical reading and writing classes at Waseda University. In particular, we will look at in-class layout instruction, students' capitalizing on the opportunity for multiple draft submissions, and comments and suggestions that were ignored or incorrectly integrated, which can be essential to producing refined research papers. By exposing and examining students' performance in terms of editorial weaknesses, I hope instructors of technical writing can address these issues, and facilitate understanding and better integration of corrections by the students, resulting in higher overall quality of submitted research papers and assignments.

* Another area rife with inconsistencies was the reference section, less commonly with respect to the order of information contained in the individual listings than with respect to the header's capitalization, the numbering of the section, or the misalignment of the text margins, where text within the citation was either unevenly aligned, as in Figure 3, or set to a distance other than the 7.5mm indented margin of the text's paragraphs. However, as shown in Figure 3, this listing itself also fails to follow IEEE citation standards for order of information [1].

5.

- [1] Researchers create short-term memories in vitroDr. Ben Stowbridge 2012/10 AvailableHTTPhttp://www.sciencedaily.com/releases/2012/09/120910143407.htm2014/05/19
- Mechanism of making long-term memory Masatoshi Yoshida 2010/09/09 [2] AvailableHTTPhttp://pooneil.sakura.ne.jp/archives/permalink/001296.php

Figure 3. References section showing multiple layout errors.

Reference

- * A closer look at term-end papers and resulting grades is presented in Figures 4-7. In general, 44.83% of the graduate students submitted 3 versions (Figure 4), of which 100% had integrated tracking change feedback into subsequent versions (Figure 5), whereas that was not the case for undergraduates. Although three papers were submitted by 30.56% of the undergraduates as seen in Figure 4, some of them were duplicates with virtually no revisions incorporated whatsoever, bringing the adjusted total of fully amalgamated papers to just 13.89% for undergraduates, as shown in Figure 5.
- The advantage of receiving and incorporating editing advice and adhering to stipulated guidelines is reflected in Figures 6 and 7, which clearly show that term paper final grades were higher for students who took full advantage of two feedback sessions leading to more polished final products.

II. METHODOLOGY

- * Students were given ample support and instruction regarding language and layout of research papers, including classroom and textbook exercises and electronic feedback, to ensure excellence and accuracy in their work. To instil proper organisation of text and data even further, a 4-page worksheet based on Appendix B: Guide to Authors of the student's text [1] was distributed and completed in pairs during class. The purpose of the supplement was to simplify the complex layout guidelines into an easily readable form which could be quickly referenced. The handouts were labeled with layout details pertinent to technical research papers, such as indentations, line spacing, and font style.
- * Furthermore, multiple electronic drafts of the research papers were allowed and encouraged to afford students sufficient feedback and opportunity to refine their work. A total of three submissions were possible: two optional drafts on which comments and advice were given, and one final paper, with submissions via Waseda University's electronic system called Course N@vi. Within each draft received, comments, corrections and suggestions were written with track changes activated. However, if a subsequent submission revealed that all or a majority of the advice had been ignored and improvements not made, the draft was returned with comments instructing the student to review and incorporate prior suggestions, and no additional errors were noted.

III. RESULTS and DISCUSSION

- * Figure 1 depicts the supplemental layout worksheets completed in class which, coupled with textbook exercises and discussion throughout the term regarding the research papers, seemed to prove inadequate to ensure conventions be incorporated correctly into students' papers.
- Several papers were submitted with varying alignments from section to section. For example,



IV. CONCLUSIONS

* In conclusion, proper research paper layout remains a challenge for technical writers. Future efforts must be made to find innovative means of reinforcing and ensuring adherence to correct protocol in order to improve researchers' opportunities for publication, not to mention increasing their course grades. This may include having instructors confirm

some contained a left-aligned abstract while the remaining sections were flush left-right. This could be the result of sections being written at different times, resulting in inconsistent type settings.

 A contract dependence on the content dependence on the contract de
 Appendix Appendix
LIF UNCLOANT NOT TO A DECOMPTING TO A DECOMPTI
 NHING UR Reserve in Science and Engineering: Guide to Atthen significant in the server in the field in figning the server in the field in the server in the server in the server in the server in th
 Writing Up Research in Science and Engineering: Guide to Authors Mriting Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors Mining Up Research in Science and Engineering: Guide to Authors<
$\int_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}}_{\operatorname{L}}_{\operatorname{L}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}_{\operatorname{L}}}}}}}}}}$
And print Yan Water (In Yang Yang) and the print of the stands of the print Hange (In Hange) (In Hange (In Hange)) (In Hange) (In Ha
A DEFINITION of the part o
All product matter for the short set is table significant set. All research tages are marked by explained for the star set. Set is a basic string for the specing are marked by a specing are mark
Mining and the part of the
 Advace—The shares is to be infly justified text, at he logs of the gags at it here, below the word 'Athenne' as the word 'Athenne' athen 'Athenne' athen' 'Athenne' athen 'Athenne' athen' 'Athenne' athen 'Athenne' athen' 'Athenne' athen' 'Athenne' athen' 'Athenne' athen' 'Athenne' athen' 'Athenne'Athen' athen' 'Athenne' athen' 'Athenne' Athenne' 'Athenne' 'A
 Internet information for the first information. Surface of the first information for the first information fo
 author information. Start the abstract with the word "Abstract" in the obstract information. built information. Start the abstract with the word "Abstract" in the obstract information. built information. <l< td=""></l<>
hiddings boldhoe type, initially equilibried, followed by a dath. The body of the ablerate thould by in figle space (by equilibried), figle space (b) (b) (b) (b) (figle space), figure space (b) (figle s
be in 10 point, Times, nos-bald, single-generating, nos-bald, single-gener
box. End the ablance with a blank line followed by three to four keywords for indexing purposes, i.e., ladex Terms—Assessment, engineering communication, portfolios. Lave two blank lines after the index terms, and then begin the main text. All research purposes, i.e., ladex Terms—Assessment, engineering communication, portfolios. Lave two blank lines after the index terms, and then begin the main text. All research purposes, index seconds of the fourt seconds of the index of the in
should be indented 7.5 mm. Be aure your text is fully justified—that is, flub left and flab in right. Please do not place any additional blank. lines between paragraphs. Index Terms—About four key words or phrases in alphabetical order, separated by commas. INTRODUCTION These guidelines include compated encomptones must to the fourts, spacing, and related information for producing flag crassch, paragraphs. In your paper. Please follow them, and if yon have any questions, direct them to the course teacher.
he index terms and then begin the main text. All research papers mut be in English. the index terms and then begin the main text. All research papers mut be in English. <i>Index Terms</i> —About four key words or plrases in alphabetotical order, separated by commas. <i>Intex Terms</i> —About four key words or plrases in alphabetotical information for producting arresearch papers mut be in English. <i>Intex Terms</i> —About four key words or plrases in alphabetotical information for producting arresearch papers mut be information for in your paper. Please follow them, and if you have any questions, direct them to the course teacher. <i>Integr Paper</i> for teachers and the paper. <i>Integr </i>
Implementation is more works, and taken segin free mining of a sentence: immediately following it. Use "(1)," or "equation (1)," except at the beginning of a sentence: Index Terms-About four key words or phrases in alphabetical order, separately to commas. Figure and table captions should be in 9-point Times, non-boldfac type. Capitalize only the first immediately following it. Use "(1)," or "equation (1)," except at the beginning of a sentence: Index Terms-About four key words or phrases in alphabetical order, separatel by commas. Figure and table captions should be in 9-point Times, non-boldfac type. Capitalize only the first Use a zero before decimal points: "0.25," not ".25." Use "end3," not "ec." Do not mix complete NTRODUCTION Doubling figures and tables are to be centered above the tables. Doubling figures and tables the tops and botoms of columns and centered. Try to svoid placing the net methor and plants: "0.25," not ".25." Use "end3," not "ec." Do not mix complete NTRODUCTION Doubling figures and tables are to be centered above the tables. Doubling figures and tables the figures. Table beaders should be in bold. The next part in text: "a few H: "Do not add any kind of pagination anywhere non not figures, figures, and equations of the tables should be in bold. not the course teacher. The next part of this template describes the different orders of beadings that can be used, and their not presserve the earter of the first work of each figures. Table headers should be in bold. not presterms-Above the tables. The n
Index Terms—About four key words or phrases in alphabetical order, separated by commas. letter of the first word of each figure caption and hole title. Figures and tables mumbered separately. "Equation (1) is" Index Terms—About four key words or phrases in alphabetical order, separated by commas. letter of the first word of each figure caption and hole title. Figures and tables mumbered separately. Use a zero before decimal points: "0.25," not ".25." Use "cm3," not "ec." Do not mix complete separated below the figures. Table if this are to be centered above the tables. Use a zero before decimal points: "0.25," not ".25." Use "cm3," not "ec." Do not mix complete separated prevente: "webers per square meter," not "webers/m2." Spell units when they apper in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few H:" Do not add any kind of pagination anywhere in text: " a few hearies," not " a few H:" Do not add any kind of pagination anywhere in the page. in your paper. Please follow them, and if you have any questions, direct them to the course teacher. 10.5-point Times. Table headers should be in bold. The next part of this template describes the different orders of headings that can be used, and their placement within the body of the paper. It is to page. It is to page. It is to page. It is to page. It is
Index Lems—About tour key weeks of puintees in injuncted to too, spanned of columns Is a zero before decimal points: "0.25," tot ".25." Use "cm3," not "ecc." Do not mix complete Intex Lems—About tour key weeks of puintees in injuncted to too, spanned of columns For example: "Figure 1. Database contexts," "Table 1. Input data." Figure captions are to be centered below Spallings and abbeviations of unix: "Wb2/m2" or "weekers per square meter," not "weekers/m2." Spall units Intex Lems—About tour key weeks of puintees For example: "Figure 1. Database contexts," "Table 1. Input data." Figure captions are to be centered below Spallings and abbeviations of unix: "Wb2/m2" or "weekers per square meter," not "weekers/m2." Spall units Intex Lems—About tour key weeks of puintees Position figures and tables to be contered above the tables. Spallings and abbeviations of unix: "Wb2/m2" or "weekers per square meter," not " a few H." Do not add any kind of pagination anywhere in the modied of columns. word lacing figures and tables to for columns. word lacing figures and tables before decimal points: "0.25," use "cm3," not " a few H." Do not add any kind of pagination anywhere in the modied of columns. word lacing figures and tables to for columns. word lacing figures and tables to for columns. Weekers the per series in the modied of columns. Weekers of beadings that can be used, and their placement within the body of the paper. In your paper, Please follow them, and if you have any questions, direct them to the course teacher. In page figures and indexes about be in bold. The next part of this template describes the different orders of headings that can be used, and their placement within the body of the paper. <t< td=""></t<>
INTRODUCTION Interm to the figures. Table tiles are to be centered above the tables. spellings and abbrevitations of units: "Wb2/m2" or "webers per square meter," not "uebersim2." Spell units Interm to the figures. Table tiles are to be centered above the tables. spellings and abbrevitations of units: "Wb2/m2" or "webers per square meter," not "uebersim2." Spell units Interm to the middle of columns. Avoid placing figures and tables at the tops and bottoms of columns. Avoid placing figures and tables before their first mention in the text. Use spellings and abbrevitations of units: "Wb2/m2" or "webers per square meter," not "uebersim2." Spell units in your paper. Please follow them, and if you bave any questions, direct them to the course teacher. Interm to the course teacher. The next part of this template describes the different orders of headings that can be used, and their placement within the body of the paper. in your paper. Please follow them, and if you bave any questions, direct them to the course teacher. Interm to thold. The next part of this template describes the different orders of headings that can be used, and their placement within the body of the paper.
I.INTRODUCTION Position figures and tables at the tops and bottoms of columns and centered. Try to avoid placing when they appear in text: "a few H:" On out add any kind of pagination anywhere Imm Position figures and tables at the tops and bottoms of columns. Avoid placing figures and tables before their first mention in the text. Use when they appear in text: "a few H:" On out add any kind of pagination anywhere Imm Imm Position figures, and related information for pt Imm Imm Position figures and tables at the tops and bottoms of columns. Avoid placing figures and tables before their first mention in the text. Use in the pager. producing a research paper. They also include information on positioning the graphs, figures, and equations
There guidelines include complete descriptions of the fonts, spacing, and related information for producing a research paper. They also include information on positioning the graphs, figures, and equations
GIF or JPEG formating for embedded figures and images. The contents of the tables should be in in your paper, Please follow them, and if you have any questions, direct them to the course teacher.
in your paper. Please follow them, and if you have any questions, direct them to the course teacher.
in your paper. Please follow them, and if you have any questions, direct them to the course teacher.
2. FORMATTING YOUR PAPER TABLE I. Type sizes for tables. >PT 7. FIRST-ORDER HEADINGS
All printed material, including text, illustrations, and charts, must be kept within a print area
surrounded by 25 mm framing on all sides, Do not write or print argins on all sides. Do not write or print argi
surrounded by <u>Column marguing our week</u> to do where there are the strength of
must be in a single-column tomat. Each must be made be printed and stored in black
and white. Do not number the pages, an papers will be integer to the purpose of example a bound of other a b
Proceedings, and page numbers will be applied at that the control of the object of the proceedings and page numbers will be applied at that the control of the object of the proceedings and page numbers will be applied at that the control of the object of the proceedings and page numbers will be applied at that the control of the object of the proceedings and page numbers will be applied at that the object of the proceedings and page numbers will be applied at that the object of the proceedings and page numbers will be applied at that the object of the proceedings and page numbers will be applied at that the object of the proceedings and page numbers will be applied at that the proceedings and page numbers will be applied at that the proceedings and page numbers will be applied at that the proceedings and page numbers will be applied at that the proceedings and page numbers will be applied at that the proceedings and page numbers will be applied at the proceedings and page numbers at the proceedings and page numbers at the proceedings at the page numbers at the proceedings at the page numbers at the page numbe
and we seek where any only with animal state of the second state of the second state of the second state of the
3. MAIN TITLE label axes with a ratio of quantities and units. For example, write "Temperature (K," the standard stand
The main title (on the first page) should begin at the top edge of the page, entered, and in Times Use SI units. Multipliers can be especially confissing. Write "Magnetization (kAM)" To post would get be used to the page of the page o
14-point, boldface type, Capitalize the first letter of nouns, pronouns, veres, agreetives, and advatus, do not
capitalize articles, coordinate conjunctions, or prepositions (unless the tille begins with such a word). Leave top axis label in Fig. 1 meant 15 000 A/m of 0.015 A/m.
a single blank line after the title.
and number all biblioremptical references in 10.5-point Times, single-spaced, at the end of your paper, with

Figure 1. Research paper layout details in worksheet style from Anthony's "Appendix B: Guide to Authors" [1].

students' knowledge of using electronic track changes and pinpoint areas of editorial weakness. Clearly, great benefits can be reaped by instructor feedback and suggestions being integrated into successive drafts, resulting in higher overall quality. Furthermore, if writing efficiency can be improved, perhaps even more valuable content can be covered in class, or more in-depth study of other areas can occur. In other words, it is likely that the course progression would become more efficient, resulting in an opportunity to more fully maximize learning.

REFERENCES

* [1] L. Anthony, "Appendix B: Guide to Authors," in Writing Up Research in Science and Engineering — Foundations. Tokyo, Japan: Waseda University, 2013, pp. 127-130.