

Common SITE Coop Report Problems

Version 0.0

1 Introduction

Good communication skills are an important need to engineers, especially in writing coherent, well-structured and well-expressed reports. Faculties of Engineering across the country have expressed concern for the lack of these skills in students. From the May 28th 2003 issue of the National Post in an article by Heather Sokoloff entitled “*Engineers Forced To Learn How To Write:*”

Undergraduate engineering faculties, home to some Canada’s cleverest technical minds, are finally forcing students to learn how to write.

Canadian engineering schools, which remain almost 70% male, are among the toughest faculties on campus to gain admission to, yet engineering graduates are notoriously poor communicators.

"We get complaints from industry all the time," said Bruce Dunwoody, associate dean of engineering at the University of British Columbia. "Engineers don't know how to write."

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Dr. Dunwoody said he tells his students that professional engineers spend more time writing compared to any other skill they learn in school. "You are always writing," he said. "An engineer has to convince people what they've done is the correct thing, or why they want to do something new."

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When Tas Venetsanopoulos became Dean of University of Toronto's Faculty of Engineering and Applied Science two years ago, he announced improving students' writing ability was his top priority, along with bolstering the faculty's research capabilities.

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Dr. Venetsanopoulos said he would eventually like prospective students to write an essay as part of their application to the faculty, something prospective medical students are required to do.

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Amit Chakma, vice-president academic at the University of Waterloo, said 10% to 20% of incoming engineering students at the elite southern Ontario school fail a basic writing exam and are forced to take a remedial English class, even though students accepted into the engineering program have high school averages of more than 90%.

"We don't expect engineering students to write novels or poems, but we do expect them to communicate," he said.

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For coop students here, work term reports provide an exercise of those writing skills. Unfortunately, on the whole, the reports indicate the same weakness and/or a lack of

seriousness in preparation by students—a large number of coop work term reports have serious problems making them unacceptable. Besides the ordinary writing problems of bad grammar, poor structure and organization of ideas, other serious problems have been noted with high frequency. This memo is intended to discuss some of these problems to guide students away from these errors.

2 **Plagiarism**

2.1 What Constitutes Plagiarism

Presenting the ideas, writings, expressions, etc. of someone else as if they were your own is plagiarism. Therefore, copying from another document word-for-word (or with some editing) without providing a reference for the material's source and without acknowledging it as a quote by using quotation marks is plagiarism—you are passing off the material as your own work when it is not. Copying from a source word-for-word without acknowledging it with quotation marks (or other device), even though a reference to the source has been made, is also plagiarism because you are passing off the work as your own expression of some ideas discussed in the source when it is not your writing.

There are several ways to indicate that material was taken from another source in the text. The Coop Work Term Guidelines specific to SITE [1, Appendix D] outline the way that coop reports in SITE should reference material taken from other sources. Section 3.2 provides further explanations.

For more information on plagiarism, we encourage you to visit the University of Ottawa website on plagiarism [2] at: www.uottawa.ca/plagiarism.pdf

2.2 Sanctions for Plagiarism

Any amount of plagiarism is totally unacceptable and represents academic fraud. This also makes a report unacceptable. Material taken from another document, whether word-for-word or paraphrased, without indicating in the text that it was taken from a source, is considered a particularly egregious form of plagiarism. It is a serious academic offence that will result in a report being failed with no chance of revision allowed and will be brought to the Faculty Committee on Academic Standing who may recommend further sanctions to the Faculty Executive Committee. (Recent cases have produced further sanctions!) Failure of a work term report has the side effect of the removal of a student from the coop program and the denial of a coop mention upon graduation. Furthermore, a failed work term report lowers your cumulative grade point average (CGPA).

It is particularly distressing to encounter students in engineering and computer science programs resorting to plagiarism. This displays a lack of the integrity that professional engineers and computer scientists are required to possess.

3 **Referencing**

3.1 When to Reference Material

In general, references are required in writing to indicate a source for ideas and material or the basis for statements you may make. In a coop work term report, then, references are typically needed for

- (i) any information taken directly from another source, whether it is from the internet, a textbook, a reference manual, a journal or conference paper, a thesis, a co-worker, your supervisor, etc.;
- (ii) any information that you had to look up or ask in order to write about it in your report; and
- (iii) any theory or information you learned during your work term which you did not have prior knowledge about before starting your work term.

Most of the information that will need to be referenced is theory and background information, new technologies used, new processes learned, etc.

3.2 Proper Referencing

In order to reference material properly, you have to provide an adequate reference for the material taken, and you have to properly indicate in the body of your report what material was taken from other sources.

According to the Coop Work Term Report Guidelines, “the references should be given as a[n]” enumerated “list at the end of the report. When you mention an idea or quotation in the body of the report, cite the number of the corresponding bibliography item like this [12]” [1, Appendix D, Section 4].

For the above paragraph material has been taken word-for-word from the Coop Work Term Report Guidelines, except one word was changed, and the article “a” changed to “an”. Note how quotation marks are used to indicate the quoted words. At the end of the statement, a reference marker was added which corresponds to the reference in the reference list at the end of this memo.

This is not the only way to quote material taken from other sources. This memo began with a large quote from a newspaper article, and the quote is indicated not with quotation marks but with indentation that should clearly indicate what was quoted. This was done because quotation marks appear in the quote and this would make further quotation marks confusing.

The guidelines also state that when referencing a website, you “should include the title of the web page, the URL, and the date you looked at the page” [1, Appendix D, Section 4]. For material that you have received from another person, such as a co-worker or a supervisor, or any other person, the guideline instructs you to include the person’s name and add that the information was taken from a personal communication [1, Appendix D, Section 4]. Note that for this second reference, although the information was paraphrased, the content is not original and a reference is needed.

When using a reference, the purpose is to credit the source of the quote or to indicate the justification for the statement. For this latter case, you must always use a source accessible to the reader. It is unacceptable to reference a source that cannot be checked, or that might be transitory (thus web sources are less desirable than references to a journal article for example).

It is suggested that you always be aware of where you have taken the material you are reporting on. Please be careful of plagiarism. It has serious ramifications on your academic standings, your involvement with the coop program, and your future careers.

4 **Report length**

The SITE guidelines for coop work term reports place limits on the length of work term reports [1, Appendix D, Section 1]. This is done to ensure reports discuss material in reasonable depth. Students are expected to delve into the subjects related to their work term, and to provide a sufficiently detailed discussion of their work term experience to meet the requirements.

The guidelines indicate that *the bodies of reports are expected to be approximately 7,500 words long*, and in all cases must be at least 5,000 words and no more than 17,000 words. These requirements correspond to report lengths to average 15 pages, and be somewhere between 10 pages and 30 pages when written using single spaced 12 point Times font text with margins of 1 inch at the top, bottom and right edge, and 1.5 inches on the left. When other fonts, line spacing, etc, are used, the numbers of pages required would correspondingly change.

In considering the report length, only the explanatory material you write is counted towards the length of the report. Front matter, such as the title page, abstract, table of content, etc., do not count, nor does non-text material such as figures, tables, software code, extensive mathematical symbolism [“displayed” mathematical equations], or similar material, or material in appendices. Some reports we have received have included copious amounts of quoted material. Such material taken from a source word-for-word (or with some editing) also does not count towards the length of the report since the material was not written by the student.

5 **The Abstract**

It is customary for formal technical and scientific reports or papers to start with an abstract. Few SITE coop students seem to be aware of the purpose and use of an abstract and thus do not know how to write a proper abstract.

An abstract is a very brief summary of the report which is supposed to convey to the reader what reading the report will convey. It is supposed to be designed so a reader can quickly know what the report is about so as to know if the report would be of interest to read. Someone who knows they want to read a report would supposedly not read the abstract. It should therefore contain nothing the report does not include, but one should not have to read any of the report to understand the abstract. It should definitely not be an introduction to the report.

For a SITE coop report, we recommend you include an abstract that contains between 75 and 175 words. Stick to brief statements of the content of the report. As an example:

For my third work term (CEG3902), completed from January to April 2003, I was employed as an Assistant Engineer in the Widget Design Group of Acme

Networking. My duties were to perform hardware testing of two new pieces of hardware. The report concentrates on the second project, the testing of a cable modem being developed. Potential problems pertaining to the cable modems, their parameters, and testing procedures are discussed. Practical lab equipment problems were encountered during testing and solutions to the problems I developed with the assistance of my manager, A. Cooper, are presented. My measurements showed the prototype modem was unacceptably susceptible to power supply noise and electromagnetic interference. This resulted in the design engineers modifying the circuit board, which I retested to show the required specifications were all met. Specific product performance results that were part of my testing are withheld from the report for proprietary reasons, and some values reported are typical rather than actual values.

6 **The Introduction**

A good introduction should provide a very brief introduction to your employer, your responsibilities during your work term, your work environment, and what you will be discussing in the rest of the report.

When providing a brief introduction to your employer, you should avoid a large amount of company background and any company history because this is usually irrelevant information to your work term.

When providing information on your work environment, you should indicate the size of the group you worked with to accomplish your tasks (in a shared cubicle with another co-worker, in a lab with a large group of co-workers, alone at a computer). You can also provide information on the computer platform you used and the equipment that was available to you. You should avoid being too informal by discussing the company's social activities or coffee breaks.

7 **The Conclusion**

A good conclusion section contains a summary of the major tasks accomplished during your work term, of the major analysis made in your report, and of what you learned during your work term. New information should never be introduced in the conclusion. For instance, if you have not discussed final results of a project that you were working on in the body of the text, this information should not be presented in the conclusion. Instead, it should be placed in a separate section before the conclusion and summarized in the conclusion afterwards.

8 **Literary Quality**

A coop work term report is a formal document that must meet university level standards for writing (in either English or French). All students must be capable of writing to this level. We do not demand exceptionally perfect use of language, but the writing must be reasonably clear, concise, grammatically correct, well-organized, and free of typographical and spelling errors. Excessive numbers of grammar, spelling or

typographical errors indicate either an unacceptable lack of care or lack of communication ability in the language of the report. We all make mistakes in writing, and that is why we have to proofread our work carefully. To help spot errors, it often helps to read your report out loud after you write it, or to put it away for a day or two and then proofread it. Furthermore, to write properly, almost everyone needs to occasionally consult style manuals (see Section 8.4).

English or French not being your first language is not an excuse for poor writing skills; if you have problems writing properly, then you should make special efforts to acquire this ability. It is a very important skill for almost all engineers and scientists as the Introduction should have indicated.

8.1 Grammar

The most common grammar problems identified in reports written recently by SITE coop students are missing articles, verb tense inconsistencies, and incomplete or poorly structured sentences.

Care must be taken to ensure that appropriate articles are used and that they are included in front of nouns. An example of a sentence with missing articles is as follows: “Database that I designed now contains name and address that department required.”

By adding the appropriate articles, the sentence should read: “The database that I designed now contains the name and address that the department required.”

Care must be taken to ensure that the appropriate verb tense is used throughout the report. ‘Flip-flopping’ from the past tense to the present tense and back to the past tense (or any combination of verb tenses) should be avoided as much as possible. As a rule of thumb, the reports should mostly be written in the past tense since the objective of the report is to tell us what you did during your work term. These are events that have already taken place; therefore, the past tense should be used. Statements of universal fact are stated in the present tense, even though you may use it with the past tense on work done. For example, we would write:

To measure the power dissipated by the resistor, the current and voltage drop of the resistor *were* measured. Power dissipated in a resistor *is* given by the product of current and potential difference drop across the resistor.

This may sound basic but all sentences should be complete with a subject, a verb, and an object or complement. Complete sentences should also be used when listing items. A good example of a complete sentence with items listed can be found in Section 3.1. Using complete sentences makes your text easier to read. Care must also be taken to ensure that sentences are properly structured. Examples of poorly structured sentences are those that are fragmented or run-on, and those where the subject and verb do not agree. Some examples, all taken from [3], are provided for you below

Here is an example of a fragmented sentence: “Mary appeared at the committee meeting last week. And made a convincing presentation of her ideas about the new product.”

Here is the same sentence written properly: “Mary appeared at the committee meeting last week and made a convincing presentation of her ideas about the new product.”

Here is an example of a run-on sentence: “Sometimes, books do not have the most complete information, it is a good idea then to look for articles in specialized periodicals.”

Here is the same sentence written properly: “Sometimes, books do not have the most complete information; it is a good idea, then, to look for articles in specialized periodicals.” Alternatively it could be written as two sentences: “Sometimes, books do not have the most complete information. It is a good idea, then, to look for articles in specialized periodicals.”

Here is an example of a subject/verb disagreement: “Skyrocketing charges for data preparation, the need to keep pace with rapidly increasing amounts of data, and requirements for fast system response has led to a search for more efficient input devices.”

Here is the same sentence written properly: “Skyrocketing charges for data preparation, the need to keep pace with rapidly increasing amounts of data, and requirements for fast system response have led to a search for more efficient input devices.”

Several books and websites are available to help you with proper technical writing. If you have a lot of grammar problems, we encourage you to read through these references to gain a better perspective on what is considered good technical writing and to improve your own writing skills. [3] – [5]

8.2 Clarity

Writing should be clear and concise. This means that sentences should be short and contain one main idea (typically one subject and one verb). Sentences must be free of technical jargon, and free of an abundance of variables or acronyms. Appropriate words and phrases must be chosen to express ideas. The report must also be written so that your classmates can understand the material. Highly technical explanations should therefore be kept simple with most of the in-depth details left out.

8.3 Use of Personal Pronouns

Because the main objective of this report is to present what you have done during your work term, the personal pronoun “I” cannot be avoided in the text. This is different from most technical writing documents which require the use of the third person. Care should be taken to avoid generalities such as using the pronouns “we,” “us,” “our,” “you,” etc. You should be specific when you are talking about groups of people and include the pronoun “I” as often as possible in order to specify your involvement with the information you are providing in your report.

8.4 Style Manuals

Even for the best of us, there are many aspects of proper writing we may need help with. For example, when we use an abbreviation at the end of a sentence, we might not know whether the abbreviation gets a period and then another period is added to end the

sentence, or whether there is just one period. Perhaps our question is about punctuating a sentence where quotations occur—does a comma we add go before or after the closing quotation mark? There are many such small details we should be aware of. They are the mechanics of writing.

Books that help with these fine points (and more general matters) are available in the form of “style manuals.” Many such books are written by publishing organizations for the use of their authors, and are available in the reference section of bookstores. A popular style manual with many university students is [6]. This style manual is available in the University bookstore. An authoritative style manual widely referred to is [7]. A Canadian style manual is [8]. The classic work on many subtleties of proper use of English (somewhat old fashioned) is [9]; and another thin, informal but highly regarded book on how to write well is [10]. Some things discussed in style manuals are matters of taste, such as the precise order of listing matter in a reference or numbering references. The reference list required, as outlined in the Coop Work Term Report Guidelines [1, Appendix D, Section 4], corresponds to the form required in publications of the Institute for Electrical and Electronic Engineers (IEEE).

In order for a report to be acceptable, it must meet a minimum literary quality. Care must be taken to ensure that the report contains the least amount of grammar mistakes, that the report is free of spelling mistakes, that the text is written in a clear and concise manner, and that it has an appropriate style for these types of reports.

9 Formatting

All reports should have a proper format. It is recommended that you use 12 point Times font text or similar with margins of 1 inch on the top, bottom and right edge, and 1.5 inches on the left edge.

The report should begin with the title page, followed by the abstract, table of contents, list of figures and tables, glossary of terms, introduction, interior sections, conclusion, recommendations, references, and finally any needed appendices. The introduction should start a new page, which should be page 1. The earlier material (called the “front matter”) other than the title page should be numbered with lower case roman numerals (i, ii, iii, iv, v, etc.). The main body should be appropriately separated into sections and sub-sections, with each section normally having no more than three or four sub-sections. All sections and sub-sections should be enumerated starting with the introduction at 1.0. Large blank spaces between sections should also be avoided.

Page division is also important:

- (i) Make sure a section or sub-section heading is not immediately followed by a page break. At least two lines of the next paragraph should be included following a heading.
- (ii) Paragraphs should not be divided between pages so that one line is left on a page. Such “club” or “widow” lines are considered bad form. It is OK to leave blank space equivalent to a single line on a page to avoid having a club line.

- (iii) Place figures on the same page or the next possible page where the figure is first referenced. Do not make anyone search for the figure.

Reports must be properly printed on good paper; with attention to properly sizing figures so they present information clearly, and locate figures appropriately in the text (normally as soon after the figure is referred to in the text as is reasonably possible)

10 Analytical Content and Relevance of Material

One common problem with a lot of the coop work term reports is that a large portion of the reports describe products, processes, and technologies, etc., without including the involvement of the student with these products, processes, and technologies. In order for your report to maintain a Type II style, it is important to include your involvement throughout your report, even when describing products, processes, and technologies. For example, this means that you should specify how you used the products you are describing, or how you followed the processes you are listing, or how you used the technologies to complete your tasks.

Another common problem when describing products, process, and technologies is that these are not presented in an analytical manner, which is a requirement outlined in the Coop Work Term Guidelines [1, Appendix D, Section 6]. This section of the guidelines outlines what is acceptable and not acceptable when presenting “user guides, configuration guides, design documents, specification or requirements documents, and research reports” [1, Appendix D, Section 6].

If product, process, or technology descriptions are not presented in an analytical manner and do not include your involvement, they should not be provided in the report except in their role of giving needed background to discuss your work. Therefore, you should provide an analysis and include your involvement with these products, processes, or technologies.

11 Symbols and Mathematical Expressions

Properly writing symbols and mathematical expressions in a modern document is an involved subject. The rules express the mathematical conventions that make reading an expression easier and clearer just as a language’s grammar and punctuation does. The rules for doing so well are involved, and we cannot expect that you will know these rules, even though you have seen mathematics written in your textbooks for years. (For those interested, perhaps the best source for these rules is [11], with a good informal discussion about typing mathematics well contained in chapters 16 through 19 of [12]; some of these rules are also covered in [7].)

One of the basic conventions is that mathematical symbols denoting simple variables, functions, etc. are written in italics. This helps to distinguish between normal English and mathematics. At the same time, certain classical functions are written with roman (non-italicized) characters. Thus, we should write “ $f(x) = x + 1 - \text{soc}(x^2)$,” but write “ $g(t) = \cos(\pi t^{2t})$.” Note that brackets, numbers and operations such as “+” are not in

italics, just variables and function names; superscripts (and subscripts) are written in a font about 70% the size of the basic font. The issue of the case, style, etc. of a character is important as changing anything normally denotes a new mathematical object: A , A , \mathbf{A} , \underline{A} , \underline{a} , a , \mathbf{a} , \underline{a} , etc. would all normally denote different entities (bold face is often used to denote a matrix or vector). It is important that the same quantity has a consistent form. For example, do not use t as the time variable in some expression and then draw a sketch of a signal over time and label the axis “ t .”

Some software packages exist for writing equations (e.g., “Microsoft Equation” in the MS Word software package). The good software packages are aware of many of the conventions for writing mathematics. If you use such a package to write some expressions, use it for all expressions to make sure your notation for quantities is consistent.

References

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