The purpose of a project report is to convey adequate information to the reader about how the tasks were implemented, the results, and what knowledge was gained by a student. It is an important aspect of the final year project since it is the only official document the student submits together with the developed device; it could even be the only document submitted to the department if the student has carried out an analysis work or study. It is imperative that students attach due importance to this aspect of the final year project, as a beautiful idea poorly packaged and presented by a student may not arouse the interest of the reader/supervisor and could lead to lower marks.

Experience has shown over the years that a sizeable number of engineering students do not know how to present their ideas when it comes to report writing. The excuse usually given is that what engineering requires from the students is beyond the art of writing, which consequently leads to less attention being given to this equally important area. This perception is an erroneous one. Perhaps this attitude is responsible for why many engineers cannot live up to expectations concerning communication skills. It is important to mention at this juncture that a site project cannot be said to be completed without a quality technical report of such project. In view of this, engineering students need to give due attention to writing superior project reports.

This article is for engineering undergraduate students and designed to ease the task of writing and preparation of their final year project reports. This will go a long way in not only enabling students to present high quality final year reports but also assisting in writing good technical reports in their places of work after graduation. Although the work is primarily targeted at undergraduate students, graduate students as well as IEEE GOLD Members will benefit immensely from it.

The preliminary pages

These pages, numbered in lower case Roman numerals, should start with the title page. For example, the numbering would be i, ii, iii, iv, etc., though the title page number is usually suppressed. A sample of the cover page and title page are shown in Fig. 1 and Fig. 2, respectively, the content of which should be arranged symmetrically to fill up the entire page.

Apart from these pages, text on all other preliminary pages and in the main body of the report should be double-line spaced and typed usually in Times New Roman 12-point font. The pages are to be arranged in the following order:

1) title page
2) declaration
3) approval
4) dedication (if any)
5) acknowledgments
6) the executive summary
7) table of contents
8) list of figures
9) list of tables
10) list of symbols and abbreviations.

Items two through ten are page titles, and each should begin on a new page, written in bold capital letters and centered on the page. The page contents should be written with left and right justification.

The declaration could be written as illustrated in Fig. 3, or as specified by the department of the student. A sample of the approval page is presented in Fig. 4. The dedication page is optional in a report.

Expression of appreciation by the author to the people who have contributed in one way or another to the success of the study/project should come on this page. A person or persons to whom the report is dedicated need not be mentioned on the acknowledgments page. Some level of flexibility in the use of language is allowed here.

An executive summary is a concise statement that is usually between 250 and 300 words in length, for undergraduate reports. It contains the problem statement, some background information on the project, the methodology to be employed in solving the problem,
the major findings, and conclusions drawn from the study/project. Its purpose is to inform the reader of points to be covered in the report without any attempt to expatiate on them. An executive summary differs from an abstract in that the latter is usually shorter and is used in research articles, academic theses, reviews, conference proceedings, and the like, while the former is used in reports, proposals, and portfolios. Both the executive summary and the abstract are independent components of the main body of the document, and they both appear at the beginning of the document. In writing the two, great emphasis should be placed on brevity, and present tense is usually employed in this section of the report.

Subsections of chapter sections should be indented from the left margin in the table of contents. While some authors still use leaders in the table of contents, many have jettisoned this style. A sample of a typical table of contents is illustrated in Fig. 5 for a better understanding.

The list of figures and list of tables should both provide captions and page numbers, while the list of symbols and abbreviations should only indicate the meaning and units of the symbols where applicable. Providing page numbers where symbols and abbreviations appear in the body of the report is not required.

The main body of the report

Pages in the main body should be numbered sequentially using Arabic numerals, starting from page 1. The main body should be broken into chapters giving appropriate titles to each chapter. Chapter one is usually the introduction chapter, while chapter two is normally dedicated to the literature review, although a more specific title may be given. For chapters three to four, or five, a title reflecting the contents of the chapter should be given. Chapter five or six concludes the report and also makes some recommendations for future work on the project.

Each chapter should be divided into titled sections numbered in accordance with the chapter number. For example, Chapter one is titled “Introduction,” and its sections will be 1.1 introduction or background information, 1.2 the significance and motivation of the study/project, 1.3 aim and objectives of the study, 1.4 methodology, 1.5 report outline, and so on. With the exception of chapter one and the concluding chapter, the other chapters should normally start with the introduction section and end with the summary/conclusion section. The introduction section tells the reader what to expect from the chapter while the summary section, usually written in the past tense, presents a brief account of the achievements of the same chapter. In
writing the summary, the author should know that many readers may not have time to go through the entire report and are therefore interested in this section. Students must endeavor to highlight the very important and revealing aspects of the study.

Subsections of a section in a chapter should bear titles and numbers in accordance with the section numbers. For example, subsections of section 2.2 in chapter two would be numbered as follows: 2.2.1, 2.2.2, 2.2.3. It should be noted that creating a single subsection out of a section of a chapter is not proper.

Illustrations

In engineering, diagrams or figures are often used in the text to complement an explanation in order to enhance understanding of the presentation. Each diagram or illustration should bear a meaningful caption that is numbered sequentially in accordance with the chapter number and not the section or subsection number in which they appear. The figure caption should be located at the bottom of the figure as close as possible to where it is cited in the text. All figures should be referenced in the text and this should be done prior to the appearance of such figures. As much as possible, students should avoid referring to a figure as “the above or below figure” without mentioning the actual figure number or name. Fig. 6 illustrates how a figure and its caption are presented in a report.

It is also important to note that free-hand drawings and manual labeling of figures should be avoided. A number of software packages have adequate tools for drawing and labeling illustrations. For example, Microsoft Word is adequate for drawing block diagrams as well as schematic diagrams. SmartDraw is very good in drawing schematic diagrams and circuit symbols. There is hardly any diagram that cannot be drawn with Microsoft Visio—circuit diagrams, flow charts, block diagrams, organization charts, and a host of others. These software packages are readily available in the market at reasonable prices.

Equations

In a similar vein, Equation Editor or MathType in Microsoft Word are very good options for the typing of equations in text. These packages will present equations as natural as possible to avoid unnecessary ambiguities in their interpretations. Equations should be numbered sequentially according to the name of the chapter in which they appear for ease of reference. Equation numbers should be enclosed in parentheses and made to align toward the right hand margin of the text. For example, chapter three would have equation numbers (3.1), (3.2), and (3.3), that are cited in the text as “Differentiating eqn (3.2) results in eqn (3.3)…”.

When equations are cited at the beginning of a sentence, “eqn” would be written in full starting with a capital letter. For example, “Equation (4.11) implies that the system being described is marginally stable and hence…” Each equation should appear on its own line and should be indented from the left margin of the text. The use of dotted lines in between the equation and its number is no longer
fashionable. The following examples illustrate how to present equations in a text:

\[ X(f) = \int_{-\infty}^{\infty} x(t) \cdot e^{-2\pi jf \cdot dt} \]  
\[ x(t) = \int_{-\infty}^{\infty} X(f) \cdot e^{2\pi jf \cdot df} \]  

Tables

Where there is a need to tabulate data or present results in a tabular form, proper tables should be drawn. Each table should have a meaningful caption and must be numbered according to the chapter number in which it appears and should appear on top of the table to which it is referring. While most journals prefer hiding the vertical border lines in tables, some choose to present tables without border lines at all, as illustrated in Table 1. This is not to say that having border lines in tables are no longer in practice. Like figures, all tables must be cited in the text prior to the appearance of such tables, except on occasions where the available space on the page is not sufficient for the illustration.

**Chapter one: Introduction**

This chapter should provide some brief background information concerning the study/project in flowing sentences and paragraphs. This can be supported by citing relevant literature on the subject. Other information expected in this chapter includes the problem statement, significance of the study, motivation, main aims and objectives, methodology intended to employ to solve the problem, and the scope of the study/project or report outline.

There is no specific universally accepted format for this chapter. All that matters is to ensure that the chapter contains the basic ingredients that clearly spell out what the student intends to do, why he wants to do it, and how he intends to carry it out. Students should avoid one sentence paragraphs. Usually, graphical illustrations or drawings rarely appear in this chapter. The central idea of the project is presented in this chapter around which all the other things in the other chapters in the report revolve. By the end of this chapter, the reader should be prepared for what to expect in the chapters ahead.

**Chapter two: The literature review**

The literature review or the review of literature has become a norm in all disciplines even though it was not the case some two decades ago. The significance of the literature review is to evaluate the current work with respect to the existing works. This chapter should be devoted to a critical review of the technical and academic literature on previous works on the project. This will provide the researcher an insight into the existing and up-to-date information on the project on which he is working. Consequently, a good literature review is the first step toward producing a high quality report and satisfying the panel of examiners of the originality of the work.

Another reason why the literature review is highly important is that it provides the author with insights to really understand the problems and limitations of the previous researchers on that study/project. The foreknowledge would enable him to know what methodology to employ to proffer solutions to these problems and limitations. The literature review must start with an introduction showing the approach adopted in the review and the need for it. This is usually followed by the body of the review. The review must use clear, simple, and courteous language, so that the import of the analysis is made clear and past contributions to knowledge are acknowledged. Quotations may be sparingly used in writing the literature review.

**Chapters three to four or five**

These chapters should concentrate mostly on the student’s own work on the project. This may involve system design and calculations, modeling and simulation of a system, data collection and analysis, software development and implementation, description of construction works, comparison of different methods of analysis, and/or discussion of results. The aforementioned are broken down and developed into relevant meaningful chapters. The problems encountered in the course of the study may also be stated here.

Under the design calculations, evidence of how all values of various components used in the study are obtained must be shown. All the assumptions made should be clearly stated and any material selected based on any standard should be referenced adequately in the text. Great emphasis is placed on correct units and consistency in the use of such units should be maintained. Students should be careful in the way they write units. For example, 2 kilo-ohms is written as 2 kΩ and not 2 KΩ; the symbol of watts is W and not W; that of volts is V and not v; m (milli) should not be written when M (mega) is intended. A space must always be maintained in between the value of the parameter and its unit. In the same vein, subscripts and superscripts must be written clearly from standard fonts.

Where a physical construction or realization of a prototype is carried out, the photograph of the contraption should be taken, using a digital camera, and the picture(s) included in the relevant chapter to complement the description of the constructional details. Where a graph is required to be plotted with the data generated from a test carried out in the course of the study, it should be produced neatly, using a relevant computer package such as Microsoft Excel or MATLAB. This is then imported to Microsoft Word where text is typed.

**The concluding chapter**

This may be chapter five or six depending on the scope of the project. In any case, the chapter should start by stating
the major aim of the project/study, summarize the highlights of the previous chapters, and mention the achievements of the project in the conclusions section. The conclusion is to be written in present perfect tense. For example, “This study has presented a method to simulate fault cases in …”

Just as conclusions are based on the findings of the study, so are recommendations based on the conclusions. The recommendations flow logically from the discussion of the findings and conclusions drawn from them. This chapter is usually concluded in the Recommendations section by stating the constraints of the study and recommendations for other possible investigations as a follow-up to eliminate those constraints or to improve on the efficiency of the developed contraption.

**Referencing**

Referencing is a standardized method of acknowledging sources of information and ideas used in the course of the study/project in a way to identify the source. Referencing is done to avoid plagiarism and to afford the reader the opportunity to read more of the cited source where a follow-up is necessary. Unfortunately, the majority of project students lack the essential ingredients for citing references appropriately in their reports. To adequately document the sources of the information used in the text, two vehicles are required. They are in-text citations at the point where the information is presented in the text and a works-cited page that provides a list of all the sources used in the report. This comes at the end of the report. Students should note that references not cited in the text should not be listed here and vice versa.

In referencing, a number of styles or formats are usually employed in reports writing. They include American Psychological Association (APA), Chicago Author-date, Harvard, Modern Languages Association (MLA), and Vancouver formats. Of these, APA and Vancouver are widely in use. APA format uses the author’s name and year of publication in parentheses in the in-text citations and at the end of the report the literature cited are listed alphabetically by author’s last name, followed by his initials, the year of publication in parentheses, the title of the material (to be in quotation marks), journal name, volume and issue number of the journal, and page numbers. For textbooks, edition, city of publication, and publisher should be stated. Under this style of citation, references should not be numbered in the text or when listing them. The other widely used style—Vancouver—uses numbers in the chronological order of citation in the text and later arranges the literature cited in the text under the references with the author’s last name, followed by his initials (or vice versa), the title of the material, journal name (to be italicized), volume number, the year of publication in parentheses, and page numbers. The numbers could either be in superscript form or standard numbers in square brackets. A publication with no clear-cut date of publication should bear n.d. (no date) in place of date of publication when referencing such a source.

It is allowed to quote statements verbatim from another text, but this will be done by citing the source and using quotation marks appropriately. Quotations of not more than 30 words could be inserted in the text of the report, using single quotation marks. A longer quotation is usually preceded by a full colon and the entire quote should be reduced in font size and indented from the left-hand side of the text.

**Appendices**

This section usually comes immediately after the references section and should contain information that is primarily not part of the main body of the report. This is information that when removed from the main body of the report would not affect the flow of material being presented. For example, the Bill of Engineering Measurements and Evaluation (BEME), as well as manufacturers’ data for components may be put in an appendix. A long computer program source code may be relegated to an appendix while retaining its flow chart and comments on its functions in the body. Tables and data generated from experimental procedures may be put under an appendix while corresponding graphs are retained and discussed in the main body of the report.

Appendices should be appropriately cited in the text with each having a title such as “Appendix A” or “Appendix B.” Where there is only one appendix, the title should just read “Appendix” and a brief statement of what it stands for should follow. Each appendix should normally start on a new page.

**Report binding**

This is the final and delicate stage of the art of report writing and preparation. As simple as it looks, it can spoil all the efforts that have been put forth on the project report, if handled carelessly. The final hardbound project report should look professional and neat, since this is the first point of contact with the reader. An aesthetically pleasing cover page of a report can surely persuade the reader to go deeper into the contents of the report. This could only be achieved if the student hands the job to a competent printer. As far as the author of this paper is concerned, spending a little bit more time and money on the report binding is worthwhile and would produce a quality and professional finish.

**Conclusions**

This article has presented the basic guidelines required for writing and preparing a high-quality project report. The simplistic approach as well as many relevant illustrations used in the article makes it an essential tool for any undergraduate student who desires to present a superior report. Although this article is targeted at the undergraduate final year students, it is strongly believed that graduate students would equally find it beneficial. It is hoped that this article will not only assist them in presenting quality final year project reports but will enable them to prepare standard technical reports of any project carried out in their place of employment after graduation.

As a whole, a high-quality project report must contain a central idea around which other ideas revolve. It must allow for a logical and orderly presentation of materials. It must be concise and precise. Above all, it must be devoid of grammatical and spelling errors. To guide against this, a draft of the report should be given to someone with a good mastery of the English language to proofread and make the necessary corrections before printing the final report. This will relieve project supervisors of the burden of having to correct grammar, which is not their primary responsibility.
Read more about it


About the author

Mudathir Funsho Akorede (makorede@ieee.org) was born in Nigeria and earned his B.Eng. and M.Eng degrees in electrical engineering in 2000 and 2006, respectively, in Nigeria. He is a lecturer at the University of Ilorin, Nigeria, and is currently pursuing his Ph.D. degree in electrical power engineering at Universiti Putra Malaysia. He is a member of the Nigerian Society of Engineers, an IEEE Graduate Student Member, and a registered professional engineer with the Council for Regulation of Engineering in Nigeria (COREN).

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