

Requirements and Guidelines
for the
MPM Capstone Communication Project

Master of Science in Project Management Program
Director: Professor Shelley C. Finnigan
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Rationale for Completing the MPM Communication Capstone Report

Written and oral communication are extremely important parts of project management. When employers are surveyed about the skills required for success, they routinely identify communication as critical. For that reason, the MPM Program includes a capstone report— a 20- to 25-page technical report and a 30-minute oral presentation, both of which spell out a problem and solution in a crisp, interesting way. This requirement is designed to help you improve your written and oral communication skills, thereby empowering you with a competitive edge in the job market. The requirement helps you grow into a project manager who truly cares about communicating with the people you will manage—with proactive messages at the core of your job.

Note: The report is not a master’s thesis, which would require considerably more original research.

To fulfill this capstone requirement, you are expected to do the following:

- Complete the fall or winter quarter, half-credit MPM communication course, which culminates in the required proposal.
- Work with an assigned writing mentor:
 - During the writing phase phase, the writing mentor will work with the student to review draft segments of the student’s document. The writing mentor will provide feedback on organization, content, style, and mechanics. It is not mandatory for the writing mentor to edit the student’s paper.
 - Schedule and workload permitting, the writing mentor can extend their work with the student into the development phase for the oral presentation. Whether or not this support occurs is at the discretion of the writing mentor (i.e., the student can request, and the mentor has the option to decline.) If the writing mentor works with the student during this phase, the type of work that the writing mentor may execute is to provide (1) feedback on the outline of the presentation and plans for the intended slides, and (2) feedback on design, grammar, and correctness of slides.
- Take advantage of free writing consultations with writing tutors at Northwestern University’s Main Library Writing Place or Graduate Writing Place (www.writing.northwestern.edu).
- Get feedback on technical content, as necessary, from other MPM faculty or colleagues.
- If necessary, hire a professional editor to help you with your final editing (correctness in grammar, style, punctuation, and documentation format).

The process of completing your capstone report will help you achieve a major goal of the MPM program: that is, to establish a personal communication standard that represents your best writing and presenting skills and also earns the approval of professionals in project management and writing. Your commitment to fulfilling the MPM capstone report will serve you well in whatever professional career you follow.

Procedure for Completing the Requirements

The following procedure and milestones have been established to help you finish your report and presentation in time to graduate in June 2023. The procedure assumes you are beginning your work in the fall of the academic year and intend to finish in the spring.

Overview: Three Stages for Submitting Your Work

The capstone process falls into three stages, described briefly in this section. Each stage requires you to produce a specific deliverable. To get advice on each deliverable, you are expected to take the fall or winter quarter MPM communication course (fall, if you are planning to graduate in spring) and to work individually with an assigned writing mentor.

- **Stage 1:** This stage is generally completed by taking the fall or winter communication course, depending on your intended graduation date. The communication course will provide general instruction in the principles to be applied in writing and/or presenting a report, and then help you apply those principles in the preparation of your capstone report, particularly in writing the proposal for the report. You will receive help in identifying a topic; finding appropriate resources; organizing your information so that your report will be coherent; writing clear, concise paragraphs and sentences; correctly citing and documenting your sources; and presenting your report with professional-looking PowerPoint slides and a good presentation style.
- **Stage 2:** This stage consists of writing a complete draft of your report while working with a writing mentor. **The typical report length is 20-25 double-spaced pages** (35-page maximum including appendices and reference list). You are expected to write and submit the draft in sections, working closely with your assigned writing mentor.
- **Stage 3:** During Stage 3, you revise and edit your completed draft report and prepare the slides for your oral presentation. If necessary, you will engage the services of a private editor, at your expense, to help you with final editing. If you need help finding a private editor, your writing mentor will be able to suggest some names.

IMPORTANT: You cannot schedule a date for your final presentation until your report has been approved.

Stage 1: Writing the Proposal

The first step in working on your proposal is to choose a topic. Potential topics are explored in the communication course, after which you will draft a proposal that must include the following:

- A proposed title for your project.
- A paragraph or two introducing the problem you are investigating or the situation you are describing. This paragraph may provide important historical or geographical information, explain a controversy, discuss cultural context, including why the topic will interest project managers and who are the intended readers. This material is likely to become part of the

preface or introduction in your report. This section must include some preliminary research and citations, in order to convince your instructors that the topic is feasible and you are sufficiently familiar with the material you will need to read for the report.

- A statement of the report's purpose or objective – what new information or analysis will you provide to your readers that they cannot get elsewhere?
- A preliminary table of contents and brief discussion of how you intend to cover your topic in sufficient depth within the page limitation of the report.
- Possible technical readers – if your topic is highly technical. As you choose a topic, you should consider not only your interest in the subject but also your technical background. The committee evaluating your capstone report and presentation will expect those deliverables to be technically accurate and to demonstrate your expertise in some aspect of project management. However, your writing mentor is not an expert in engineering or project management. Therefore, you may need to identify a faculty member or outside expert who will be willing to read a draft of your report and give you feedback.
- A proposed timeline for completing your work, including specific dates for submitting draft sections. As mentioned above, your timeline must allow time for your mentor to read your draft sections and return them with comments as well as time for you to make revisions and have your revisions reviewed.
- A reference list including all sources to which you've referred in the proposal itself (in other words, correlated with any citations you've provided in your narrative). Just like your final report, your proposal will include appropriate citations for any material that you take from other sources, and these must be formatted according to APA style (explained later in these Guidelines). Note: Proposals with incorrect formatting will not be approved.
- An additional list of potential resources for your project (books, articles, interviews, web sites, etc.) that you intend to explore but haven't cited in your proposal – also formatted according to APA style. Note: Proposals with incorrect formatting will not be approved.

This draft proposal will be completed in stages and submitted during Week 9 of the fall quarter course.

Stage 2: Drafting Your Report

The draft report should be written and submitted in stages to your writing mentor for two reasons. First, this method is efficient because your mentor can be reviewing one draft section while you are writing the next section. Second, this method allows your mentor to discover any problems early on before you have written the bulk of your report. For example, he or she will be able to tell whether your report is going to be too long, or whether your citations are incorrect, or whether you need to get additional help with grammar and style.

Documenting your sources early will help you avoid the possibility of plagiarism, which is a serious violation of academic integrity that may result in your being reported to the dean

and suspended from the university. For more advice about documentation, with examples, see Appendix A.

As you meet with your writing mentor, you will discuss how your draft matches the plan you outlined in your proposal. Any changes in the report's organization, style, or documentation will be planned during these meetings.

During the remainder of Stage 2, you will draft and revise the rest of your report, while receiving feedback on content, style, and mechanics from your mentor and peers. Remember that your writing mentor is not an engineer and is not in a position to evaluate your technical descriptions and conclusions for accuracy. Thus, you may need an engineering professor or industry advisor to review the technical content of your report.

Stage 3: Completing the Requirements

During this stage, you will need to finish editing your report and make any previously unanticipated revisions. You will also work with your mentor to outline your presentation, draft your slides (which you are welcome to give to your mentor for advice), practice your presentation, submit your report to Professor Krizek, and deliver your presentation. Remember: you cannot schedule a date for your final presentation until your writing mentor has approved your report, and your mentor cannot approve your report until the report completely meets the MPM report-writing criteria.

- *Revising and editing the report.* After Stage 2, all reports will need final revisions and final editing. Your mentor (and perhaps technical reader) will suggest content revisions and any restructuring that is needed. When the content is acceptable, you will be responsible for final editing of the work. Most students need to get additional help with this step. You should plan to work with one of the following:
 - (a) a student consultant from Northwestern's Main Library Writing Place or Graduate Writing Place. (This service is free, but you are limited to two hours of consulting per week, and the consultants will not do the editing for you). It is a good choice if you would like to work with the consultants to improve your English while you edit collaboratively and if you allow sufficient time to get help over a period of several weeks.)
 - (b) an editor recommended by the MPM program. You will need to pay for this service.
 - (c) a qualified editor of your choice.

In most cases, an editor indicates the corrections needed by writing comments on your draft report or inserting comments and corrections in your electronic file. **It is your responsibility to make sure that the editor has a copy of the MPM capstone report specifications (that is, these guidelines). In addition, you are responsible for implementing editorial corrections.** If you do not understand the editor's comments or corrections, you should meet with the editor to ask for clarification.

Note: If you work with an editor, it is important to work interactively because editorial changes to improve grammar can sometimes change the technical meaning of the message you are attempting to convey.

Preparing slides for the oral presentation. MPM presentations assume you will use PowerPoint slides to summarize your capstone report and accompany a 30-minute presentation. (Your talk should be about 20 minutes long. Then you will have five minutes for questions and discussion. Finally, your committee will want five minutes to give you their comments.) Once you have a draft report completed, you may ask your writing mentor to help you outline your presentation, plan your slides, and review your slides for slide design, grammar, and correctness.

One of the classes in the communication course will discuss best practices in PowerPoint slide design. Since slides will be based on key points and graphics from your report, you can begin to design your slides while you are still working on your report. Slides should take advantage of the visual dimension of PowerPoint; that is, you will want to minimize the amount of text on any single slide and instead use diagrams, pictures, and other visuals to communicate your ideas. Well-designed slides will help you remember key points and encourage you to look at the audience while presenting instead of reading the slides.

- *Practicing your oral presenting skills.* Since the capstone exercise is designed to help you achieve a “personal best” in written and oral communication, it places great importance on oral communication skills. You will be expected to have practiced your presentation in advance so that your presenting skills are smooth and professional. Students often work in small group meetings to help one another present effectively – with good pace, volume, eye contact, gestures, and references to slides.
- *Evaluation of your work.* At the end of your presentation (following questions and answers), you will be informed of the decisions regarding your written report and presentation:
 - If the report and presentation are acceptable, you are ready for graduation.
 - If the presentation is judged *unacceptable*, it must be repeated after at least one week has elapsed. Additional repetitions may be required until you “get it right.”
 - If the report is judged *unacceptable*, it will be returned to you with requirements for additions, modifications, and corrections. All changes requested at the final presentation must be made to the written report before it will be accepted and before you can graduate. Final reports must be completely (or almost) error-free. A report with excessive errors (grammatical, technical, stylistic) will be returned to you for further refinement.

When the report is judged acceptable, you must submit electronically an MS Word and PDF copy of the final, acceptable version. It should be submitted via email to Karen Healy Stover.

Report Specifications

As in any project, quality often comes down to the matter of details. Thus, **the MPM Program requires scrupulous attention to formatting details in the capstone reports.** If you format your draft sections according to the following specifications, you will have less final editing to complete during “crunch time” in spring quarter. But regardless of when you work on formatting, your final report must adhere to these specifications.

Length

The body of the report must be no fewer than 20 pages and no more than 25 pages, double-spaced, using 12-point Times New Roman font. The total document, including the report, appendices and bibliography must not exceed 35 double-spaced pages.

Front-End Materials

All reports must include the following front-end material (material that comes before the body of the report and before p.1); front end material has page numbers in small Roman numerals, starting *after the title page* with Roman numeral i. (The title page has no page number.)

- ***A title page:*** *Your title page should have* a concise descriptive title. Use Times New Roman font, 18-point boldface, for the title of your report. Center the title; if it is long, it is fine for it to extend to two lines. For the remaining material on the title page, use 18-point Times New Roman font, but without boldface. After a double-double space below the title, center your name. Then double-double space again and include the following information: the name of the program, department, school, university, city and state, and date. The title page has *no page number*. See **Figure 1** for the required cover page format.
- ***Abstract:*** 50 words maximum. An abstract is the kind of concise description that would appear in a conference program describing your talk. It should convey your report’s key message—without mentioning the word “report.” The abstract should be on its own page along with the keywords (*see below*). Center the heading, “Abstract,” at the top of the page in boldface and 14-point Times New Roman font. The page number, Roman numeral “i,” should be centered at the bottom of the page. **Note:** An abstract is typically written *after* you finish writing the report.
- ***List of keywords and keyword phrases:*** Keywords appear on the same page as the abstract, about one inch below your text. In a horizontal format after the word Keywords, list six to 10 keywords (or keyword phrases) that would help a researcher retrieve this report with a keyword search in a database. An extensive list of keywords in civil engineering is available at the ASCE website (<http://cedb.asce.org/subjlst.html>). Make sure that your terms are focused enough to be useful to a researcher. In other words, if you are talking about the real estate industry in Korea, do not use “Korea” as a keyword. By itself, it is too broad. You might use “Korea real estate” to get closer to a useful keyword.
- ***Executive Summary:*** The required executive summary for an MPM report is a one-page (maximum), double-spaced version of your report, written after the report is completed. The MPM executive summary must explain the purpose of the project; the issues it addresses; and

key findings, solutions, and/or recommendations. Therefore, it is often three paragraphs long. In the third paragraph, solutions or recommendations can be presented in a bullet point list.

One good approach for writing an executive summary is to write one short paragraph for each section of your report. Like the abstract, the executive summary should begin with a centered title (boldface, 14-point font). The page number is “ii.” **Note:** An executive summary is NOT an introduction; it should not say what the report will cover, and it should not even mention the word “report.” Instead, the executive summary should summarize the main ideas of the report. Because it is written after the rest of the report, an executive summary usually borrows key ideas and even phrasing from your introduction and conclusion. This is not considered plagiarism or unnecessary repetition because executive summaries often are read by people who do not intend to read the report.

To the extent possible, the abstract and executive summary should convey to the reader a) the essence of the problem addressed, b) the approach that was used, and c) the essential findings of the study -- with a strong emphasis on the findings or conclusions.

- **Table of Contents:** Center the words “Table of Contents” at the top of this section (boldface, 14-point font). List major report sections at the left margin. Indent second order and third order headings (see **Figure 2**). Note that it is not necessary to include third order headings in the table of contents. To create the dots that connect your text in the TOC to your page numbers, use the Format menu to format tabs and add “leaders.” This will allow your right-hand margin to be properly aligned. The first page of the TOC will be Roman numeral “iii.” Depending on the length of your TOC and whether it includes lists of figures, tables, etc., it may take several pages and require several page numbers.
- **Lists of figures, tables, and symbols:** (if appropriate) These are part of your TOC but begin with centered headings, such as List of Figures; see **Figures 3 and 4**. Use Roman numerals for all page numbers throughout your TOC.
- **Definitions:** (if needed).
- **List of appendices:** (if needed) An appendix, if used, should contain supporting data or information that would be bulky or cumbersome in the body of the report, but substantiates arguments and adds credibility. If you want to include different kinds of supporting data, use two or more appendices, labeling them consecutively (Appendix A, Appendix B, etc.) and giving each a distinctive title. List the titles of all appendices in your TOC. Note: In your report, you will introduce appendices where relevant (for example, “See Appendix A: Title”).
- **Preface:** A preface is optional. Use a preface if you want to explain your interest in the report topic and include anything about your experience that readers should keep in mind. In an MPM report, it is acceptable to use the pronoun “I” in the preface. Like the executive summary, *a preface does not replace your report introduction*. The preface will be the last of the “front pages” with a lower-case Roman numeral page number.

Page Design and Visual Elements for the Body of the Report

Use the following format and font sizes as soon as you begin to write—that is, for your proposal, for all of your report draft sections, and for your final report.

- **Spacing:** Double-space the body of the report. Indent the first line of each paragraph one-half inch. Do not leave an extra blank line between paragraphs (use the Format menu in Word to eliminate this line if it appears by default or if there is an extra space that is left after each line as a default).
- **Margins:** Leave a one- and one-half inch (3.8 cm) margin on the left side of the page and a one-inch (2.5 cm) margin at the top, bottom, and right of the page. Use a ragged (unjustified) right margin (not a justified margin); readers find it easier to read unjustified margins than justified right margins, which sometimes lead to awkward spaces within lines.
- **Type size:** Use regular 12-point type for body text. Use 14-point type boldface for all first-order (main) headings, 12-point type boldface for second-order headings, and 12-point type italics for third-order headings. Do not use fourth-order headings.
- **Page numbers.** Number all pages. As mentioned earlier, “lead-in” or prefatory pages (“front matter”) have lower case Roman numerals (i, ii, iii, etc.) at the bottom of the page positioned a half inch up front the bottom and four inches from the right-hand edge of the page. Do not use a number on the title page. Starting with the **Introduction**, pages should be numbered at the bottom center with Arabic numerals. You can change from Roman numerals to Arabic by inserting a “section” break and then choosing the new numbering style.

Important Requirements for the Abstract, Executive Summary, Conclusion, Figures, and Tables

The Abstract, Executive Summary, Conclusion, and all Figures and Tables should “stand alone” in the sense that a reader should be able to obtain a general understanding of the message conveyed without reading the body of the report. Therefore, acronyms and references to figures or tables in the report should not be used in these sections. In the case of figures and tables, be certain that the ordinates and abscissae used in graphs, and the column headings used in tables, clearly identify the entity, its units, and the symbol used to represent it (where appropriate). If you are using a table or graph published in a language other than English, you must translate all the terminology into English.

(From the top of the page to the bottom of the title is 7 cm.)

Legal and Regulatory Issues in Construction Site Safety

(From the top of the page to the bottom of your name is 12 cm.)

Your name

(From the top of the page to the top of Master of Project Management is 16 cm.)

Master of Project Management Program
Department of Civil and Environmental Engineering
McCormick School of Engineering and Applied Science
Northwestern University
Evanston, Illinois

(From the top of the page to the bottom of Evanston, Illinois is 21 cm.)

April 15, 2023

(From the top of the page to the bottom of the date is 26 cm.)

Figure 1: Format for MPM Report Title Page

Note: The border on this page (and the next three pages) indicates the edges of the page. Do not use a border in your report.

Table of Contents	
Abstract.....	i
Executive Summary.....	ii
Preface	vi
Introduction	1
Accident Statistics	3
National Safety Council.....	3
National Institute for Occupational Safety and Health	5
Bureau of Labor Statistics	
Costs	8
Safety Cost Formula	8
Cost v. Safety Effort	11
The Law.....	12
Ethics	12
Tort Law	13
Workers’ Compensation Laws.....	14
Administrative Law	17
OSHA	18
Responsibilities under OSHA	18
OSHA’s Duties	20
Interpretations of Responsibilities	25
Application of OSHA standards	25
The Contractor’s Responsibility	26
The Owner’s Responsibility	27
The Design Professional’s Responsibility	29
Actions.....	30
Insurance.....	30
Contracts.....	32
Safety Programs and Other Measures.....	34
Conclusion.....	35
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Figure 7. Cost v. Safety Effort	11

List of Tables

Table 1. Types of OSHA Violations	18
Table 2. Ten Most Frequently Cited OSHA Standards for Building Construction General Contractors, October 1998 through September 1999	20
Table 3. Insurance Included in a Project Cost Breakdown.....	30

Figure 3: Sample List of Figures and List of Tables

These lists are part of the TOC and follow the References.

LIST OF SYMBOLS		
		<u>Units</u>
e	Void Ratio	Dimensionless
p _a	Atmospheric Pressure	lb/in ²
v	Velocity	cm/sec
α	Coefficient	Dimensionless
σ	Normal Stress	kPa

v

Figure 4: Sample List of Symbols

Also part of the TOC.

Note: The List of Symbols should be presented alphabetically with the English letters first and the Greek letters (if any) following.

- **Headings:** Use no more than three levels of headings in the report. Use first-, second-, and third-level headings, formatted as follows, in your report draft as well as in your final report.

First-level headings (14-point type, boldface): Each of the major divisions will be developed under a first-level heading, which should be written in bold letters, centered, and identified with an Arabic numeral (see the examples below). The first letter of each major word should be capitalized and the remaining letters should be lower case.

A second-level heading (12-point type, boldface) should begin at the left margin. The first letter of each major word should be capitalized, and the remaining letters should be lower case. A second-order heading should not be used unless it is necessary to divide the material under a first-order heading into two or more sections. Second-order headings are numbered with Arabic numerals.

A third-level heading (12-point type, italics) is similar to a second-order heading except that it appears in italics and is not in boldface. A third-level heading should not be used unless it is necessary to divide the material under a second-order heading into two or more sections. If

additional subdivisions are needed, use a bullet point list or a list that uses lower-case letters (a,b,c, etc.)

Following this system, the headings should look like this:

1.0 First Level

1.1 Second Level

1.1.1 Third Level

1.1.2 Next Third Level

1.2 Next Second Level

1.2.1 Third Level

1.2.2 Next Third Level

1.2.3 Next Third Level

Note: Do not refer to report sections as “chapters.” An MPM capstone report is not long enough to have chapters; use the word “section.”

- **Equations.** Center all equations. Equations should be centered on an individual line and numbered consecutively throughout the text. All symbols (unless previously defined in the report) should be defined immediately thereafter, as follows:

$$k = k_o \exp (-E_a/RT) \quad (7)$$

where k is the coefficient of heat conductivity, and so forth. In the text, this equation would be referred to as Equation (7).

Figures and Tables

- Use figures -- graphs, charts, photos, drawings, and diagrams -- as necessary to help readers visualize what you are discussing. Introduce and discuss all figures in your body text before the figure. Be sure to state clearly the description, symbol, and units of all variables; for example, the abscissa of a rectangular Cartesian coordinate plot or the variable in a bar chart should be expressed as Length, L (meters).
- Use tables to present detailed facts in concise, readable form and to help readers find specific facts quickly. If tables are used, be sure to include a complete description of each variable, as explained above for figures. Introduce and discuss all tables in the text of the report before the table.
- Position figures and tables at the point where they are introduced, directly following the first reference to the figure or table. This method of positioning takes writers a little longer than grouping tables and figures all together at the end of the report, but a report is much easier to read when figures and tables are integrated into the text. If a figure or table will not fit on the page where it is discussed, it is fine to place it on the next page, but in the meantime, fill the page with text. That is, do not leave big, blank spaces in the middle of a

section just because the figure appears on the following page. Large blank spaces make readers think they are at the end of a section.

- Label figures and tables correctly. Each figure and each table should have a unique title in the report. The major words in each title should be capitalized, as in the examples below. Note that titles are positioned differently for figures and tables. For figures, titles should be centered at the *bottom*, but for tables, titles should be centered at the *top*. Figures and tables should be numbered in separate sequences; that is, a report may have both a Table 1 and a Figure 1. Moreover, figures and tables are labeled sequentially (1, 2, 3, etc.) throughout the report; do not begin the number for a figure or title with a section number (that is, do not label figures as 1.1 or 2.1).
- Provide citations for tables and figures if you have taken or adapted them from another source. Translate all the language into English. Doing this may require you to recreate the graph or image rather than simply copy it.

See **Figure 5** for a sample figure and **Figure 6** for a sample table.

Content and Organization

- **Introduction**

In your introduction, identify your project, explain its significance, and tell readers how your report will be organized. Will you be explaining how a complicated project has worked? Arguing in favor of a new technique? Analyzing an approach that was successful or unsuccessful where you have worked? Reviewing recent research on a topic that interests you?

Although your report will have an abstract and executive summary, they are not the introduction to the report. Instead, they are shortened versions of the report and are designed to stand alone. An introduction, which does not stand alone, is the beginning of the report. It is designed to arouse your readers' interest and help them read the report. The introduction should clearly explain the purpose of the report (and of the project, if the two are different), the issue to be addressed, why it is important, and how the report is organized to discuss it. In addition, the introduction may provide important background information that the reader will need.

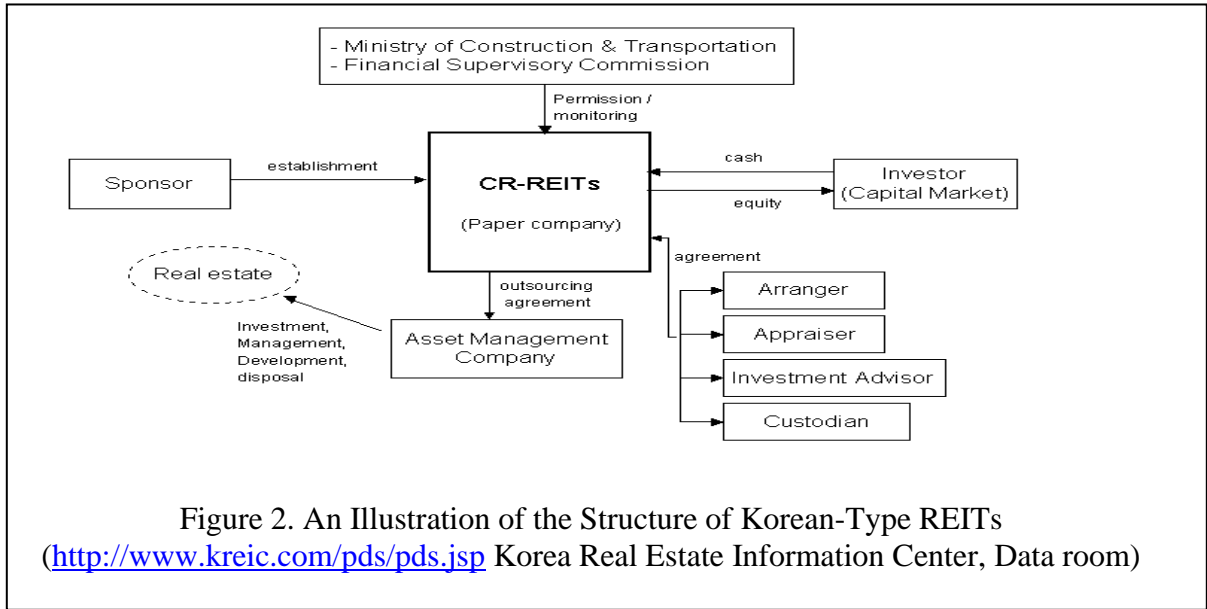


Figure 5: Sample Figure

Table 2. What will change in the REITs Act?
(adapted from <http://www.moct.go.kr> Ministry of Construction & Transportation, Contents of REITs Act)

Classification	Regulation in force	Direction for amendment	Expected effects
Minimum Capital	50 billion won	30 billion won	It will become easier to set up a REIT
Investment in kind	It is prohibited for general REITs in principle. However, it is possible after receiving permission for real estate development projects (or being listed in the stock market)	General REITs are allowed to invest in kind within the limit of 30% of capital	The burden for fund raising will decrease, while the constitution of products will become easier. In addition, development projects will be activated
Investment target	Real estate, marketable securities, rights for the use of real estate and rights for the operation of roads	Investment target will also include loans to short-term real estate development projects for less than six months	The range of asset operation will expand.

Figure 6: Sample Table

Another way of looking at the introduction is that it gives readers the “big picture” before providing the details. It is the first step in a sequence recommended for most technical writing, described colloquially in the following familiar advice:

- Tell them what you’re going to tell them (the essence of the introduction)
- Tell them (the body of the report)
- Tell them what you told them (the conclusion, although a conclusion does more than merely summarize)

- ***Body of the Report***

The body of the report should be divided into sections with headings, as explained earlier. The logic of the headings should be immediately transparent. That is, a reader should immediately be able to see why sections are in a specific order and how they relate to each other. Begin each section with a short introduction explaining what that section covers. Begin each paragraph with a topic sentence – a key point, or the paragraph’s purpose.

- ***Conclusion***

In a long report, the conclusion often includes a summary; this is the point where you “tell them what you told them.” *However, a 20- to 25-page report rarely needs a summary.* In the MPM capstone report, use your conclusion to expand on the significance or implication of your ideas. It’s the “so what” of your report. It may suggest topics for future research. It may remind readers of the limitations of your study. But it should definitely explain why your report is important and what your research shows or suggests.

Writing Style

The MPM report is a technical document, not a personal narrative. Avoid using personal pronouns (“I,” “me,” “you”) except in the rare instances when you are providing evidence based on your own experience. The focus should be not on you but instead on the topic of your report. As mentioned above, you may use personal pronouns in the preface of your report where you speak about your interest in the topic, your background with the material, and any relevant experience you have had. But a preface is not required.

Good technical writing style is clear and concise, with relatively short sentences and active-voice verbs. MPM capstone reports are expected to illustrate correct English grammar and punctuation. If you need help with your writing style – and particularly if you are not a native English speaker – you should plan to get editing help from the student consultants in Northwestern’s Writing Place or from a private editor. You can make an appointment with consultants at the Writing Place on their website (www.writing.northwestern.edu).

Documentation and Citation Requirements

Whether you write a case study, an argument, or an explanation of a cutting-edge approach to a problem, your capstone report will be based on research. You will be writing about ideas you take from academic journals, trade journals, government publications, product literature, company documents, websites, site visits, and interviews. You will be using information from

your classes, the internet, faculty, industry experts, and peers. When doing so, you must adhere to strict principles of academic integrity and avoid any possible accusation of plagiarism. This means giving credit for -- that is, *documenting* -- all of the material you take from somewhere else, whether you are quoting that material directly or paraphrasing it (restating the ideas of others in your own words). **You need to document (identify the source and give credit to) all material except your original ideas or accounts from personal experience.**

Documentation Guidelines

- **Use APA documentation for your capstone report.** APA style is widely used and is very similar to ASCE style. It is easy to find examples of correct APA documentation on the internet. If you need guidance with APA style beyond what is given in these guidelines, go to the Purdue Online Writing Lab (OWL): <http://owl.english.purdue.edu/owl/resource/560/01/>.

For internal citations, go to <http://owl.english.purdue.edu/owl/resource/560/02/>.

For advice about your reference list, go to

<http://owl.english.purdue.edu/owl/resource/560/05/> and the specific pages that give advice on the kinds of sources you used (for example, an article in a journal, book, electronic source, etc.)

- **Do NOT cut and paste from any electronic document for your content.** This will lead to plagiarism (and failure).
- **When you want to use or refer to material from your sources, summarize and paraphrase that material.** Even though your report will be based on research, it needs to reflect your voice and point of view. Your point of view and your voice should dominate the report; the research is merely your support. This means that most of your sources should be summarized or paraphrased, rather than quoted.
- **Use quotations (the author's actual words) in two instances only: (1) when you are telling readers exactly what someone said, as in an interview, and (2) when it is important to have the exact words of your source.** Introduce quotations in your own words, as in the example below:

The American Society of Civil Engineers (1998) notes, "Three of these violations occurred in . . ."

- **Include citations in all of your drafts.** Your writing mentor will read drafts ONLY if they include citations. **Do not wait until you are done writing a draft to add citations to your paper!** This is a careless writing practice that leads to extra revision at the end and can result in hours of extra work and mistakes. Moreover, if you are paraphrasing material that your writing mentor thinks is your original work, they will not be able to tell if your documentation is sufficient until you submit your final report. That is way too late: if the writing mentor discovers that your documentation is not adequate, they will not be able to

approve your report. That is a professional and legal standard central to Northwestern's standards for academic integrity and required by the Graduate School.

- ***Cite all sources in two places.*** For your paper to be properly documented, you must cite sources parenthetically within the body of the report (e.g., author and date) and fully at the end in your reference list.

Citations in the body of the report

- ***Use the correct style.*** In the text, references follow one of two styles, depending on whether you mention the author's name in the text of your report or not. You need to determine when to use each style.

Example: citing a source when you mention the author's name in your sentence
Zilch (2011) reported that . . .

Example: citing a source when you do NOT mention the author's name first
Several researchers (Zilch, 2011; Smith, 2005; Jones, 2007) have reported that . . .

- ***Add page numbers to citations if you quote from a text.*** Most citations do not include specific page references. However, if you quote from a text, include the page number for the quotation.

Example: citing a source for a quotation

The Equal Employment Opportunity Commission (EEOC) issued guidelines related to discrimination in employment. The most noted guideline was the 80% Rule of Thumb, which states, "If minority selection rate is less than 80% of the rate of the top majority then it can be considered evidence of discrimination (Doverspike, 2000, p. 8).

- ***Cite tables and figures accurately.***
 - If a figure or table is taken from a book or article and included in the report, the reference must be included in the title:

Figure 2. Gross National Product of Norway (Zilch, 2011).

- If a figure or table is modified or supplemented with new data, the original figure or table must be referenced with a clear indication of the change that was made.

Figure 2. Gross National Product of Norway (adapted from Zilch, 2011).

- ***In the body of the report, cite information gained from personal discussions or the internet just as you cite print sources.*** Put the author and the date the information was received in

parentheses after the reference. In addition, for personal communications, identify the form of personal communication in the parenthesis, since personal communications are the one type of source that does not appear in the reference list.

Example: personal communication

None of the existing regulations addresses the system as a whole (Mastaglio, telephone interview, 2012).

Example: personal communication

Mastaglio (2012, telephone interview) claims that none of the existing regulations addresses the system as a whole.

Example: reference to the internet

“To avoid costly changes on page proofs, authors are asked to very carefully review the final manuscript they send to ASCE for publication . . . “ (ASCE, 2000).

Reference List

- **Organize the reference list alphabetically**, by the author’s last name if possible (see **Figure 7**). For first and middle names, just use initials. Remember that sometimes the “author” is a department or organization. If there is no author, use the title of the book or article. When you alphabetize, ignore “A” and “The” if they start a title; alphabetize according to the first major word. Do not number the entries in your reference list.
- **Put titles of books and journals in italics**. Also italicize names of websites and reports.
- **Do not put the titles of shorter works, such as articles or chapter titles, in quotation marks**, even though you used quotation marks to identify articles in the body of your report and your internal citations.
- **Do not use abbreviations. Spell out the names of all organizations, publishers, proceedings, journals, and so forth in full**. Doing this in your reference list allows readers to identify your sources readily and retrieve the information you used, if they desire. Using abbreviations can lead to confusion. As one example, most civil engineers know that ASCE is the American Society of Civil Engineers, but how many know that ASPT is the American Society for Paving Technologists? As another example, does J. Math. Phys. refer to the *Journal of Mathematics and Physics* or the *Journal of Mathematical Physics*?
- **Use single-spacing** for the text of an individual reference, but double-space in between references. **Note:** This direction is an *exception* to APA style exclusive to the MPM capstone process.

References

- American Society of Civil Engineers. (2000). *ASCE keyword list to the Civil Engineering Database* Retrieved from <http://cedb.asce.org/subjlst.html>.
- ASTM. (1991). Standard practice for the use of the International System of Units (SI) (the modernized metric system), E 380-91a, Philadelphia, PA.
- Educators, practitioners to provide focus for 1995 ASCE education conference. (1993), *ASCE News*, 18 (1), p. 1.
- Fairweather, V. (1993), Infrastructure opportunity in Chile, *Civil Engineering*, 67 (4), 46-52.
- International Conference of Building Officials. (1988). *Uniform building code*. Whittier, CA: International Conference of Building Officials.
- Parker, D.E. (1991). *Project budgeting for buildings*, (2nd ed.), Columbus, OH: Prentice Hall.
- Phair, M., & Jaselskis, E.J. (1994). Automated timekeeping using bar code techniques. *Journal of Project Management*, American Society of Civil Engineers, 82 (3), 17-25.
- U.S. Army Corps of Engineers (1995). Water resources development. *Technical Report REMR-EI-5*, Waterways Experiment Station, Vicksburg, MI: Author.
- Yamamoto, K., Kobayashi, Y. & Suzuki, A. (1995). Developments in Japanese construction automation and information systems. *Proceedings of the Third Construction Congress*. (Vol. 2), 209-2. Osaka, Japan.

Figure 7: Sample Reference List

For more examples, refer to the Purdue Online Writing Lab (OWL):
<http://owl.english.purdue.edu/owl/section/2/10/>

- **Use the formats indicated below for various types of sources.** However, do not include the type of genre—for example, the label “book” or “journal paper”—in your list. These labels are included below just to help you find the correct form of citation.

Book

Parker, D.E. (1991), *Project budgeting for buildings* (2nd.ed.). Columbus, OH: Prentice Hall.

Journal Paper

Phair, M., & Jaselskis, E.J. (1994). Automated timekeeping using bar code techniques. *Journal of Project Management*, American Society of Civil Engineers, 82 (3), 17-25.

Magazine Article

Fairweather, V. (1993). Infrastructure opportunity in Chile, *Civil Engineering*, 67 (4), 46-52.

Newspaper or Bulletin Article (with no author)

Educators, practitioners to provide focus for 1995 ASCE education conference. (1993), *ASCE News*, 18 (1), p.1.

Paper in a Conference Proceedings

Yamamoto, K., Kobayashi, Y. & Suzuki, A. (1995) Developments in Japanese construction automation and information systems. *Proceedings of the Third Construction Congress* (Vol. 2), 209-2. Osaka, Japan.

Personal Interview

(Note: in APA style, reference lists do not include personal interviews. However, interviews are indicated in the parenthetical references.)

Report

U.S. Army Corps of Engineers. (1995). *Water resources development*, (Technical Report REMR-EI-5). Waterways Experiment Station, Vicksburg, MS: Author.

Technical Standard or Code

ASTM. (1991). Standard practice for the use of the International System of Units (SI) (the modernized metric system). (E 380-91a). Philadelphia, PA: Author

International Conference of Building Officials. (1988). *Uniform building code*. Whittier, CA: International Conference of Building Officials.

Website or article published on a website

American Society of Civil Engineers. (2000). *ASCE Keyword List to the Civil Engineering Database*. Retrieved from <http://cedb.asce.org/subjlst.html>

For more examples of documentation covering specific situations, see the OWL website on APA style: <http://owl.english.purdue.edu/owl/resource/560/01/>. For examples of correct documentation based on excerpts from MPM capstone reports, along with some discussion, see Appendix A: Western Documentation Conventions for Technical Reports.

For examples of how to document Chinese, Japanese, and Korean sources correctly, see <http://guides.library.yale.edu/c.php?g=296262&p=1974231> Follow similar guidelines for sources in Hebrew, Arabic, or any other language that does not use the English alphabet.

Note: You may use Zotero or Word citation tools to organize references and to generate your reference list and citations, but be sure to input the correct information in the correct fields -- and make sure everything is spelled correctly. To ensure that your reference list and citations are correct, check them manually after Zotero or Word generates the list. Do not assume they will be correct because you used Zotero.

Appendix A: Western Documentation Conventions for Technical Reports

Technical reports in professional and academic communities in the West take the documentation of information seriously. While there is no single documentation style that applies to every field, there is much agreement about what needs to be cited and where that information should appear. The MPM Program expects students to follow the documentation practices prescribed by the American Psychological Association, commonly referred to as the APA. APA style is widely used and is similar to the style used by the American Society of Civil Engineers (ASCE). You can easily find examples of correct APA documentation on the internet. As explained earlier in these guidelines, you can find many useful examples by going to the Purdue Online Writing Lab (OWL): <http://owl.english.purdue.edu/owl/resource/560/01/>.

Failure to document sources correctly and completely constitutes a serious breach of academic integrity and is taken seriously by the Graduate School at Northwestern. Graduate students have to take particular care to document **all** of their sources, including information they take from the internet, other classes, people they interview (including professors and fellow students), and even their own papers from previous classes. It is not acceptable to paste chunks of material from another source in your papers or reports. If you use information without changing it, even if you're using just a few specific words or phrases, you must put that information in quotation marks. In fact, even if you paraphrase the information (meaning that you've restated it in your own words), you still need to give credit to the person or people who came up with the idea. This strict method of documentation may be different from the way that documentation is handled in other countries, but it is common in the United States, Canada, Europe, and many other places.

This appendix illustrates a variety of ways in which MPM students have used APA documentation in their reports, along with short explanations. If you would like help understanding these examples or documenting your own material, contact the Graduate Writing Place on Northwestern University's Evanston campus. It's a free peer-tutoring program available to all Northwestern students and faculty.

APA Documentation: A Two-Part System

In any long report, documentation appears in two places: first, in abbreviated form in the body of the report, and second, as a complete citation in a reference list at the end of the document. The abbreviated form, a parenthetical citation, briefly identifies the material as cited and then gives the most important information about it -- author(s) and year of publication -- so that readers can easily find the complete citation in the References, which lists all of the sources alphabetically by the first word in the entry, which is usually the author's last name.

Examples of Parenthetical Citations Used for Different Purposes

The following examples focus on parenthetical citations and illustrate different kinds of content that need to be cited. For each parenthetical citation, there would be a complete citation in the reference list. Some of the examples show how the complete citation would look.

1. *Explains the source of facts* used in an introductory paragraph. Every time you use facts in an MPM report, your readers will want to know where your facts come from. Citing your sources accurately establishes your credibility and illustrates your expertise.

In most metropolitan cities in the world, heavy traffic flows terrify people, especially during the rush hours, Beijing, the second biggest city in China, which has approximately 30 million people, suffers from huge traffic jams every single day. Nowadays, people not only have to face an endless traffic jam going to work during weekdays, but also are tortured by the congestion during the weekends. According to a report released by the Chinese Academy of Sciences (China.org.cn, 2011), people in Beijing spend 38 minutes on average to get to work under normal traffic conditions. The commuting time extends to 52 minutes when taking the congestion into consideration. Both situations are ranked to be the worst among 50 cities in China's mainland.

The parenthetical citation -- China.org.cn, 2011 -- gives readers enough information to find the complete citation in the References list, which starts with the author's last name or the organization that functions as the author, and is immediately followed by the date of publication.

China.org.cn, (June 28, 2011). Beijingers' commuting time longest in China. Retrieved from http://www.china.org.cn/learning_chinese/extensive_reading/2011-06/28/content_22874976.htm

Notice that there is no period at the end of the URL. That is because readers wouldn't know whether the period is actually part of the URL and thus might have trouble accessing the source.

2. *Gives the authors and publication date of the book the author has introduced* as an "excellent example" of the point he has just made:

There have been many comprehensive studies done in the past few decades on the vernacular architecture throughout the world. In order to analyze the enormous amount of data, most studies of this kind have divided the world into regions by culture, weather, and geographic location. An excellent example of this are the maps included in the *Atlas of Vernacular Architecture of the World* (Bridge, Oliver, & Vellinga, 2007), a research initiative conceived as part of the United Nations International Year of Housing the Poor and supported by Oxford University.

The complete citation would be listed in the alphabetized reference list under the last name of the first author:

Bridge, A., Oliver, P., & Vellinga, M. (2007). *Atlas of vernacular architecture of the world*. NY: Routledge.

Notice that the authors' first names are not used. APA style cites authors by their full last name, followed by a comma, and then their first initial, followed by a period and then by a comma, since the name appears in a list. Also, APA style uses the ampersand (&) instead

of spelling out the word “and.” The ampersand is used in the citation even if the authors use “and” somewhere else, such as on their title page.

3. *Synthesizes information from several sources in an introductory paragraph, with each source indicated with a parenthetical citation:*

In response to the Great Mississippi Flood of 1927, which resulted in millions of dollars in damage and the death of over 200 people in the Mississippi River Delta, the United States government enacted the Flood Control Act of 1928. The Act placed the United States Army Corps of Engineers in charge of improving the levee systems along the Mississippi River, including New Orleans, while leaving the responsibility of maintenance to the New Orleans Levee Boards (Seventieth Congress Session 1, 1928). The New Orleans levee system at this time was constructed of earthen material including clay, peat, and silts on top of natural levees (Rogers, 2008) and was to be built higher and thicker than existing levees along the river (Ambrose, 2001).

Each parenthetical citation refers to a different source, listed in alphabetical order, in the reference list:

Ambrose, S. (2001, May 01). Great flood. *National Geographic*. Retrieved from news.nationalgeographic.com/news/2001/05/0501_river4.html/

Rogers, J. D. (2008). Historical background of the New Orleans levee system. Retrieved from University of Missouri-Rolla: web.mst.edu/rogersda/levees.

Seventieth Congress Session 1. (1928, May 15). Appendix E 1928 Flood Control Act . Retrieved from <http://www.mvd.usace.army/mrc/history/AppendixE.htm>

Notice that in some cases an organization or a meeting can be the “author” of a document.

4. *Gives credit for someone else’s definition:*

REITs, known as FIBRAs in Mexico, were implemented in 2004 and have experienced great success. According to the article “FIBRAs Insight: Toward a Decade of Mexican REITs,” FIBRAs are defined as “fiscally transparent trusts incorporated under Mexican legislation that must acquire or construct real estate destined to be leased” (Sanchez & Padilla Ordaz, 2013).

The citation would look this way in the reference list.

Sanchez, A. & Padilla Ordaz, R. (2013, May). FIBRAs insight: Toward a decade of Mexican REITs. *International Tax Review*. Retrieved from [http://www.chevez.com/ingles/upload/files/PerspIng2013-07\(2\).pdf](http://www.chevez.com/ingles/upload/files/PerspIng2013-07(2).pdf)

Notice that in the text, the name of the article is put in quotation marks, and each word in the title is capitalized. In the reference list, the article is not in quotation marks and only the first word of the title -- and the first word after the colon -- are capitalized.

5. *Puts just the year in parentheses* because the sentence includes the “author,” which in this case is an organization:

Because of the unstable economic environment suffered during 2007–2009, the number of visitors the country received during these years varies. Nevertheless, from 2007 to 2012, the number of tourists has increased at an average rate of 4% each year according to figures provided by the Ministry of Tourism (2013).

6. *Includes a parenthetical citation that points to the source used for this figure.* All figures and tables must be cited as well. If you have modified a figure or table, you can indicate that in your citation. If the figure or table is entirely your own work, and you have not used it in a previous paper, then you do not need to cite it.

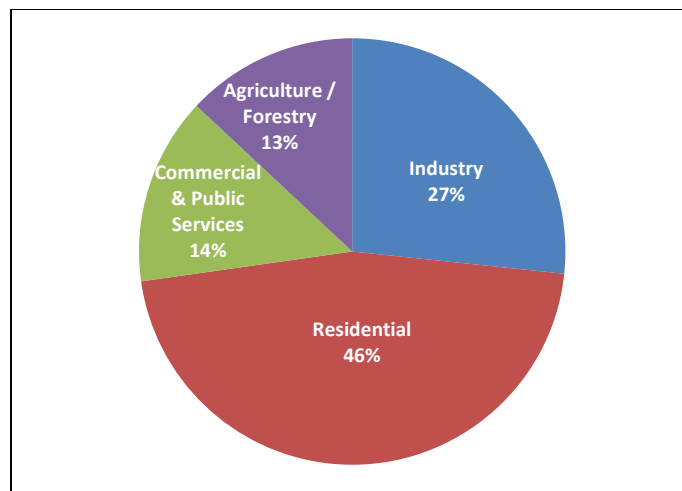


Figure 1: Pakistan’s Electrical Consumption by Sector
Adapted from International Energy Agency (n.d.)

In the reference list, the complete citation would appear as follows:

International Energy Agency. (n.d.). Retrieved from
http://www.iea.org/stats/electricitydata.asp?COUNTRY_CODE=PK

7. *Is used after several sentences that come from the same source.* This can be done because no material from another source has intervened.

The shortage of housing units in Iraq has been one of the major issues for the last three decades, where the population growth has increased significantly without major projects or solutions from the governments to solve this ever-growing problem. In urban Iraq 13% of houses have more than ten occupants, and 37% have three or more people per room. Fifty-seven per cent of the urban population currently lives in slum-like conditions. By 2030, the population will grow to almost 50 million, which will put further strains on access to adequate housing (“UNCT Iraq,” 2010).

8. *Gives credit for information that came from a telephone interview:*

The Zion Nuclear Plant was in operation at the time of the TMI meltdown in 1979 whereas the Byron and Braidwood stations were in the construction phase. After the regulations from the NRC were issued, the industry was slow to respond to the level of detail required to meet the new expectations. This was most apparent with those plants at mid-construction because contracts were in effect. The result of not being able to respond to the new NRC regulations contributed to both Byron and Braidwood being completed at dramatically higher overruns: original estimate after receipt of the construction permits was \$750M for Byron with actual construction and startup costs totaling \$3.80B (cost overrun of 400 percent) and \$1.10M for Braidwood with actual construction and start-up costs of \$5.05B (cost overrun of 360 percent) (Donavin, R., telephone interview, 2013).

When you use APA documentation, you do not list interviews in your reference list at the end of the report. That is because your readers would not easily be able to access that information. However, citing the source in a parenthetical citation shows where you got your information, which could, in theory, be verified.

9. *Illustrates how the writer gives credit for ideas he is primarily summarizing but also uses quotation marks around a phrase that he found worth quoting:*

The first [project that gave rise to 3D printing] was initiated by a Dutch architect, Janjaap Ruijsenaars, who designed a house “with no beginning or end,” shaped like a Mobius strip of 1,100 square meters of floor space and that would take 18 months to come out of the ground (Architects 2013). The production of the building will be done on a 3D printer called D-Shape, a technology that uses a stereolithography printing process with sand and a binding agent that enables builders to create structures that are supposedly as strong as concrete. In a *BBC* article (“Architect,” 2013), Ruijsenaars explains that his building could be used as either a home or a museum, and would feature parts usually made from concrete but printed using broken up rocks and an emulsion binding, while the façade would use glass and steel for an overall cost of 4 to 5 million dollars.

Notice that parenthetical citations of a work without an author include only the first word of the title -- or enough of the title to distinguish the work from all other entries in the reference list. Do not include the entire article name in parentheses. Notice, too, that in parenthetical citations the title is put in quotation marks and, if you include multiple words, all words four or more letters long are capitalized. By contrast, in the reference list, the title is not put in quotation marks, and only the first word of the title is capitalized, as in the following:

Architect plans 3D-printed buildings. (2013, January 21). Retrieved from
<http://www.bbc.co.uk/news/technology-2112106>

Concluding Remarks: Ask for Help!

Documenting a report completely and correctly is a complex and time-consuming task. The examples above are not meant to be an exhaustive or complete discussion of how to use APA documentation in your MPM capstone report or in other technical reports. Instead, they illustrate the most common aspects of APA style while also showing that documentation requires decision-making and precision.

The earlier you begin to use APA style in your MPM capstone report, the easier it will be and the more quickly you will be able to proceed. If you find that you are at all confused after reading these examples and the online information, contact the Main Library Writing Place or the Graduate Writing Place at Northwestern for help.