Writing a Synthesis Essay

A synthesis is a written discussion incorporating support from several sources of differing views. This type of writing requires that you examine a variety of sources and identify their relationship to your thesis.
It is a meaningful and insightful connection between different materials by the identification of common themes or traits.
A synthesis essay is to create new knowledge out of existing knowledge and sources.
To combine sources and the writer's position to form a cohesive supported argument, accurately citing the sources.
Synthesis essay format is not that different from an argumentative paper as both use multiple sources to support one position. However, synthetic writing focuses more on the relationships between the references than on making a point. In this aspect, it is closer to a compare and contrast paper.
It is nothing like a reflective or narrative paper, so first-person writing and subjective opinion are not acceptable.

Types of Synthesis Essay

Explanatory synthesis helps readers make sense of a complicated topic. You don't have to argue a point, just present facts, data, and different perspectives. This type of synthetic writing is common for research papers and scientific articles. Literature review or background sections use explanatory synthesis.
Argumentative synthesis supports a controversial position based on the data presented across a variety of sources. It's an argumentative paper with a twist. Aside from listing critical points, you need to consider the relationship between references, especially if the authors support opposing views.
A **review synthesis** paper is a summary of research whose goal is to discover previous findings on the topic. Instead of proving your point based on the sources, you simply examine the ideas presented in those topics. As a rule, a synthesis essay thesis in such a case may simply state that the issue has not been properly discussed yet and requires more research.

Integrating Source Evidence into Your Writing

Writing in an academic context often entails engaging with the words and ideas of other authors. Therefore, being able to correctly and fluently incorporate and engage with other writers' words and ideas in your own writing is a critical academic skill. There are three main ways to integrate evidence from sources into your writing: quoting, paraphrasing, and summarizing. Each form requires a citation because you are using another person's words and/or ideas. Even if you do not quote directly, but paraphrase source content and express it in your own words, you still must give credit to the original authors for their ideas. Similarly, if you quote someone who says something that is "common knowledge," you still must cite this quotation, as you are using their sentences structure, organizational logic, and/or syntax.

Integrating Quotations

WHY: Using direct quotations in your argument has several benefits:

- Integrating quotations provides direct evidence from reliable sources to support your argument.
- Using the words of credible sources conveys your credibility by showing you have done research into the area you are writing about and consulted relevant and authoritative sources.
- Selecting effective quotations illustrates that you can extract the important aspects of the information and use them effectively in your own argument.

WHEN: Be careful not to over-quote. Quotations should be used sparingly because too many quotations can interfere with the flow of ideas and make it seem like you don't have ideas of your own. Paraphrasing can be more effective in some cases.

So when should you use quotations?

- If the language of the original source uses the best possible phrasing or imagery, and no paraphrase or summary could be as effective; or
- If the use of language in the quotation is itself the focus of your analysis (*e.g.,* if you are analyzing the author's use of a particular phrasing, imagery, metaphor, or rhetorical strategy).

How to Integrate Quotations Correctly

Integrating quotations into your writing happens on two levels: argumentative and grammatical. At the argument level, the quotation is being used to illustrate or support a point that you have made, and you will follow it with some analysis, explanation, comment, or interpretation that ties that quote to your argument. ***Never quote and run***: don't leave your reader to determine the relevance of the quotation. A quotation, statistic or bit of data generally does not speak for itself; you must provide context and an explanation for quotations you use. Essentially, you should create a "quotation sandwich" (see **Figure C-1**). Remember the acronym I.C.E. → Introduce – Cite – Explain.

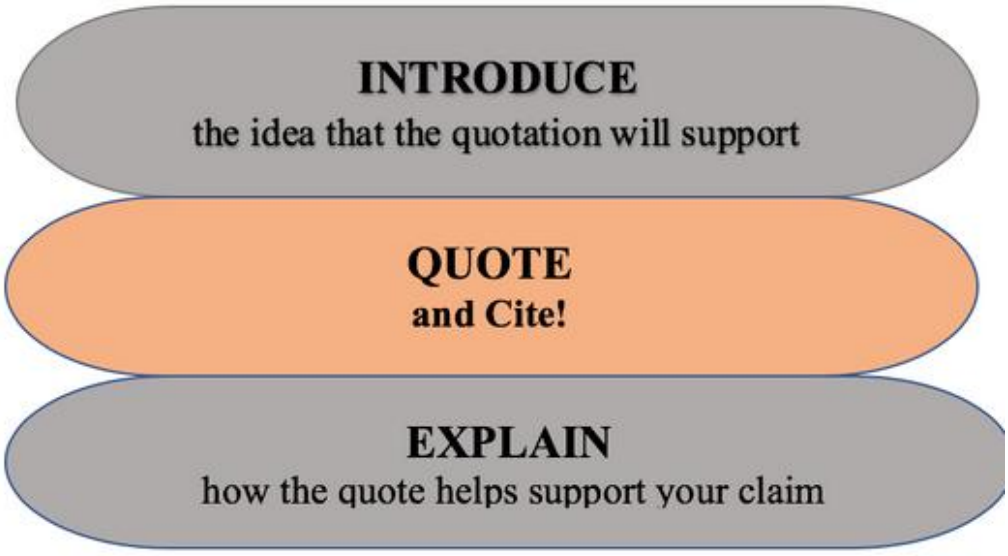

Figure C-1 *Quotation sandwich.*

The second level of integration is grammatical. This involves integrating the quotation into your own sentences so that it flows smoothly and fits logically and syntactically. There are three main methods to integrate quotations grammatically:

1. **Seamless Integration Method:** embed the quoted words as if they were an organic part of your sentence (if you read the sentence aloud, your listeners would not know there was a quotation).

2. **Signal Phrase Method:** use a signal phrase (Author + Verb) to introduce the quotation, clearly indicating that the quotation comes from a specific source
3. **Colon Method:** introduce the quotation with a complete sentence ending in a colon.

Consider the following opening sentence (and famous comma splice) from *A Tale of Two Cities* by Charles Dickens, as an example:

"It was the best of times, it was the worst of times."

1. Seamless Integration: embed the quotation, or excerpts from the quotation, as a seamless part of your sentence

Charles Dickens begins his novel with the paradoxical observation that the eighteenth century was both "the best of times" and "the worst of times" [1].

2. Signal Phrase: introduce the author and then the quote using a signal verb (scroll down to see a list of common verbs that signal you are about to quote someone)

Describing the eighteenth century, Charles Dickens observes, "It was the best of times, it was the worst of times" [1].

3. Colon: if your own introductory words form a complete sentence, you can use a colon to introduce and set off the quotation. This can give the quotation added emphasis.

Dickens defines the eighteenth century as a time of paradox: "It was the best of times, it was the worst of times" [1].

The eighteenth century was a time of paradox: "It was the best of times, it was the worst of times" [1].

Editing Quotations

When you use quotation marks around material, this indicates that you have used the ***exact*** words of the original author. However, sometimes the text you want to quote will not fit grammatically or clearly into your sentence without making some changes. Perhaps you need to replace a pronoun in the quote with the actual noun to make the context clear, or perhaps the verb tense does not fit. There are two key ways to edit a quotation to make it fit grammatically with your own sentence:

- **Use square brackets**: to reflect changes or additions to a quote, place square brackets around any words that you have changed or added.
- **Use ellipses** (3 dots): to show that some text has been removed, use the ellipses. Three dots indicate that some words have been removed from the sentence; 4 dots indicate that a substantial amount of text has been deleted, including the period at the end of a sentence.

Sample Quotation, Citation, and Reference

"Engineers are always striving for success, but failure is seldom far from their minds. In the case of Canadian engineers, this focus on potentially catastrophic flaws in a design is rooted in a failure that occurred over a century ago. In 1907 a bridge of enormous proportions collapsed while still under

construction in Quebec. Planners expected that when completed, the 1,800-foot main span of the cantilever bridge would set a world record for long-span bridges of all types, many of which had come to be realized at a great price. According to one superstition, a bridge would claim one life for every million dollars spent on it. In fact, by the time the Quebec Bridge would finally be completed, in 1917, almost ninety construction workers would have been killed in the course of building the $25 million structure" [3].

[3] H. Petroski, "The Obligation of an Engineer," in *To Forgive Design*, Boston: Belknap Press, 2014, p. 175.

You are allowed to change the original words, to shorten the quoted material or integrate material grammatically, but only if you signal those changes appropriately with square brackets or ellipses:

Example 1: Petroski observed that "[e]ngineers are always striving for success, but failure is seldom far from their minds" [3; p. 175].

Example 2: Petroski recounts the story of a large bridge that was constructed at the beginning of the twentieth century in Quebec, saying that "by the time [it was done], in 1917, almost ninety construction workers [were] killed in the course of building the $25 million structure" [3; p. 175].

Example 3: "Planners expected that when completed the … bridge would set a world record for long-span bridges of all types" [3; p. 175].

Integrating Paraphrases and Summaries

Instead of using direct quotations, you can paraphrase and summarize evidence to integrate it into your argument more succinctly. Both paraphrase and summary requires you to read the source carefully, understand it, and then rewrite the idea in your own words. Using these forms of integration demonstrates your understanding of the source, because rephrasing requires a good grasp of the core ideas. Paraphrasing and summarizing also makes integrating someone else's ideas into your own sentences and paragraphs a little easier, as you do not have to merge grammar and writing style—you don't need to worry about grammatical integration of someone else's language.

Paraphrase and summary differ in that paraphrases focuses on a smaller, specific section of text that when paraphrased may be close to the length of the original. Summaries, on the other hand, are condensations of large chunks of text, so they are much shorter than the original and capture only the main ideas.

Sample Paraphrase

At the end of its construction, the large cantilever bridge cost $25 million dollars, but the cost in lives lost far exceeded the prediction of one death for each million spent. While the planners hoped that the bridge would set a global record, in fact its claim to fame was much more grim [3].

Sample Summary

According to Petroski, a large bridge built in Quebec during the early part of the twentieth century claimed the lives of dozens of workers during its construction. The collapse of the bridge early in its construction represented a pivotal design failure for Canadian engineers that shaped the profession [3].

Regardless of whether you are quoting, paraphrasing or summarizing, you must cite your source any time you use someone else's intellectual property—whether in the form of words, ideas, language structures, images, statistics, data, or formulas—in your document.

Using Signal Verbs

Verbs like “”says,” “writes” or “discusses” tend to be commonly over-used to signal a quotation and are rather vague. In very informal situations, people use “talks about” (avoid “talks about” in formal writing). These verbs, however, do not provide much information about the *rhetorical purpose* of the author.

The list of signal verbs below offers suggestions for introducing quoted, paraphrased, and summarized material that convey more information than verbs like “says” or “writes” or “discusses.” When choosing a signal verb, try to indicate the author’s rhetorical purpose: what is the author ***doing*** in the quoted passage? Is the author *describing* something? *Explaining* something? *Arguing*? *Giving examples? Estimating? Recommending? Warning*? *Urging?* Be sure the verb you choose accurately represents the intention of the source text. For example, don’t use “concedes” if the writer isn’t actually conceding a point. Look up any words you don’t know and add ones that you like to use.

Table C.1 Commonly used signal verbs

Making a claim	**Recommending**	**Disagreeing or Questioning**	**Showing**	**Expressing Agreement**	**Additional Signal Verbs**
argue	advocate	challenge	illustrates	agree	responds
assert	call for	complicate	conveys	admire	assumes
believe	demand	criticize	reveals	endorse	speculates
claim	encourage	qualify	demon-strates	support	debates
emphasize	exhort	counter	proposes	affirm	estimates
insist	implore	contradict	points out	corroborate	explains
remind	plead	refute	exemplifies	verify	implies
suggest	recommend	reject	indicates	reaffirm	uses
hypothesize	urge	deny			
maintains	warn	question			

Be careful with the phrasing after your signal verb. In some cases, you will use the word “that” to join the signal phrase to the quotation:
*Smith argues **that** “bottled water should be banned from campus” [1].*
But not all signal verbs can be followed by “that.”
We can use clauses with ***that*** after these verbs related to thinking:
Think I think ***that*** you have an excellent point.
Believe He believes ***that*** unicorns exist.

Expect	She expects ***that*** things will get better.
Decide	He decided ***that*** it would be best to buy the red car.
Hope	I hope ***that*** you know what you are doing.
Know	I know ***that*** you will listen carefully
Understand	She understood ***that*** this would be complicated.

And after verbs related to saying:

Say	She said ***that*** she would be here by 6:00 pm.
Admit	He admits ***that*** the study had limitations.
Argue	She argues ***that*** bottled water should be banned on campus.
Agree	He agrees ***that*** carbon taxes are effective.
Claim	They claim ***that*** their methods are valid.
Explain	He explained ***that*** the rules are complicated.
Suggest	They suggest ***that*** you follow instructions carefully.

But some verbs require an ***object*** (a person or thing) before you can use "that":

Tell	tell ***a person*** that… tell ***as story***… tell ***the truth***
Describe	describe ***the mechanism***
Convince	convince ***an audience*** that you are credible
Persuade	persuade ***a reader*** that this is a worthwhile idea
Inform	inform ***a colleague*** that their proposal has been accepted
Remind	remind ***the client*** that …
Analyze	analyze ***a process***; analyze ***a text***; analyze ***the problem***
Summarize	summarize ***a text***; summarize ***an idea***
Support	I support ***the idea*** that all people are created equal

It would be **incorrect** to write the following:

- The author persuades that …x
- The writers convince that … x
- The speaker expressed that …x
- He analyzes that …x
- She informs that … x
- They described that …x
- I support that … x

Integrating Quotations Exercise

Using the following excerpt from William Zinsser's "Simplicity" (available online: http://www.geo.umass.edu/faculty/wclement/Writing/zinsser.html), practice the three integration methods.

"But the secret of good writing is to strip every sentence to its cleanest components. Every word that serves no function, every long word that could be a short word, every adverb which carries the same meaning that is already in the verb, every passive construction that leaves the reader unsure of who is doing what - these are the thousand and one adulterants that weaken the strength of a sentence. And they usually occur, ironically, in proportion to education and rank." (Zinsser, 1980)

Integrate portions of this quotation correctly and effectively into your own sentences. If you want to leave out or change words slightly to fit your sentence structure, make sure to follow the rules (using ellipses and square brackets). Also, make sure you are saying something interesting and useful about the words you

are quoting (don't just write "Zinsser says "insert quote") – make sure your sentence expresses your **own** idea, and use the quotations to support or develop your idea.

Write your sentences below, using each of the three methods:

1. **Seamless Integration**

2. **Signal Phrase**

3. **Introduce with a Colon**

W. Zinsser. "Simplicity" [Online]. (Originally published in *On Writing Well: An Informal Guide to Writing Nonfiction*. New York: Harper & Row, 1980)
Available: http://www.geo.umass.edu/faculty/wclement/Writing/zinsser.html

Activity 1:

Using at least three of the sources provided below, write a cohesive synthesis essay (approx. 300–400 words) that addresses the following prompt:

Does modern technology enhance our ability to connect with others, or does it fundamentally erode the quality of human interaction?

Requirements:

1. Form an Opinion: Do not just summarize the texts. Develop a clear thesis that takes a stand on the issue.
2. Identify Relationships: How do the statistics in Source B challenge the optimism in Source A? Does the "new literacy" in Source E offer a counter-argument to the "death of nuance" in Source C?
3. Integrate Evidence: Use the I.C.E. (Introduce, Cite, Explain) method described in your lesson.
4. Use the Three Methods:
    - Seamless Integration
    - Signal Phrase Method
    - Colon Method
5. Edit for Flow: Use square brackets [ ] and ellipses ... where necessary to fit the quotes into your grammar.

Source 1: The Digital Bridge

Technology has democratized global conversation, dismantling geographical barriers that once isolated us. Through instant messaging and video conferencing, we can maintain "ambient awareness" of loved

ones' lives regardless of time zones. This digital proximity fosters a sense of global citizenship and allows for the niche communities—marginalized groups or hobbyists—to find support systems that do not exist in their physical vicinity. Rather than replacing face-to-face interaction, digital tools supplement it, providing a continuous thread of connection that strengthens the fabric of modern relationships. Communication hasn't declined; it has simply evolved into a more fluid, omnipresent state.

Source 2: The Data of Disconnection

Recent longitudinal studies suggest a correlation between high social media usage and perceived social isolation. A 2023 survey of 2,000 adults found that while 72% reported "increased connectivity" via apps, 48% felt their meaningful relationships had weakened over a five-year period. Furthermore, the "Goldilocks Effect"—the preference for communicating at a distance—has seen a 30% rise in younger demographics who prefer text over voice calls. Data indicates that while the *volume* of outgoing messages has increased by nearly 400% since 2010, the average duration of deep, focused conversation has decreased by 18 minutes per session. The frequency of interaction is up, but the depth is numerically declining.

Source 3: The Death of Nuance

We are trading empathy for efficiency. Human communication is 90% non-verbal—the slight tilt of a head, the catch in a voice, or a shared silence. Technology strips these layers away, leaving us with sterilized text that is easily misinterpreted. We no longer "talk"; we "post." This performative nature of digital communication encourages us to curate a persona rather than share a soul. We have become a society of monologists, shouting into the void for "likes" rather than engaging in the vulnerable, messy, and unedited dialogue that defines true human intimacy. We are more "connected" than ever, yet we have never been more alone.

Source 4: The Workplace Revolution

In the professional sphere, technology is an indisputable catalyst for clarity and productivity. Asynchronous communication tools like Slack and Trello allow teams to collaborate without the "cognitive tax" of constant meetings. This shift enables a "deep work" state where communication is intentional rather than accidental. While critics argue that office camaraderie suffers, the reality is that technology allows for a diverse workforce—including neurodivergent individuals who may struggle with traditional social cues—to contribute effectively. Communication is now measured by its outcome and accuracy rather than social performance, representing a significant improvement in organizational transparency**.**

Source E: A New Literacy (Educational/Reflective)

To say communication is "declining" is to ignore the birth of a new visual and digital literacy. Today's youth communicate through a sophisticated blend of memes, emojis, and short-form video—a shorthand that conveys complex emotional states with remarkable speed. This isn't a degradation of language; it is a creative expansion. Just as the printing press was once feared for "ruining" oral tradition, digital media is simply a new canvas. We are learning to be "multilingual" in a sense, navigating different tones and platforms with a dexterity that previous generations never required.

Activity 2:

Directions: The following prompt is based on the accompanying six sources. This question requires you to integrate a variety of sources into a coherent, well-written essay. Refer to the sources to support your position; avoid mere paraphrase or summary. Your argument should be central; the sources should support this argument.

Remember to attribute both direct and indirect citations.

Introduction

Television has been influential in United States presidential elections since the 1960's. But just what is this influence, and how has it affected who is elected? Has it made elections fairer and more accessible, or has it moved candidates from pursuing issues to pursuing image?

Assignment

Read the following sources (including any introductory information) carefully. Then, in an essay that synthesizes at least three of the sources for support, take a position that defends, challenges, or qualifies the claim that television has had a positive impact on presidential elections.

Refer to the sources as Source A, Source B, etc.; titles are included for your convenience.

Source A (Campbell)
Source B (Hart and Triece)
Source C (Menand)
Source D (Chart)
Source E (Ranney)
Source F (Koppel)

Source A
Campbell, Angus. "Has Television Reshaped Politics? " In Encyclopedia of Television / Museum of Broadcast Communications, vol. 1, ed. Horace Newcomb. New York: Fitzroy Dearborn, 2005.

The following passage is excerpted from an article about television's impact on politics.
The advent of television in the late 1940's gave rise to the belief that a new era was opening in public communication. As Frank Stanton, president of the Columbia Broadcasting System, put it: "Not even the sky is the limit." One of the great contributions expected of television lay in its presumed capacity to inform and stimulate the political interests of the American electorate.

"Television, with its penetration, its wide geographic distribution and impact, provides a new, direct, and sensitive link between Washington and the people," said Dr. Stanton. "The people have once more become the nation, as they have not been since the days when we were small enough each to know his elected representative. As we grew, we lost this feeling of direct contact—television has now restored it."

As time has passed, events have seemed to give substance to this expectation. The televising of important congressional hearings, the national nominating conventions, and most recently the Nixon-Kennedy and other debates have appeared to make a novel contribution to the political life of the nation. Large segments of the public have been given a new, immediate contact with political events. Television has appeared to be fulfilling its early promise.

Source B

Hart, Roderick P., and Mary Triece, "U.S. Presidency and Television." Available at http://www.museum.tv/debateweb/html/equalizer/essay_usprestv.htm.

The following passage is excerpted from an online article that provides a timeline of major events when television and the presidency have intersected.

April 20, 1992: Not a historic date perhaps, but a suggestive one. It was on this date [while campaigning for President] that Bill Clinton discussed his underwear with the American people (briefs, not boxers, as it turned out). Why would the leader of the free world unburden himself like this? Why not? In television's increasingly postmodern world, all texts—serious and sophomoric—swirl together in the same discontinuous field of experience. To be sure, Mr. Clinton made his disclosure because he had been asked to do so by a member of the MTV generation, not because he felt a sudden need to purge himself. But in doing so Clinton exposed several rules connected to the new phenomenology of politics: (1) because of television's celebrity system, Presidents are losing their distinctiveness as social actors and hence are often judged by standards formerly used to assess rock singers and movie stars; (2) because of television's sense of intimacy, the American people feel they know their Presidents as persons and hence no longer feel the need for party guidance; (3) because of the medium's archly cynical worldview, those who watch politics on television are increasingly turning away from the policy sphere, years of hyper familiarity having finally bred contempt for politics itself.

Source C

Menand, Louis, "Masters of the Matrix: Kennedy, Nixon, and the Culture of the Image." The New Yorker, January 5, 2004.

The following passage is excerpted from a weekly literary and cultural magazine. Holding a presidential election today without a television debate would seem almost undemocratic, as though voters were being cheated by the omission of some relevant test, some necessary submission to mass scrutiny.

That's not what many people thought at the time of the first debates. Theodore H. White, who subscribed fully to [John F.] Kennedy's view that the debates had made the difference in the election, complained, in The Making of the President 1960, that television had dumbed down the issues by forcing the candidates to respond to questions instantaneously. . . . He also believed that Kennedy's "victory" in the debates was largely a triumph of image over content. People who listened to the debates on the radio, White pointed out, scored it a draw; people who watched it thought that, except in the third debate, Kennedy had crushed [Richard M.] Nixon. (This little statistic has been repeated many times as proof of the distorting effects of television. Why not the distorting effects of radio? It also may be that people whose medium of choice or opportunity in 1960 was radio tended to fit a Nixon rather than a Kennedy demographic.) White thought that Kennedy benefited because his image on television was "crisp"; Nixon's—light-colored suit, wrong makeup, bad posture—was "fuzzed." "In 1960 television had won the nation away from sound to images," he concluded, "and that was that."

. . . "Our national politics has become a competition for images or between images, rather than between ideals," [one commentator] concluded. "An effective President must be every year more concerned with projecting images of himself."

Source D
Adapted from Nielsen Tunes into Politics: Tracking the Presidential Election Years (1960-1992). New York: Nielsen Media Research, 1994

TELEVISION RATINGS FOR PRESIDENTIAL DEBATES: 1960-1996

Year	Networks	Candidates	Date	Rating	Homes (millions)	People (millions)
1960	ABC CBS NBC	Kennedy-Nixon	Sept. 26	59.5	28.1	N/A
1964 1968 1972	NO DEBATES					
1976	ABC CBS NBC	Carter-Ford	Oct. 6	52.4	37.3	63.9
1980	ABC CBS NBC	Anderson-Carter-Reagan	Oct. 28	58.9	45.8	80.6
1984	ABC CBS NBC	Mondale-Reagan	Oct. 7	45.3	38.5	65.1
1988	ABC CBS NBC	Bush-Dukakis	Sept. 25	36.8	33.3	65.1
1992	ABC NBC CNN	Bush-Clinton-Perot	Oct. 11	38.3	35.7	62.4
1996	ABC CBS NBC CNN FOX	Clinton-Dole	Oct. 6	31.6	30.6	46.1

Source E
Ranney, Austin, Channels of Power: The Impact of Television on American Politics. New York: Basic Books, 1983.

The following passage is taken from a book that examines the relationship between politics in the United States and television.

In early 1968 [when President Lyndon Johnson was running for reelection], after five years of steadily increasing American commitment of troops and arms to the war in Vietnam, President Johnson was still holding fast to the policy that the war could and must be won. However, his favorite television newsman, CBS's Walter Cronkite, became increasingly skeptical about the stream of official statements from Washington and Saigon that claimed we were winning the war. So Cronkite decided to go to Vietnam and see for himself. When he returned, he broadcast a special report to the nation, which Lyndon Johnson watched. Cronkite reported that the war had become a bloody stalemate and that military victory was not in the cards. He concluded: "It is increasingly clear to this reporter that the only rational way out . . . will be to negotiate, not as victors, but as an honorable people who lived up to their pledge to defend democracy, and did the best they could."

On hearing Cronkite's verdict, the President turned to his aides and said, "It's all over." Johnson was a great believer in public opinion polls, and he knew that a recent poll had shown that the American people trusted Walter Cronkite more than any other American to "tell it the way it is." Moreover, Johnson himself liked and respected Cronkite more than any other newsman. As Johnson's aide Bill Moyers put it later, "We always knew . . . that Cronkite had more authority with the American people than anyone else. It was Johnson's instinct that Cronkite was it." So if Walter Cronkite thought that the war was hopeless, the American people would think so too, and the only thing left was to wind it down. A few weeks after Cronkite's broadcast Johnson, in a famous broadcast of his own, announced that he was ending the air and naval bombardment in most of Vietnam—and that he would not run for another term as President.

Source F
Koppel, Ted. Off Camera: Private Thoughts Made Public. New York: Vintage Books, 2001.

The following reflections come from the printed journal of Ted Koppel, a newscaster who is best known for appearing on the news show Nightline.

All of us in commercial television are confronted by a difficult choice that commercialism imposes. Do we deliberately aim for the lowest common denominator, thereby assuring ourselves of the largest possible audience but producing nothing but cotton candy for the mind, or do we tackle the difficult subjects as creatively as we can, knowing that we may lose much of the mass audience? The good news is that even those aiming low these days are failing, more often than not, to get good ratings.

It is after midnight and we have just finished our Nightline program on the first Republican presidential "debate" involving all of the candidates. . . .

It is a joke to call an event like the one that transpired tonight a debate. Two reporters sat and asked questions of one of the candidates after another. Each man was supposed to answer only the question he was asked, and was given a minute and thirty seconds in which to do so. Since the next candidate would then be asked another question altogether, it was an act of rhetorical contortion for one man to address himself to what one of his rivals had said. . . .

Because we were able to pull the best three or four minutes out of the ninety- minute event, Nightline made the whole thing look pretty good. That's the ultimate irony.

CITING AND DOCUMENTING SOURCES IN IEEE STYLE

Citing and documenting your sources is a critical component of using research in your writing. It gives credit to the experts upon whom you have built your argument. From an ethical standpoint, citing correctly, accurately, and thoroughly strengthens your credibility and the validity of your ideas.

1. What is IEEE Style and why do I need to use it?

The Institute of Electrical and Electronics Engineers (IEEE) Style is one of many systems for referencing (citing and documenting) sources that you have quoted, paraphrased, or summarized in your documents or presentations. Different disciplines use different styles, as they suit the needs of their users. For example,

- Engineering generally uses IEEE or APA Style
- Social Sciences generally use APA
- Humanities disciplines often use MLA or Chicago Style
- The Sciences generally use CSE.

IEEE is the generally accepted format for writing research papers and reports in technical fields, particularly in computer science. You should always confirm with your instructors which format they expect you to use.

In your assignments and Work Term Reports, you often have to gather information, data, illustrations, theories, interpretations and facts about your assigned topic. These sources often provide the evidence or theoretical framework you need to support and develop your ideas. You must cite information and images that you retrieved from other sources to show that you have done good quality research, and to give credit for the ideas to the original author. Failing to cite the source—whether quoted, paraphrased or summarized—is plagiarism. Citing your sources correctly has the following benefits:

- Provides evidence you need to support your claims and validate ideas
- Shows you have done significant reading and research on your topic, and therefore have a credible level of authority to write or speak on this topic
- Shows that you can synthesize and incorporate information into your own work, combining it with your own ideas; the citations distinguish YOUR ideas from those of your sources

- Allows the reader to find those sources and do further reading
- Allows you to maintain academic integrity (avoid plagiarizing).

2. How to cite and reference sources properly?

Citing and referencing sources is a two-part process: there is an in-text marker that directs the reader to the complete bibliographical reference at the end of the document. Both elements are essential and missing one or the other can result in plagiarism. This **cross-referencing** system is made up of the following two elements:

1. **In-Text Citations:** when you (a) first refer to a source, (b) quote, paraphrase or summarize a source, or (c) use data or graphics from a source, you must place an in-text citation referring to that source within paragraph. The citation takes the form of a number in a square bracket [1] typed inline with your sentence text (generally not super-scripted). Citations are numbered in chronological order as they appear in your paper. Thus, the first source that you site is [1]. The second source is [2], *etc*. Once a source is given a number, it always retains that number. So if you cite the first source later on in your paper, it is still (and always) cited as [1] throughout your paper.
2. **References List:** include a numbered list of all the sources you have cited in your paper, documented properly in IEEE style, at the end of your paper. A reader familiar with academic conventions will be able to tell what kinds of sources you are referencing, and will be able to find the source based on the information included.

3. In-Text Citations – Where do they go?

It can be tricky to know exactly where to place the in-text citation in your sentence. Generally, the default position for a citation is at the end of the sentence, unless placing it there would create confusion. For example, where should the citation go in the following sentence?

> Smith claims that "insert a quotation here," but other scientists argue that her conclusions are flawed.

If you place the citation for Smith at the end of the sentence, you are saying that Smith acknowledges that many scientists think her conclusions are flawed. That wouldn't make sense. You would have to cite like this:

> Smith claims that "insert a quotation here" [1], but other scientists [2]-[5] argue that her conclusions are flawed.

The citation can be put in several places:

- At the end of the sentence, if the entire sentence is a quotation, paraphrase, or summary of the source's idea: Chan asserts ideas X and Y, and he gives additional examples to illustrate them [3].
- Directly after the name of the source: Chan [1] claims…

- Directly after the quotation: Chan asserts that "insert quotation here" [2], and carry on with *your* idea (your analysis of Chan's assertion).
- After referring to a source or an idea from a source:
    - This theory was first put forward in a 1996 study [4].
    - Several recent studies [3], [5], [9]-[12] have suggested that…

NOTE: Your citation should NOT go inside the quotation marks; it is not part of the quotation. However, **punctuation** must be placed AFTER the citation, as that citation is part of that sentence (or clause), not part of the next sentence. For example

> Author X claims "this idea is a quotation" [1]. The next sentence starts here…

> Author X claims "this ideas is a quotation" [1], and I add my interpretation after.

Occasionally, some writers use IEEE citations like this (but I don't recommend it for your university assignments or Co-op Work Term Reports):

> As [1] and [5] have shown, quantum theory has many practical applications in real world settings. [2] disagrees, however, and argues that ….

This is why you must put the period AFTER the citation when a sentence ends with a citation. A citation that comes AFTER the period technically belongs to the next sentence, as [2] does in the preceding example.

4. Page numbers for quotations?

When citing a quotation from a print source, your citation should indicate the page where that quotation can be found:

> [2, p.7]. or, if referring to several consecutive page [2, pp. 7-12]

If the source is from the Internet or does not have pagination, you don't have to indicate page numbers (or paragraph numbers).

When citing equations, figures, appendices and such, use the same format you use for citing the page number:

> [3, eq. (2)]

> [3, Fig. 7.2]

> [3, Appendix B]

If you create your own visual (table or graph) based on the data from a source, then your citation should refer to the source. You might include a note such as

… figure data adapted from [3].

5. Do I need to keep citing the source every time I refer to it?
If you are discussing the ideas in a source at length (for example, in a summary), you do not need to cite every consecutive sentence. Cite the first time you mention the source. As long the following sentences clearly indicate that the ideas come from the same source—for example, you are using **signal phrases**, such as "the author further clarifies the problem by…"—you do not need to keep citing.

If you stop using signal phrases, be sure to include a citation. If you introduce material from another source or add your own analysis between references to that source, you will have to re-cite the source when you refer to it again. Always make sure your reader knows which ideas come from a source, and which come from you, and when you shift from one to the other. If in doubt, cite.

6. What if a source has more than one author?
If the source you are citing has one or two authors, use their names in your signal phrase:

- Brady [5] argues that ….
- Mehta and Barth's study [6] demonstrates that ….

If the source has three or more authors, use the name of the lead author, followed by *et al.*, the Latin term meaning "and the others." Like all Latin words, *et al.* should be italicized:

- Isaacson *et al.,* in their study on fluid dynamics, found that ….

NOTE: in your Reference at the end of your paper, it is a courtesy to list the names of ALL the authors who contributed to the source (rather than using *et al.*). However, if there are 6 or more authors, it is acceptable to use *et al.* in your reference list.

7. How do I figure out what the title of an academic journal is?

Figure 6.1.1 shows a typical .pdf file of a journal article. It will help you determine the various elements of an academic article that must be included in your reference. Note the difference between the database company (such as Elsevier, EbscoHost, JSTOR, etc) and the name of the journal.

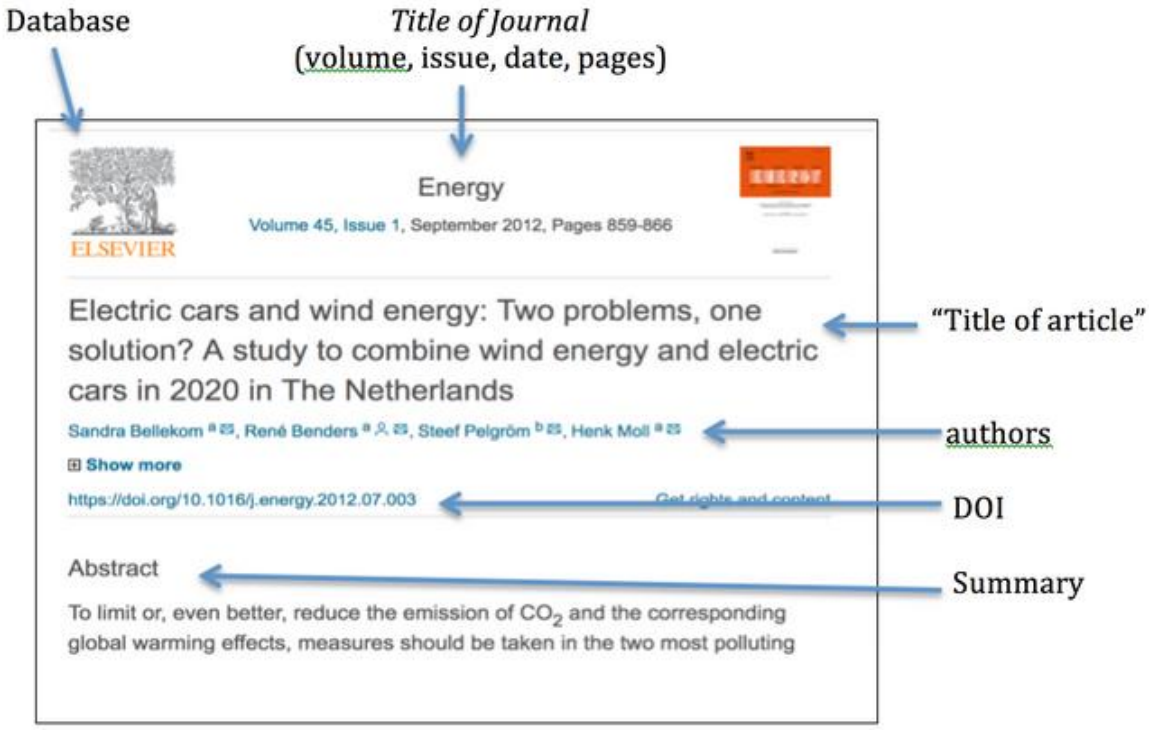

Figure 6.1.1 *Elements of an Academic Article.*

8. How do I set up my References list?

Different citation styles use various terms to introduce their list of references, for example, **Bibliography** or **Works Cited**. IEEE style uses the term **References**, or sometimes **Cited References** to distinguish from **General References** (of works that have helped to form the author's ideas, but have not been cited in the document).

At the end of your paper, add a list of all the sources you have cited in your paper, **in the order you have cited them**—that is, in numerical order (not in alphabetical order). Each reference must provide thorough and complete documentation so that readers can identify the kind of source, and retrieve it if they want to read it. **Section 6.2** shows the formats for many of the different kinds of sources you will likely use in your papers and projects. It is important to use the correct conventions for each type of source, as readers familiar with academic conventions will expect this, and they will be able to tell what kinds of sources you are referencing based on what information is included and how it is formatted. If you use conventions incorrectly (such as failing to italicize or use quotation marks around titles to indicate what kind of source it is), you can confuse and mislead your readers.

Format Guidelines for Setting up a REFERENCES List

Here are some general formatting guidelines for setting up your references list:

- Create a bold heading called **References**, aligned with the **left** margin. If you are using headings, make this heading consistent with other first level headings in your document.
- The square-bracketed numbered references should be flush with the left margin, and should form a column of their own, with the text of the references indented so the numbers are easy for the reader to see (use the "hanging indent" function to format this, or use a table with invisible grid lines).
- Give all authors' names (up to five), but only use the first initial. Don't invert the order. Separate names with commas, and include the word "and" before the last author.
- Capitalize only the first word (and the first word after a colon, as well as proper nouns) in titles of **articles** within journals, magazines and newspapers**, chapters** in books**, conference papers**, and **reports**. Only use ALL CAPS for acronyms.
- Capitalize the first letter of all main words in the titles of **books, journals, magazines** and **newspapers**.
- Add a space between references if you single space each reference.

If you use citation software (such as Zotero, Endnote, or Mendeley) to generate a list of references, be sure to review the references it generates for any errors. These programs are not foolproof, and it is up to you to make sure your references conform to IEEE conventions. For example, sometimes the auto-generator will give a title in ALL CAPS or the author's full first name. You will have to revise this. They usually do not give DOIs; you may have to add these.

Sample References List

The sample **References** list below presents shows the preferred formatting. Note the hanging indent that makes the numbers on the left stand out in a highly readable format.

References

[1] M. Ogot and G. Kremer, *Engineering Design: A Practical Guide*, Pittsburgh: Togo Press, 2004.

[2] A. B. Brown, P. D. Adams and J. A. Smith, "Improved procedure for error detection," *Can. J. of Elec. Engineers*, vol. 9, pp. 545-588, Nov. 1979.

[3] S. McCahan, P. Anderson, M. Kortschot, P. E. Weiss, and K. A. Woodhouse, "Working in Teams," in *Designing Engineers: An Introductory Text*, Hoboken, NJ: Wiley, 2015, pp. 219-260.

[4] "IEEE Style: A guide to referencing style for Murdoch University students and staff," *Murdoch University Library*, 6 July, 2017. [Online]. Available: http://libguides.murdoch.edu.au/IEEE

Setting Up A Reference List – Sample Entries

Below are some examples of how to document the kinds of sources you will typically reference in your academic and technical papers. When possible, include the DOI (Digital Object Identifier) for .pdf and other documents found online through a database, and/or a URL link for other online sources.

* IEEE Reference Guide (.pdf) (2018)[1] indicates that the basic guideline for citing online sources is to follow the standard citation for the print source given previously and add electronic location (URL) or the Digital Object Identifier (DOI) at the end of the citation. Add a URL at the end of the reference if the source is available on the world wide web. If both a URL and a DOI are available, place the DOI last.

Examples of how to reference different kinds of sources

Articles from Journals and Magazines (Things that are published periodically)

Author(s), "Article title," *Journal or Magazine Title*, vol. #, no. #, pp., Mo. year. DOI [If available online, add URL and/or DOI link]

Print

H. Y. Zhou and K. M. Hou, "Intelligent urban public transportation for accessibility dedicated to people with disabilities," *Sensors*, vol. 12, no. 8, pp. xx-xx, Aug. 2012.

Online

M. Sakals, "Eyes in the sky: Unmanned aerial vehicles in the natural resources sector," *Innovation Magazine* [Online], vol. 19, no. 5, pp. 17-19, Sept-Oct. 2015. Available: http://www.digitalityworks.com/Viewers/ViewIssue.aspx?IssueID=140&PageNo=1

Conference Paper

Author(s), "Title of paper," Presented at *Name of Conf.,* City of Conf., Abbrev. State/Prov., year, pp. xxx-xxx. Paper number [If available online, give URL or DOI].

M. Ibrahim, "Creative design dynamics and creative systems," in *Proc. 2009 IEEE Int. Systems Conf*., Vancouver, BC, 2003, pp. 273-278. DOI: 10.1109/SYSTEMS.2009.4815811.

Newspaper Articles

Author(s), "Title of article," *Title of Newspaper,* Mo. day, year, [Online]. Available: URL [Accessed: Mon. day, year].

Online

C. Wilson-Clark, "Computers ranked as key literacy," *The West Australian*, March 29, 2004. [Online]. Available: http://www.thewest.com.au. [Accessed Sept. 18, 2004].

Print

B. Bart. "Going Faster." *Globe and Mail*, sec. A p.1, Oct. 14, 2002.

Webpage or Website (WWW) (material *only* available online such as blogs, etc.)

Author(s), "Webpage Title," *Website Name* [Type of medium]. Available: URL and date. [Accessed: mo. day, year].

M. Fogarty, "Which versus that," *Grammar Girl, Quick and Dirty Tips* [Online]. Available: https://www.quickanddirtytips.com/education/grammar/which-versus-that-0. [Accessed: June 1, 2019].

"IEEE Style: A guide to referencing style for Murdoch University students and staff," *Murdoch University Library*, [Online]. Available: http://libguides.murdoch.edu.au/IEEE

Books

Author(s), *Title of Book*. City: Publisher, year.

M. Ogot and G. Kremer, *Engineering Design: A Practical Guide*. Pittsburgh: Togo Press, 2004.

Chapter in a book

Author(s), "Title of Chapter," in *Title of Book*. City: Publisher, year, pp.

S. McCahan, P. Anderson, M. Kortschot, P. E. Weiss, and K. A. Woodhouse, "Introduction to Teamwork," in *Designing Engineers: An Introductory Text*, Hoboken: Wiley, 2015, pp. 219-260.

Technical Reports (Government, Industry, Organizations)

Author(s), "Title of report," Name of Company/Organization, City, Report. #, year. Accessed: date [Online]. Available: URL or DOI

Delcan, "Johnson Street Bridge Condition Assessment Report," Delcan and City of Victoria, Victoria, B.C., 2009. Accessed: June 14, 2019 [Online]. Available: https://www.johnsonstreetbridge.com/wp-content/uploads/2018/01/johnson-street-bridge-condition-assessment-delcan-engineering.pdf

University of Victoria Campus Planning and Sustainability, "The Grand Promenade: Design Charrette," Campus Greenway, Summary Report 11.2018. Accessed: May 1, 2019 [Online]. Available: https://www.uvic.ca/campusplanning/current-projects/campusgreenway/index.php

Personal Communications (interview, telephone, email, *etc*.)

Author, private communication, Mo. day year.

Patents

Author, "Title of patent," U.S. Patent x xxx xxx, Mo. day, year.

J. P. Wilkinson, "Nonlinear resonant circuit devices," U.S. Patent 3 624 125, July 16, 1990.

Lectures or Presentations

Speaker (Date), "Title of Presentation/Lecture," Occasion and location of presentation. [Type of medium: URL if available online].

J. Dagg (Oct. 22, 2017), "Team Dynamics," ENGR 110 Plenary Lecture, University of Victoria. [PowerPoint slides available: https://coursespaces.uvic.ca/mod/folder/view.php?id=1021973]

Lecture Notes

"Title of class notes," class notes for Course Number, Department, University, Term, year.

"Maxwell's equations and time-varying electromagnetic fields," class notes for ECE 359, Department of Electrical and Computer Engineering, University of Victoria, Winter, 2015.

Reference Works (Encyclopedia, Dictionary, Handbook, etc.)

Author(s). (year). "Chapter title," in *Book Title*, xth ed. [Type of medium]. Editor(s) name(s), Ed(s). Location: Publisher, mo. day, volume or chapter no. (if available), pp. Available: URL [access date].

With an author

D. Hart and A. Bauen. (2002). "Fuel cell fuel cycles," in *Fuel Cell Technology Handbook*. [Online]. G. Hoogers, Ed. Boca Raton, FL: CRC Press. Available: ENGnetBASE [Accessed: Sept. 22, 2008].

A. D. French, N. R. Bertoniere, R. M. Brown, H. Chanzy, D. Gray, K. Hattori, and W. Glasser. (2003). "Cellulose" in *Kirk-Othmer Encylopedia of Chemical Technology.* [Online]. John Wiley & Sons, Inc. DOI: 10.1002/0471238961.0305121206180514.a01.pub2.

No author

"Composite material," in *Wikipedia, the Free Encyclopedia.* [Online]. May 13, 2008. Available: http://en.wikipedia.org/w/index.php?title=Composite_material [Accessed: May 24, 2008].

Image from a print source

Similar to a chapter in a book or article in a print journal:

Creator of image, "Title of image," in "Title of article" or *Title of Book*, and the rest of the required publication information for an article or book.

Image from an online source

Creator of image, if available. "Title of the image" if there is one, *Web Site name*, the URL, and the date of access.

Podcast

A. A. Artist, Credit, and B. B. Artist, Credit, "Title of episode," *Title of Program: Subtitle,* Date of recording, year. Place of recording: Publisher. [Format]. Available: URL. [Accessed: Mo. day, year].

S. Gary, Presenter, "Mars Insight's Drill Fails," *SpaceTime with Stuart Gary*, June 12, 2019. Sydney: SpaceTime. [Podcast episode]. Available: https://megaphone.link/BIT3581656190. [Accessed June 14, 2019].

Also see IEEE Reference Guide (2018) for a more complete list of various types of sources and how to reference them.

ACTIVITY

Find a variety of sources (at least 5 different types) on a specific topic related to your current course project. Set up a **References** list for them in IEEE Style.