

ENGINEERING ETHICS

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THIRD LECTURE (3/4)

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revised Hadreas 2011)**

REVIEW FROM LAST LECTURE:

Ethical Issues will come up
often in your careers.

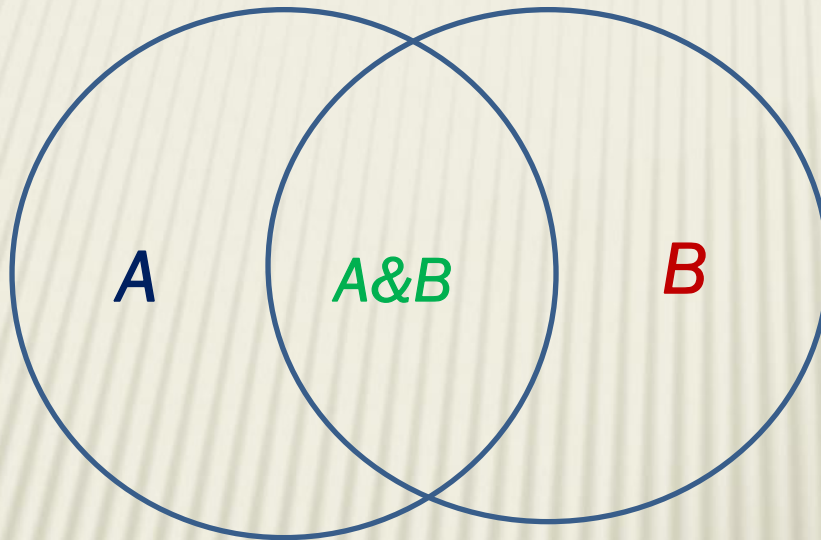
Often they seem to be hard choices or ***moral dilemmas***. There, you are pulled between **two conflicting goals**:

It appears you have to choose between ‘the lesser of two evils.’

But ethical hard choices (*dilemmas*) often can be resolved by **practical ethical reasoning**.

Instead of choosing between the lesser of two evils you arrive at a **'creative' third alternative**.

A, B: the two conflicting goals
A or B? Neither is desirable



A&B: third choice that can answer both

An example

In the 1970s, managers working for Coca-Cola were expected to pay bribes to Egyptian officials for doing business in Egypt.

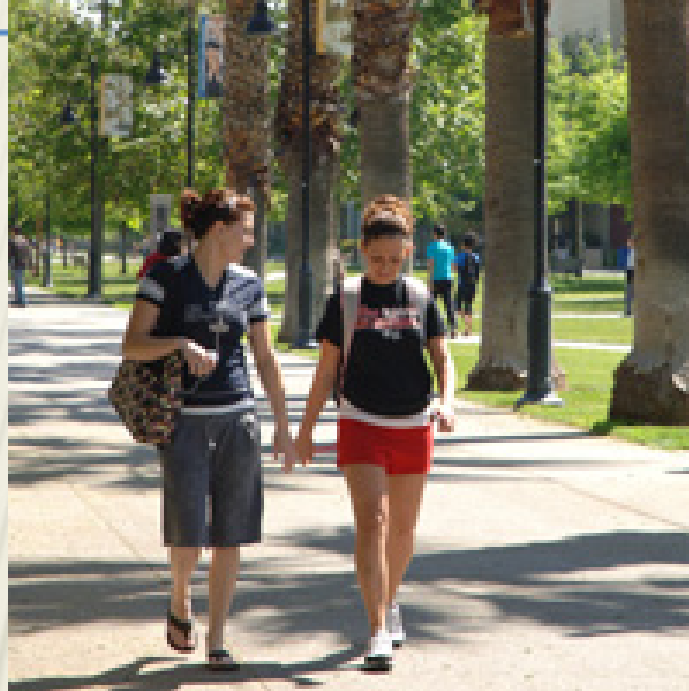
The Coca-Cola managers did not pay bribes. Instead, they hired hundreds of Egyptians to plant orange trees on thousands of acres of desert. As a result, they created goodwill with Egypt and the Egyptian officials signed the contracts with Coca-Cola without bribery.

Harris, Pritchard, Rabins. (2005). *Engineering Ethics, Concepts and Cases*.

Belmont, CA: Wadsworth, p. 71.

Case Study: **An SJSU Engineering Student's Summer Job**

This ethical scenario was written by SJSU Professor Rhea Williamson and adapted by Thalia Anagnos and P. Hadreas.



Rocio Villalobos was a civil engineering student at San José State.



Nevada Falls, Yosemite

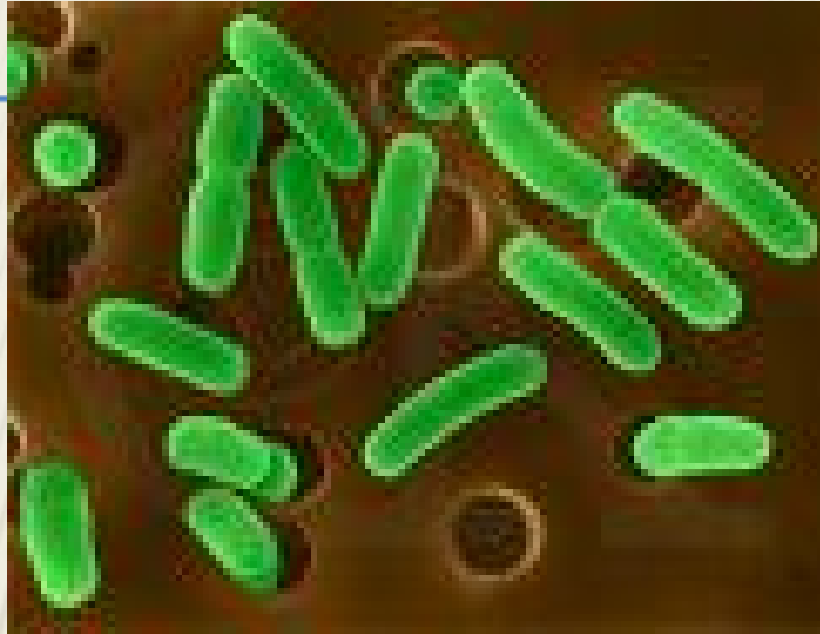


Vernal Falls, Yosemite

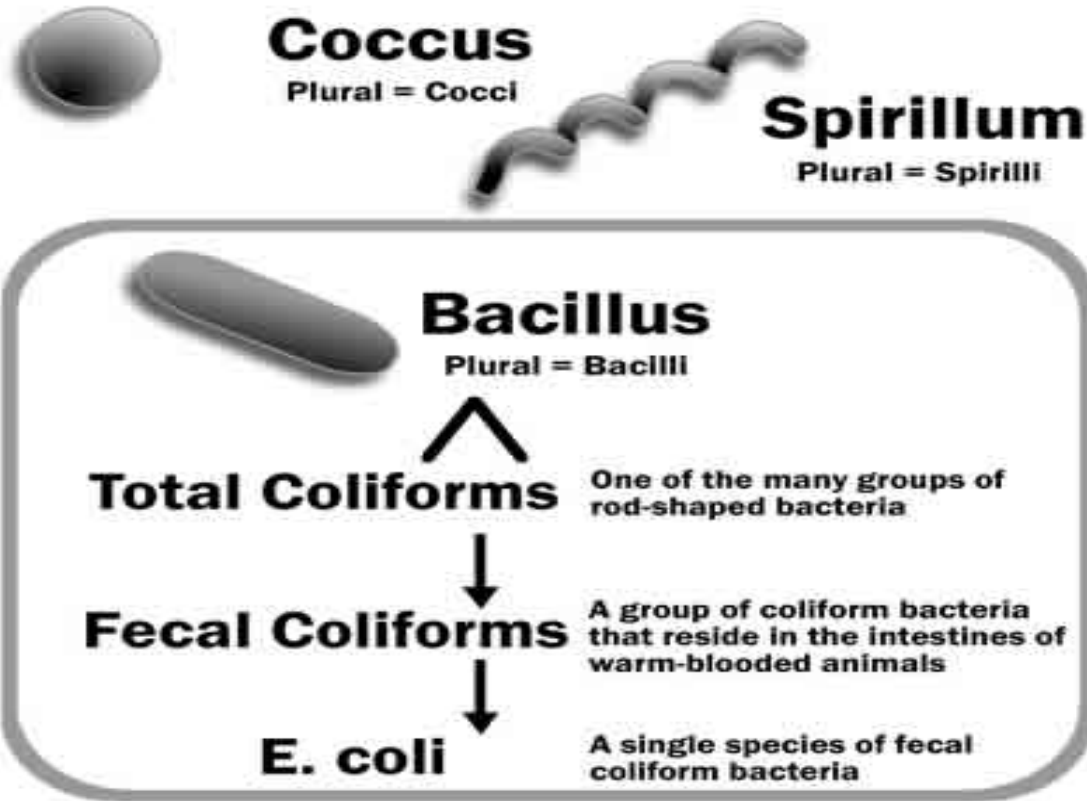
- ✘ With the help of Henry Thompson, her SJSU faculty mentor and supervisor, she landed an apprenticeship, monitoring water management at Yosemite National park.



Rocio was enthusiastic about applying her civil engineering skills to environmental issues. She was keen to focus her career on ecological issues.



- × Part of Rocio's job was testing for fecal coliforms in water samples as drawn from a Yosemite water-treatment plant.



Fecal coliforms are a form of bacteria that originate in human and animal feces. Their presence in large quantities can lead to serious illnesses including dysentery, typhoid fever, viral and bacterial gastroenteritis, and hepatitis A.



The current EPA recommendation for tolerable fecal coliform colonies in water is

- > 1 colony/100ml: drinking water.
- > 100 colonies/100ml: body-contact recreation.
- > 1000 colonies/100ml: fishing and boating.



- × For any given set of samples that Rocio analyzed, so much gas was generated by the growing bacteria that it popped the cap off the test tube. When a sample “pops,” it indicates that the sample is very polluted.



- × For a test tube to ‘pop’ it is likely that there is > 100 colonies/100mL of fecal coliform bacteria.



Rocio had to face that the water was polluted enough

- 1) to sicken park visitors who drank it;
- 2) to sicken people who swam in a polluted river;
- 3) to sicken people even who, say, picked up a wet golf ball and then touched their fingers to their lips.



- ✘ Alarmed about the results, Rocio reported her findings to the Assistant Plant Manager, Derek Nelson



- × Derek told Rocio to make up alternative acceptable data.
- × Rocio protested.



- ✘ Derek explained. The water was polluted because of an unusually large number of pack animals that had been allowed to trail behind hikers in the park.



- ✘ Derek said he had since strictly enforced the park's rules limiting the number of pack animals.



- ✘ Derek assured Rocio that the polluted water was already diluted with enough clean water to reduce the previously polluted water to acceptable levels.



Rocio told Derek that the regulatory agency in question, the Regional Water Quality Control Board (RWQCB), needed to be alerted. There was too much risk of illness from coliform bacteria.



Derek explained to Rocio that if the Regional Water Quality Control Board (RWQCB) were informed the following would result:

- 1) the RWQCB would demand expensive investigations;
- 2) these investigations would be costly and would reduce the funds available for park uses;
- 3) along with other reductions in park programs, Rocio's apprenticeship likely would be cancelled for lack of funds;
- 4) Derek would look bad.



Derek said, “It was better to tell the truth,” (as he saw it). The water, if now tested, was safe. And even if it wasn’t safe right now, it would be soon.

So on balance, everybody would be better off by letting this slip up go unreported. Derek said he’d be sure to prevent an excessive number of pack animals in the park in the future.



What should Rocio do?

What are Rocio's obligations?

Recall: Every ethical problem involves a conflict in goals.



Rocio has an obligation to the park visitors. She is obliged to prevent the undermining of their safety and health, especially if her work leads to their harm.



- × Rocio is also obliged to allow park visitors to enjoy the park, as long as they can do so safely and observe the park rules.



- × Do you think that Rocio has an obligation to be loyal to her supervisor, Derek? If not, why not?

So Rocio is pulled in three directions at once.

Not harming the park
visitor's safety or health.



Keeping the the park
open for visitors'
safe enjoyment.



Building a career for herself in environmental civil engineering,
that will be good for herself and the environment.

So we begin with the paradigm case of the first duty: not harming the park visitors' safety and health.

Following a method of ethical reasoning we ask, what would be a **paradigm case**, (an **ideal case**), of Rocio's not harming the visitors' safety and health?

In this case the paradigm case applies to not harming the park visitors' health by coliform infection.

Since Rocio has detected fecal coliform >100 colonies/100 ml the ideal case would cover the following:

Ideal paradigm action #1

Post warning notices in the polluted areas:

Warning!

Water Polluted! Park visitors who drank or had direct skin-contact with river or ground water in polluted areas between March 15th through March 22nd, 2010 may develop illnesses from fecal coliform infection. **DO NOT** drink, swim, or wash in river or ground water.

Ideal paradigm action #2

Rocio will inform Derek's supervisor that there has been an excess of pack animals in the park leading to fecal coliform pollution.

Rocio will also tell Derek's the supervisor that she will inform her SJSU faculty mentor, Henry Thompson, accordingly.

Ideal paradigm action #3

Rocio informs her faculty mentor, Henry Thompson that she detected 100 fecal coliforms/100 ml. She asks for Professor Thompson's advice on how to proceed with the situation.

So, altogether the three actions of the ideal paradigms are

- 1. Posting warning notices**
- 2. Informing the water treatment plant supervisor of the health hazards.**
- 3. Informing SJSU faculty mentor Henry Thompson.**

But remember, in ethical reasoning one also thinks analogically so as to accommodate the other conflicting goals of the ethical problem.

The other conflicting goals are:

- 1. Not interfering with the park visitors enjoying the park.**
- 2. Not harming Rocio's career in environmental civil engineering given she continues to meet professional standards.**

But are these additional goals in conflict with the ideal actions paradigm in this case?

- 1. Not harming the park visitors' safety and health.**
- 2. Not interfering with the park visitors enjoying the park.**
- 3. Not harming Rocio's career in environmental civil engineering given she continues to meet professional standards.**

But analogical reasoning still is useful in suggesting how Rocio can give Derek a second chance:

Rocio can tell Derek to join her in informing Derek's supervisor of the problem. This will allow the supervisor to judge if Derek has made a mistake he likely won't make again. The supervisor may give him a second chance.

Now let's consider an ethical problem that directly concerns many students in their classes at SJSU.

Cheating



and

Plagiarism



5

4



1.0 Definitions Of Academic Dishonesty

1.1 Cheating (As defined in current SJSU catalogue)*

At SJSU, cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means.



*www.drc.sjsu.edu/about/policies_guidelines/AcademicDishonestyPolicy.pdf

There are five (5) basic types of cheating

First,
there's a simple cheating that involves copying
another's work.

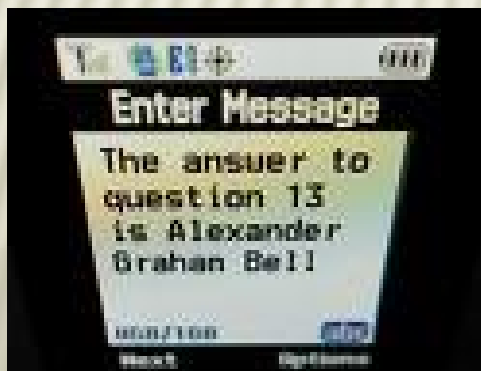
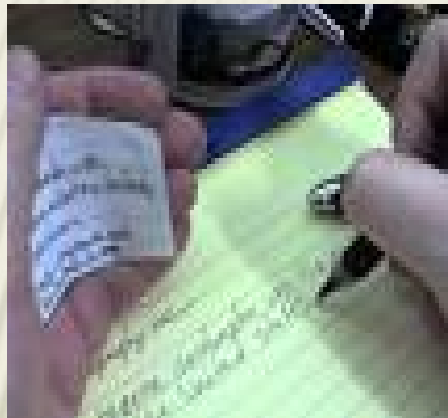


Second,
there's the cheating that involves submitting your own work from another course or submitting work to two courses at once without the instructor's approval.



Now, everyone pass forward *your* papers.

Third, there's the cheating by the (increasingly sophisticated) use of unauthorized sources and instruments.



Fourth,
there's the cheating that involves the altering of
grades.



Fifth,
there's the cheating that relies on someone else -- a **surrogate** -- taking an exam for you or your taking an exam for someone else.



So what's so wrong with cheating?

1. Cheating undermines the credibility of the university and the degrees it awards.

(and eventually your own degree)

SJSU Academic Integrity Policy:

(as stated in current SJSU catalogue)

“ACADEMIC HONESTY AND FAIRNESS FOSTER ETHICAL STANDARDS FOR ALL THOSE WHO DEPEND UPON THE INTEGRITY OF THE UNIVERSITY, ITS COURSES, AND ITS DEGREES.

UNIVERSITY DEGREES ARE COMPROMISED AND THE PUBLIC IS DEFRAUDED IF FACULTY MEMBERS OR STUDENTS KNOWINGLY OR UNWITTINGLY ALLOW DISHONEST ACTS TO BE REWARDED ACADEMICALLY.”



2. Cheating also undermines the work of fellow students who are honest.

Honest students end up carrying the burden of cheating.

As a result of cheating, honest students receive relatively lower grades than they deserve.

Because of the skewed competition, honest students tend to lose scholarships, recommendations, and admission to advanced programs.

What sort of solution does ethical-problem solving suggest?

Consider the analogy to a citizen's duties.

- As a citizen you want to stand up against the dishonesty of politicians.
- You want to stand up against the dishonesty of fellow workers and superiors.
- Standing up against cheaters in class is analogous standing up against dishonest co-workers.
- The integrity of your university as well as the fair treatment of fellow students requires you to take a stand against those who engage in academic dishonesty.
- Confront those who cheat. Given adequate evidence, discuss their cheating with the instructor.

And faculty also has obligations.

If the evidence is sustained, after discussing the evidence for cheating in private with the student, **faculty has an obligation report** the alleged infraction the SJSU Office of Student Conduct & Ethical Development.

CLICKER QUESTION

- × Cheating :
 - a. undermines the work of honest fellow students.
 - b. leads honest students to receive lower grades than they deserve.
 - c. leads honest students to receive fewer recommendations to advanced programs than they would otherwise receive.
 - d. by fellow students is analogous to the dishonest behavior of coworkers.
 - e. all of the above.

What about plagiarism?

- Plagiarism is a special case of cheating through copying another's work.
- With plagiarism, however, the copied work is taken from a book, article or off the Internet.

Students need to be especially aware of it, because many students plagiarize, ***without knowing they're doing anything wrong.***



1.2 Plagiarism

(As defined in the current SJSU catalogue)

At SJSU plagiarism is the act of representing the work of another as one's own without giving appropriate credit, regardless of how that work was obtained, and/or submitting it to fulfill academic requirements. Plagiarism at SJSU includes but is not limited to:

1.2.1 The act of incorporating the ideas, words, sentences, paragraphs, or parts of, and/or the specific substance of another's work, without giving appropriate credit, and/or representing the product as one's own work;

1.2.2 Representing another's artistic/scholarly works such as musical compositions, computer programs, photographs, paintings, drawing, sculptures, or similar works as one's own.



Suppose you have an instructor who has assigned a 500 word paper on the causes of the Challenger Disaster. You've worked on the paper, but so far it is not long enough. You think you'll paraphrase some text you find on-line about the Challenger disaster.

You find the following text about the Challenger Disaster.

“On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension. Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers’ worries about the ability of O-rings to seal at low temperatures (Harris, et al. 1993).”

So, you write out a paraphrase
of the on-line text.

Original text:

On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension. Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers' worries about the ability of O-rings to seal at low temperatures."

Notice how the original text gives the prelaunch's

- a) Time.**
- b) Place.**
- c) Company of people objecting to the launch.**
- d) Reasons or their objection.**

This is what you'll want paraphrase in your own words.

Original text:

On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension. Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers' worries about the ability of O-rings to seal at low temperatures."

Your paraphrase:

During the evening of January 27, 1986, a conference took place in which officials from Marshall Space Center clashed with Morton Thiokol Engineers. The Morton Thiokol engineers advised against the next morning's launch. Their recommendation was based on their doubt that the O-rings would properly shut off at low temperatures.

Is this plagiarism?

Yes. It is plagiarism, because:

- ⓐ **the writer has only changed a few words and phrases and has kept the same order of facts.**
- ⓑ **the writer doesn't cite the source.**

So say you try to put the text more “in your own words.”
You write a new paraphrase.

Original text:

On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension. Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers' worries about the ability of O-rings to seal at low temperatures."

A second paraphrase:

During a conference that took place the day before the *Challenger* launch, Morton Thiokol Engineers recommended against the launch. They saw a possible problem in the malfunction of inadequate moldings of the O-rings.

Is this plagiarism?

Yes. It is still plagiarism, because:

Ⓢ now the matter is in the writer's own words, but it distorts some the facts of the case. It says the problem was poorly molded O-rings, when the problem was not moldings but low temperatures.

Ⓢ The writer doesn't cite the source.

So the writer tries to state the facts "in the writer's own words," but more accurately.

Original text:

On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension. Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers' worries about the ability of O-rings to seal at low temperatures."

A third paraphrase:

During a conference that took place the day before the *Challenger* launch, Morton Thiokol Engineers recommended against the launch. They saw a possible problem in the malfunction of O-rings due to their failing to shut off because of low temperatures.

Is this plagiarism?

Yes. **It is still plagiarism, because**

**@The matter is in the writer's own words.
But the source has not been cited.**

So you try again. This time you write:

Original text:

On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension. Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers' worries about the ability of O-rings to seal at low temperatures."

A fourth paraphrase:

During a conference that took place the day before the *Challenger* launch, Morton Thiokol Engineers recommended against the launch. They saw a possible problem in the malfunction of O-rings due to their failing to shut off because of low temperatures (Harris, et al. 2005).

???

Harris, Pritchard, Rabins. (2005).
Engineering Ethics, Concepts and Cases.
Belmont, CA: Wadsworth, p. 2.

Now, **finally**, it is **not plagiarism**, because

@ you've put the matter in your own words,
without distorting the facts, and you've cited
the source.



You could also quote the passage word-for word.
But then you need to **put the passage in quotes** and **supply the source as a reference.**

Example:

“ On the night of January 27, 1986, the prelaunch teleconference involving Morton Thiokol and the Marshall Space Center was filled with tension, Morton Thiokol engineers conveyed their recommendation against launching the *Challenger* space shuttle the next morning. This recommendation was based on the engineers’ worries about the ability of O-rings to seal at low temperatures (Harris, et al. 2005). ”

So what are the rules for avoiding plagiarism?

- ❖ If you copy a text word-for-word, you must **put the text in quotes and accurately cite its source as a reference.**
- ❖ If you paraphrase a text you must **put it in your own words.**
 - *This means more than just changing a few terms or phrases.*
- ❖ Again, ***you must cite*** the source from which you adapted the paraphrase.

But what is the proper form for citing sources?

The SJSU College of Engineering, as is also the case in the social sciences, education, and business, uses the **APA (American Psychological Association)** 'author-date' format of citing texts.

CLICKER QUESTION

Plagiarism occurs when a student

- A. paraphrases a text but fails to reference the source.
- B. slightly changes the wording of a text and fails to reference the source.
- C. slightly changes the wording of a text but does not reference the source.
- D. cites a text correctly word-for-word, references the source, but fails to put the text in quotes.
- E. all of the above.

Plagiarism

For both a direct quote and a paraphrase you state the source by placing the last name of the author and the year of the publication in parenthesis after the quote or paraphrase.

Suppose in discussing the *Challenger* disaster you quote a source supplying the facts about the temperature at the day of the launch. You write:

“The previous lowest launch temperature was 53° F. But at the morning of the Challenger launch, the O-ring temperature was 29°F” (Fleddermann, 2008).

Then for each (author, date) citation in your paper or essay you supply the bibliographical reference in a final section of your paper titled 'References' or 'Bibliography.'

The proper APA format form for referencing a **book** follows:

Fleddermann, Charles B. (2008). *Engineering Ethics, 3rd Ed.* Upper Saddle River, NJ: Prentice Hall.

Plagiarism

So the order is:

Author

Year

Title

Location of publication

Publisher

Author. (year of publication). *Title*. Place of
publication: publisher.

A diagram consisting of three black arrows originating from a single point at the bottom left. The top arrow points to the end of the word 'Author'. The middle arrow points to the end of the phrase '(year of publication)'. The bottom arrow points to the end of the word 'publisher'.

1. Note periods after the author(s),
year, title, and publisher.

Author. (year of publication). *Title*.
Place of publication: publisher.



Note the year of publication is in parenthesis.

Author. (year of publication). *Title*. Place of publication: publisher.

Note there's a colon between the place of publication and the name of the publisher.

A frequent variation: Suppose you are referencing a website.
The format is

Author. (Year website was created). *Title of article or text.*

Retrieved on [specific retrieval date] from [website's name]:

<http://www.liu.edu/cwis/cwp/library/workshop/citapa.htm>

So the order is:

Author

Year Website was created

Title of text

Retrieval date from named website

Website address: <http://www> Etc.

What do you do if there's no author given on the website?

Just put the title before the date and proceed as before.

***The George Orwell Legacy.* (2008). Retrieved January 7, 2009, from The Official Star Trek Site. Web site: <http://www.startrek.com/editorials/article/2310913.html>**

For a fully detailed specification of APA citation format go to

http://www.sjlibrary.org/research/databases/sguide_subjectList.htm?subID=60

You'll see on the left of this SJSU Library web page, "APA style help." Click that and you'll be led through detailed information about APA citation style.

CLICKER QUESTION

The reference below is not properly formatted in APA style:

Fleddermann, Charles B., (2008), *Engineering Ethics*,
3rd Ed., Upper Saddle River, NJ: Prentice Hall.

Its mistake consists in

- a. a lack of specification of page number.
- b. a placing of the year of publication in parenthesis.
- c. a lack of date of retrieval.
- d. a use of commas in many places where there should be periods.
- e. The abbreviation 'NJ' instead of writing out 'New Jersey.'

QUESTION

Have friends ever asked you to let them copy your answers on a test or exam? (You don't have to answer the question, just think it over to yourself.)

If you went along with it, did it have any effect on your friendship? (Again you don't have to answer, just think about it.)

Why do you think it had the effect it did?

THE LAST ETHICS HOMEWORK ASSIGNMENT:

The last homework assignment will be due as indicated in the class web site.

It'll involve paraphrasing an excerpt from the description of the Challenger disaster.

1. [ndalimonkeyinthemiddle.blogspot.com/ 2009_0...](http://ndalimonkeyinthemiddle.blogspot.com/2009_0...)
2. psycnet.apa.org/journals/amp/41/10/1131.html
3. www.soi.wide.ad.jp/.../20050026/slides/04/8.html
4. at: flickr.com/photos/65092250@N00/977370098
5. at: versatile1.wordpress.com/.../

Nov. 14, 09