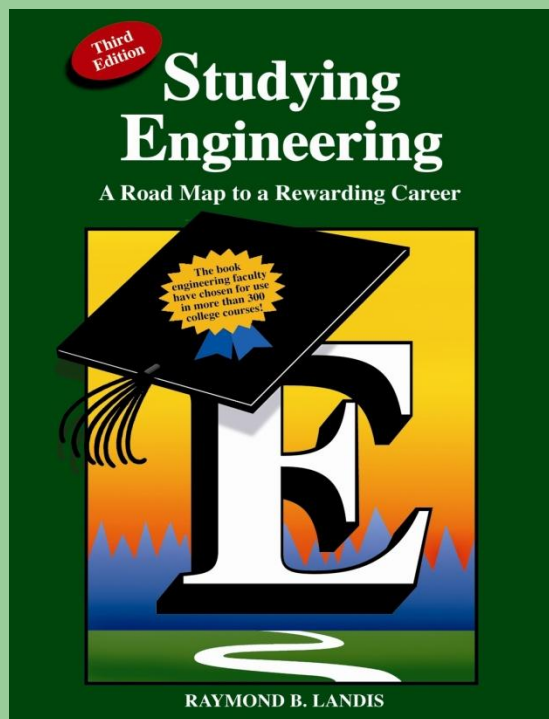
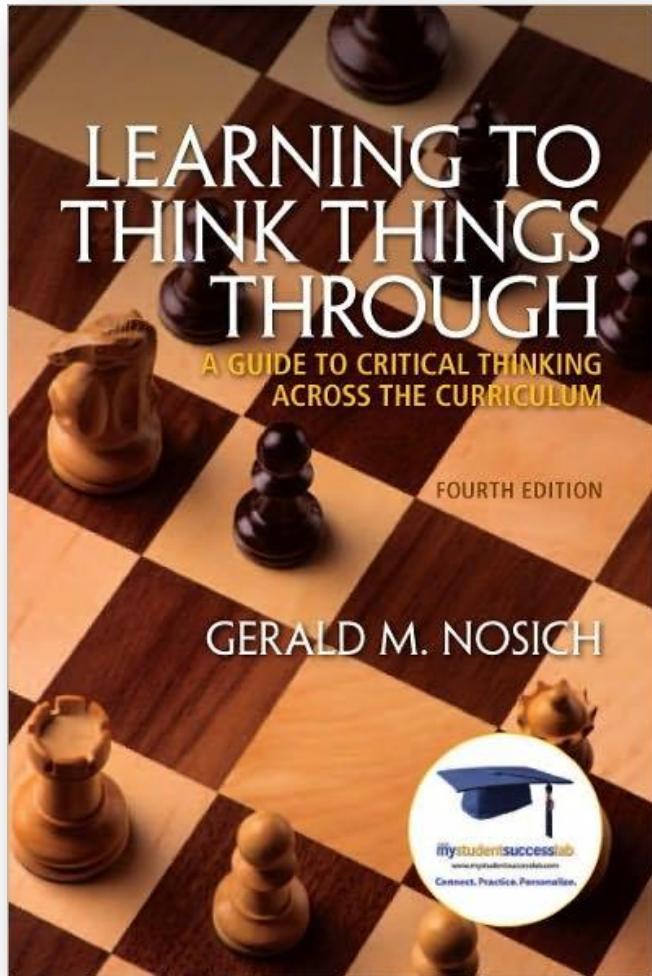


Chapter 6



Critical Thinking Skill II

Lecture Overview



Standards of Critical Thinking

Elements of Critical Thinking



What about is my thinking?

Standards

Standards of Critical Thinking



How good is my thinking?

Clarity

Your thinking is **clear** when it is

- Easily understood
- Free from misunderstanding
- What follows from it is apparent



Clarity

Your thinking is **clear** when you can

- **S**tate your meaning exactly
- **E**laborate on it
- Give good **E**xamples
- Give good **I**llustrations

SEE-I



Clarity

- S** I think that procrastination is a behavior pattern that has many negative consequences.
- E** Some of them are bad time management skills, inadequate effort toward studying and low self-esteem.
- E** When I procrastinate on an assignment I tend to have a lower grade.

I



What do you think about procrastination?

I do lots of it. It works for me. They all say it is bad, but trust me, if I can do this, you can certainly too.

Do this, do that, hey, where is my life in all of this? So, I am saying, it is working. I am still here, am I not?



Accuracy

Your thinking is **accurate** when your words describe the way things actually are

- Check out questionable information
- Consult reliable sources
- Test beliefs you hold
- Get feedback from others

$$2 + 2 \neq 5$$

Accuracy

Impediments

Generalizing: All New Yorkers are rude

Wishful thinking: If I just keep studying as I did in a high school, I'll graduate from a college

Protective thinking: Procrastination is a good attitude

Believing unexamined stories: There is afterlife after death, if you don't believe me, watch "Defending Your Life"

Relevance

Your thinking is **relevant** when it matters in deciding an issue at hand

- A company decides what types of cars to buy: gas engine cars or hybrid car.
- A team estimates mileage cost over 10 years for both types of cars.
- In conclusion, they remarked that hybrid cars have rear cameras.

Sufficiency

Your thinking is **sufficient**

- When you've reasoned it out thoroughly enough for the purpose at hand
- When you've taken into account all of necessary factors

You do not need to prove a case conclusively

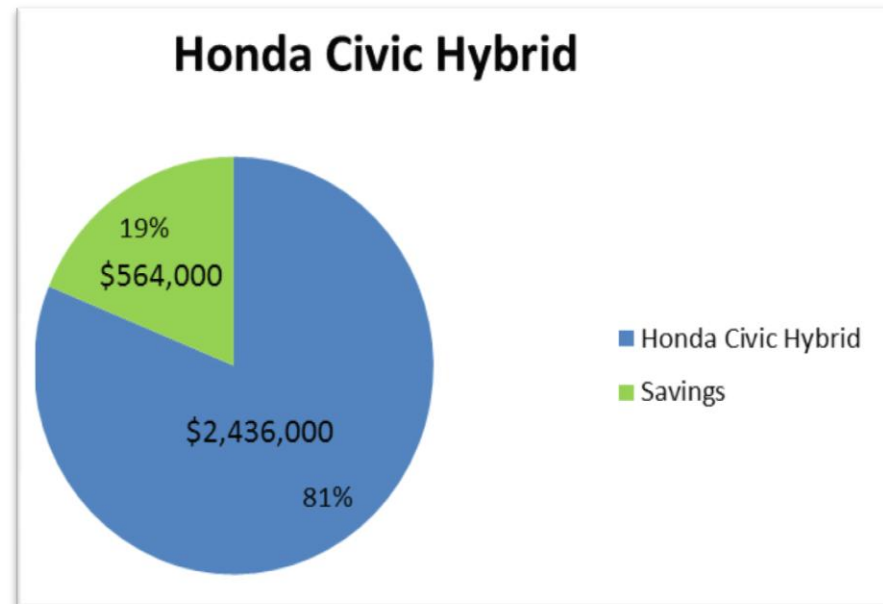
Sufficiency

A car rental company has a budget of \$1,000,000 for buying 100 new cars.

Issue at hand:

to buy 100 hybrid Hondas or

to buy 100 regular gas Hondas



Conclusion based on this graph is insufficient

Sufficiency

Hybrid

MSRP:\$24,360.00

Battery Cost: \$2000/7 Years

MPG: 44 HWY

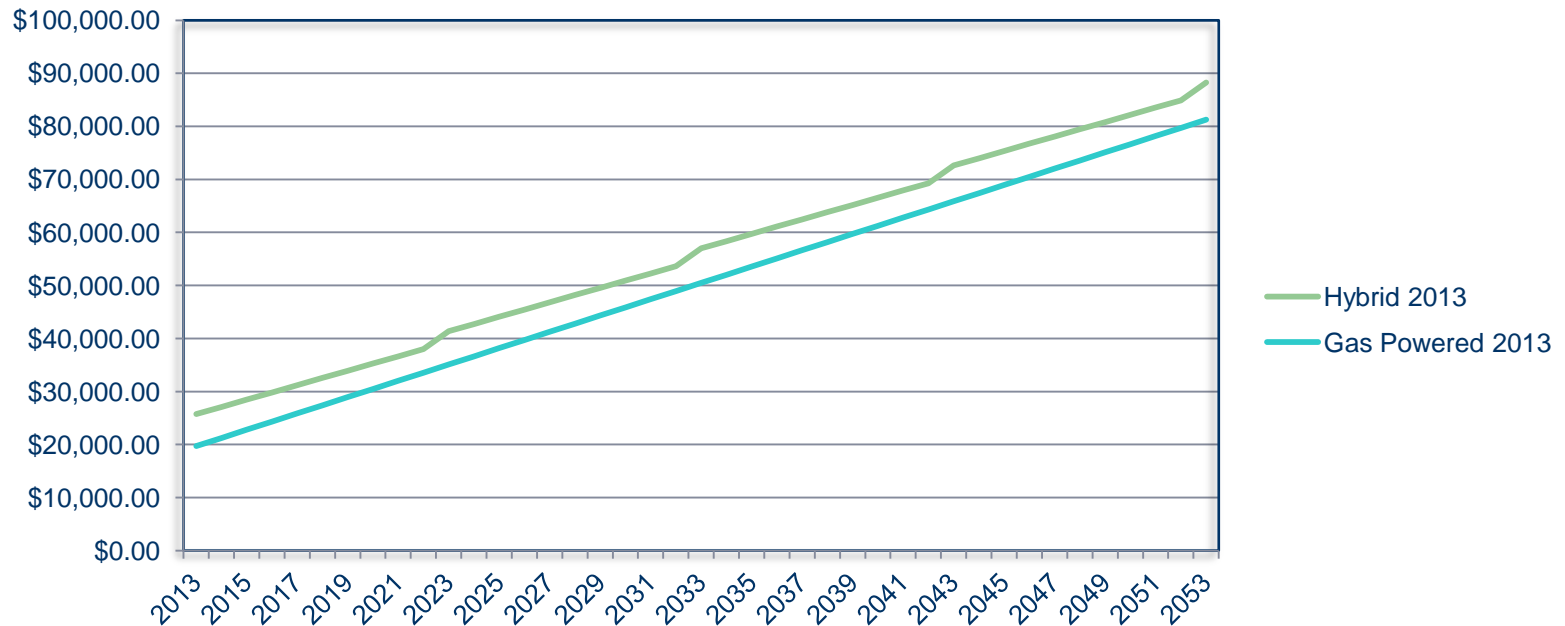
Average 10 Year Cost:
\$37,006.97

Gas Powered

MSRP:\$18,164.00

MPG: 39 HWY

Average 10 Year Cost:
\$28,972.69



Depth and Breadth

Your thinking is **deep** enough

- Recognize you must look beneath the surface of the issue at hand
- Identify the complexities underlying the issue and take adequate account of the complexities

Your thinking is **broad** enough

- Recognize the need to look at other perspectives
- Identify other aspects and take adequate account of them in reasoning through the issue

Depth and Breadth



Depth and Breadth

I am not satisfied with my grades. I study, but my grades are still not as high as should.

Broadening my thinking:

- What are other more effective ways of studying?
- Whom can I consult about this?
- Are there any skills that might be helpful?

Deepening my thinking:

- What underlines my difficulties even though I study a lot?
- Maybe some attitudes stay on the way?
- Maybe my concept of studying is off-base?

Depth and Breadth

Your thinking is **deep** enough when you look beneath the surface of the issue at hand

Example: “**Hot air rises**”

This is accurate, but not deep

Physically, cold air falls because it is heavier, so gravity pulls it downwards

Hot air is pushed upward by the falling cold air

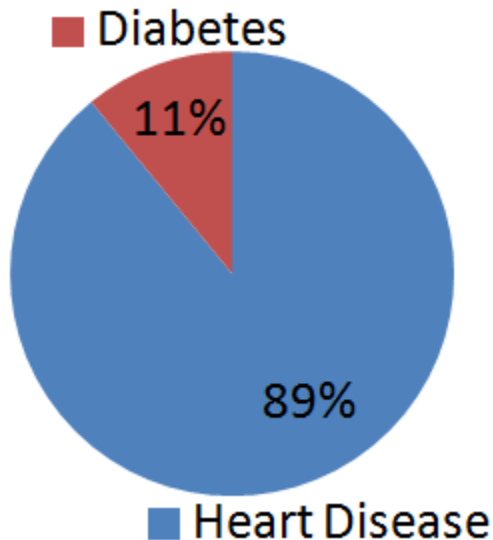
Precision

Your thinking is **precise** if you are as specific and detailed as needed to reason through an issue

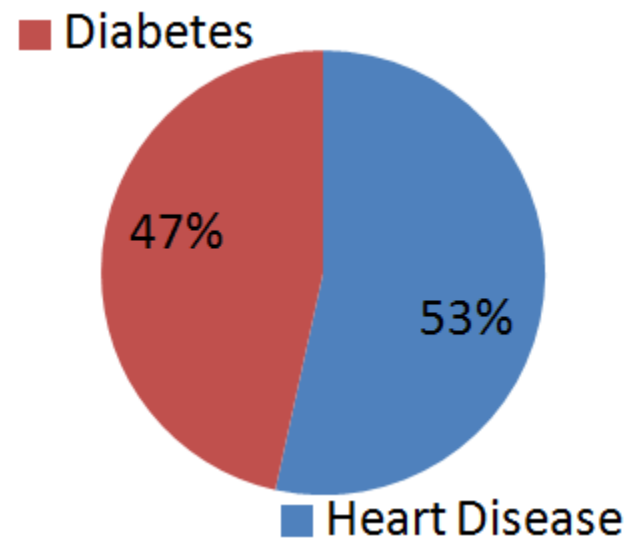
Imprecise: “Percentage of death from diabetes is much lower than from heart disease whereas funding for both types of disease is almost equal”

Precise:

Deaths in 2011



Total Funding 2011



Additional Standards

Reasonable

Logical, Rational

Consistent

Falsifiable

Testable

Well-organized

Reliable

Effective

Evaluate

Is procrastination good for me?

Most students make the mistake of studying from test to test rather than from class to class. In doing so, they fall victim to a student's greatest enemy – procrastination. Procrastination is an attitude that says, “Do it later!” This approach rarely works in any course, but especially not in math, science and engineering courses, in which each new concept builds on the previous ones.

If you are a procrastinator, you are ignoring the sequential nature of engineering study, as well as your own inability to absorb complex information all at once. So you can't realistically expect to succeed if you delay your studying until a test is imminent.

