

**Critical Thinking**

**Training Manual**

Table of Contents

[Module One: Getting Started 4](#_Toc315179638)

[Workshop Objectives 4](#_Toc315179639)

[Module Two: Components of Critical Thinking 6](#_Toc315179640)

[Applying Reason 6](#_Toc315179641)

[Open Mindedness 6](#_Toc315179642)

[Analysis 7](#_Toc315179643)

[Logic 7](#_Toc315179644)

[Case Study 7](#_Toc315179645)

[Module Two: Review Questions 8](#_Toc315179646)

[Module Three: Non-Linear Thinking 10](#_Toc315179647)

[Step Out of Your Comfort Zone 10](#_Toc315179648)

[Don’t Jump to Conclusions 10](#_Toc315179649)

[Expect and Initiate Change 11](#_Toc315179650)

[Being Ready to Adapt 11](#_Toc315179651)

[Case Study 11](#_Toc315179652)

[Module Three: Review Questions 12](#_Toc315179653)

[Module Four: Logical Thinking 14](#_Toc315179654)

[Ask the Right Questions 14](#_Toc315179655)

[Organize the Data 15](#_Toc315179656)

[Evaluate the Information 15](#_Toc315179657)

[Draw Conclusions 15](#_Toc315179658)

[Case Study 16](#_Toc315179659)

[Module Four: Review Questions 17](#_Toc315179660)

[Module Five: Critical Thinkers (I) 19](#_Toc315179661)

[Active Listening 19](#_Toc315179662)

[Be Curious 20](#_Toc315179663)

[Be Disciplined 20](#_Toc315179664)

[Be Humble 20](#_Toc315179665)

[Case Study 20](#_Toc315179666)

[Module Five: Review Questions 21](#_Toc315179667)

[Module Six: Critical Thinking (II) 23](#_Toc315179668)

[Seeing the Big Picture 23](#_Toc315179669)

[Objectivity 24](#_Toc315179670)

[Using Your Emotions 24](#_Toc315179671)

[Being Self-Aware 24](#_Toc315179672)

[Case Study 24](#_Toc315179673)

[Module Six: Review Questions 25](#_Toc315179674)

[Module Seven: Evaluate the Information 27](#_Toc315179675)

[Making Assumptions 27](#_Toc315179676)

[Watch out for the Bias 27](#_Toc315179677)

[Ask Clarifying Questions 28](#_Toc315179678)

[SWOT Analysis 28](#_Toc315179679)

[Case Study 28](#_Toc315179680)

[Module Seven: Review Questions 29](#_Toc315179681)

[Module Eight: Benefits of Critical Thinking 31](#_Toc315179682)

[Being More Persuasive 31](#_Toc315179683)

[Better Communication 31](#_Toc315179684)

[Better Problem Solving 32](#_Toc315179685)

[Increased Emotional Intelligence 32](#_Toc315179686)

[Case Study 32](#_Toc315179687)

[Module Eight: Review Questions 33](#_Toc315179688)

[Module Nine: Changing Your Perspective 35](#_Toc315179689)

[Limitations of Your Point of View 35](#_Toc315179690)

[Considering Others Viewpoint 35](#_Toc315179691)

[Influences on Bias 36](#_Toc315179692)

[When New Information Arrives 36](#_Toc315179693)

[Case Study 36](#_Toc315179694)

[Module Nine: Review Questions 37](#_Toc315179695)

[Module Ten: Problem Solving 39](#_Toc315179696)

[Identify Inconsistencies 39](#_Toc315179697)

[Trust Your Instincts 40](#_Toc315179698)

[Asking Why? 40](#_Toc315179699)

[Evaluate the Solution(s) 40](#_Toc315179700)

[Case Study 41](#_Toc315179701)

[Module Ten: Review Questions 42](#_Toc315179702)

[Module Eleven: Putting It All Together 44](#_Toc315179703)

[Retaining Your New Skills 44](#_Toc315179704)

[Reflect and Learn From Mistakes 44](#_Toc315179705)

[Always Ask Questions 45](#_Toc315179706)

[Practicing Critical Thinking 45](#_Toc315179707)

[Case Study 45](#_Toc315179708)

[Module Eleven: Review Questions 46](#_Toc315179709)

[Module Twelve: Wrapping Up 48](#_Toc315179710)

[Words from the Wise 48](#_Toc315179711)

[Lessons Learned 48](#_Toc315179712)

# Module One: Getting Started

*The way to get started is to quit talking and begin doing.*

*Walt Disney*

We live in a knowledge based society, and the more critical you think the better your knowledge will be. Critical Thinking provides you with the skills to analyze and evaluate information so that you are able to obtain the greatest amount of knowledge from it. It provides the best chance of making the correct decision, and minimizes damages if a mistake does occur.

Critical Thinking will lead to being a more rational and disciplined thinker. It will reduce your prejudice and bias which will provide you a better understanding of your environment. This workshop will provide you the skills to evaluate, identify, and distinguish between relevant and irrelevant information. It will lead you to be more productive in your career, and provide a great skill in your everyday life.

Before we begin with the main points of this course, however, we first need to complete some activities to help focus and maximize our learning experience. In Module One, we’re going to cover topics such as basic housekeeping, parking lot, workshop objectives and action plans and evaluation. So, let’s get started.

## Workshop Objectives

C:\Users\Kimmi\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\JVU559D0\MCj02934740000[1].wmfResearch has consistently demonstrated that when clear goals are associated with learning, it occurs more easily and rapidly.

The objectives for this course are as follows:

* Understand the components of critical thinking
* Utilize non-linear thinking
* Use logical thinking
* Recognize what it means to be a critical thinker
* Evaluate information using critical thinking skills
* Identify the benefits of critical thinking
* Revise perspective, when necessary
* Comprehend problem solving abilities

## Pre-Assignment

List two recent events where you could have benefited from better critical thinking skills.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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# Module Two: Components of Critical Thinking

*Thinking is the talking of the soul with itself.*

*Anonymous*

Critical thinking is akin to the study of logic. Critical thinking relates to how we make decisions and use our judgment. Critical thinking is more than just thinking about thinking or metacognition. It is also about how we take action. Critical thinking involves many components, and we will address a number of unique components in this module.

## Applying Reason

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\MP321RS9\MC900389552[1].wmfThe ability to reason is often considered one of the characteristic marks of being human. Further, the individual’s ability to reason well is a critical thinking skill. Many of the definitions of critical thinking tend to focus on this ability to reason. Reasoning occurs when we use our knowledge of one thing, process, or statement to determine if another thing, process, or statement is true. When we apply reasoning, we use logic to determine “what follows what.” Human reasoning does not always follow logic and is often based on emotional bias.

## Open Mindedness

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\31B2RP17\MC900234543[1].wmfOpen-mindedness is the virtue by which we learn. In particular, being open-minded means taking into account relevant evidence or argument to revise a current understanding. It means being critically open to alternatives, willing to think about other possibilities even after having formed an opinion, and not allowing pre-conceived notions to constrain or inhibit reflection on newly presented information. Open-minded inquiry is a central theme in education.

## Analysis

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\EOAYJ771\MC900020014[1].wmfIn critical thinking the step of analysis helps us to discriminate and access information. Going back to Bloom’s taxonomy, remember that learning occurs in three domains: cognitive, affective, and psychomotor. In the cognitive domain, analysis is the fourth level and a higher ordered thinking skill. Analysis involves the process, as previously mentioned, of discriminating or separating.

## Logic

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\OVV8IZ9R\MC900198191[1].wmfLogic and reasoning are similar but not the same. Logic is the branch of philosophy that gives the rules for deriving valid conclusions. A conclusion is valid if it follows from statements that are accepted as facts. For instance, a logical statement might be, 1 + 1 = 2. This is a rule based on fact. Factual statements are called premises. When reasoning does not follow the rules, we say it is illogical.

## Case Study

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FZCJR17Y\MC900287131[1].wmfA group of physicists have been researching matter and motion for some years. After numerous studies, they have come to the following conclusions:

“No physical activity happens by chance. All chance occurrences are random events. No random events are physical activities.”

## Module Two: Review Questions

1. What is the difference between deductive and inductive reasoning?
   1. Deductive reasoning is based on observations
   2. Deductive reasoning is used to form a hypothesis
   3. Inductive reasoning is used to form a hypothesis
   4. Inductive reasoning infers a conclusion
2. What is a syllogism?
   1. Two or more premises used to come to a valid conclusion
   2. A statement that says things occur in relation to each other based on a certain order
   3. A statement that says if the antecedent is true, then the following consequence must also be true
   4. A statement of probability
3. What does it mean to be open-minded?
   1. Refuting new information without examining its validity
   2. Being unreceptive to new information
   3. Willingness to accept new information even when an opinion has been formed
   4. An unwilling to accept new evidence that opposes opinions
4. Which scholar/philosopher encouraged open-mindedness and questioned traditional rhetoric 2400 years ago?
   1. Pliny the Elder
   2. Descartes
   3. Emerson
   4. Socrates
5. Where does analysis fall in Bloom’s Taxonomy?
   1. It’s the very top domain
   2. It’s the first domain
   3. High level – one of the upper three domains
   4. Low level – one of the lower three domains
6. Which of the following is not one of the three factors to consider when analyzing new information?
   1. Argument
   2. Evidence
   3. Environment
   4. Language
7. What is logic?
   1. Rules
   2. Conclusions
   3. Premises
   4. A branch of philosophy
8. What is a premise?
   1. A statement of fact or value
   2. Rule
   3. Conclusion
   4. Bias
9. What had the physicists been researching for years?
   1. Matter only
   2. Motion only
   3. Matter and motion
   4. None of the above
10. The scientists came to the conclusion that: “No \_\_\_\_ activity happens by chance.”
    1. Mental
    2. Physical
    3. Spiritual
    4. Psychological

# Module Three: Non-Linear Thinking

*Neither a closed mind nor an empty one is likely to produce much that would qualify as effective reasoning.*

*R.S. Nickerson*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FTRMPN7N\MC900200277[1].wmfThere are two ways to work out problems vertically and laterally, as we learned in Module Two we can approach critical thinking and problems in a step-by-step fashion. This is called linear or vertical thinking. However, often we tend to not line up the premises in a normal step-by-step fashion. When we approach a problem in a different order, we are using non-linear thinking. Sometimes, non-linear thinking is also called lateral thinking.

## Step Out of Your Comfort Zone

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\MP321RS9\MC900055555[1].wmfOne of the first steps in developing non-linear thinking is to step out of your comfort zone. Basically, this concept involves seeing information or circumstances from a different perspective. A zone is defined as an area set apart in some way. In critical thinking and problem-solving, sometimes we have to get out of the areas or zones we are comfortable with and stretch our thinking.

## Don’t Jump to Conclusions

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FTRMPN7N\MC900390808[1].wmfAn important step in problem solving is taking the time to acquire the necessary information. Often, we tend to jump to conclusions before we have all of the facts. How can we use our understanding of logic to gather all the necessary facts? Remember, the premises are the facts or statements that help us come to conclusions.

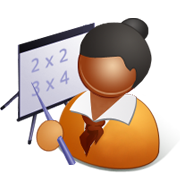
## Expect and Initiate Change

“Be the change you wish to see,” is a common slogan on bumper stickers. With so many events happening on an international and national level each day, change is simply a standard course in businesses. We can always expect changes in organizations. Nothing stays the same, and we sometimes are in the position where we the ones initiating the change.

## Being Ready to Adapt

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\OVV8IZ9R\MC900054968[1].wmfThe question in today’s culture is not will change occur in an organization, but how well are employees at adapting to change. Employees protect themselves from becoming obsolete by changing. Adaptation is a survival skill of nature. The species which survive in an environment are those that are capable of adapting well.

## Case Study

You are a high school, mathematics teacher and you want your students to improve their reasoning skills. You assign word problems, but most of the students just are not getting it. At the present time, the students do not comprehend the process of using logic and why the word problems are important or relevant to them. Some students can do the calculations, but even these students lack an understanding of the process of logic. You want your students to understand that coming up with the right answer is not the most important goal in solving the word problems. You realize you have to come up with some way to…”

1. Change you student’s thinking from linear to non-linear.
2. Get the student’s to better understand the process of logic.

Ask: What can this teacher do to solve her problem? How can she get her students to think differently?

## Module Three: Review Questions

1. What is another term for non-linear thinking
   1. Vertical thinking
   2. Cyclic thinking
   3. Lateral thinking
   4. Tangential thinking
2. What is a zone?
   1. Delineated area
   2. Demarcation
   3. Type of thinking
   4. A line
3. All of the following can help prevent us from jumping to conclusions except for:
   1. Gathering all of the facts
   2. Reviewing the premises
   3. Ignoring the premises
   4. Evaluating all the pertinent information
4. Premises help all the following except to:
   1. Lead to conclusions
   2. Develop an argument
   3. Provide evidence
   4. Manipulate language
5. What is an obstacle to change?
   1. Fear
   2. Adaptation
   3. Courage
   4. Open-mindedness
6. What is a facilitator of change?
   1. Lack of knowledge
   2. Readiness
   3. Limited resources
   4. Status quo
7. What is the first step adaptation?
   1. Awareness
   2. Controlling fear
   3. Assessing new information
   4. Letting go
8. All of the following are techniques to assess new information except for:
   1. Splitting it up
   2. Re-arranging it
   3. Denying it
   4. Re-interpreting it
9. What type of teacher is in the case study?
   1. Science
   2. Social Studies
   3. Health
   4. Math
10. One of the tasks of the teacher is to change the students’ way of thinking from \_\_\_ to \_\_\_\_.
    1. Linear to Non-Linear
    2. Abstract to Concrete.
    3. Non-Linear to Linear
    4. Concrete to Abstract

# Module Four: Logical Thinking

*Reasoning is simply a matter of getting your facts straight.*

*B.F. Anderson*

*Be the change you want to see in the w*

Logical thinking is a process which involves steps. In general logical thinking involves checking the components of the argument and making the connections between, which is what we call reasoning. The four major steps of logical are 1) asking the right questions, 2) organizing data, 3) evaluating the information, and 4) drawing conclusions. In this module, we will analyze these basic steps.

## Ask the Right Questions

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\EOAYJ771\MC900383528[1].wmfThe first step in logical thinking should begin with asking the questions. Based on the components of critical thinking, the logical thinker should begin reasoning by asking many questions. An important question to ask is what are the premises? If we are confused about the premises, we may make mistakes further down the line in the logic process. We should distinguish between whether the statement is a fact or a value and be alert to not confuse the two. Finally, we should check to see if any premises or vital information is missing. A key point to remember is that no conclusions can be made without premises.

## Organize the Data

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\31B2RP17\MC900297267[1].wmfOrganizing data is the second step in the logic process. Once we know the premises we can begin to organize the data. We can organize the information by making connections. An effective method of organizing data includes breaking up the information and diagramming or lying out the premises. Tree diagrams are helpful because they graphically show the connections. For instance, we can use tree diagrams such as this one:

Wealthy

Not Wealthy Lives in a fancy house

Lives in an average house

Does not live in a fancy house

Start

## Evaluate the Information

After organizing the information, the logical thinker can proceed with evaluating it. Evaluating information involves determining whether the information is valid. Conclusions cannot be made until a distinction is made between truth and validity. People often have trouble separating what is valid from what is true because of their ingrained beliefs. **Belief bias** occurs when an individual’s belief system interferes with his or her ability to come to a logical conclusion. **Confirmation bias** is the tendency to use information to support your hypothesis about a problem.

## Draw Conclusions

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9PDUOZYV\MC900197875[1].wmfOnce the data has been collected, organized, and evaluated, we can then draw conclusions. Recall that in deductive reasoning, conclusions are inferred based on valid premises. In inductive reasoning, uses observations to draw conclusions or a hypothesis. Inferences naturally flow from the evidence. In making inferences, the logical thinker should be certain not draw more or less than what is implied, instead:

* Infer only what the data implies
* Check to ensure inferences are consistent
* Identify underlying assumptions

## Case Study

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\31B2RP17\MC900198873[1].wmfLogic problem:

You are a chemistry student in the lab ad one assignment your group has is to mix chemicals until a color change occurs. In this case, you should see a pink color. You are given four beakers of colorless liquids, labeled 1-4. You are given a flask labeled X, which contains the reagent (activating solution). The reagent is needed to cause the color change. How will you determine which combination of chemicals will produce the required pink color?

## Module Four: Review Questions

1. Why is asking the right questions important?
   1. Because questioning is the last step in the logic process
   2. Because questions are based on conclusions
   3. Since premises do not provide any information, you have to ask questions
   4. Because asking the right questions will lead to solutions
2. What is one question that logical thinkers should ask?
   1. What are the premises?
   2. How long will the process take?
   3. Who is involved?
   4. What are the risks?
3. All of the following terms describe convergent structure in organizing data, except for:
   1. Supporting
   2. Reinforcing
   3. Supplemental
   4. Variances
4. What is an advantage of using a tree diagram?
   1. Disperse information
   2. Shows connections
   3. Makes information more complex
   4. Verbal representation
5. What is confirmation bias?
   1. Using premises to support other premises
   2. Using premises to obtain information
   3. Using premises to support what you already believe
   4. Using premises to refute a claim
6. Validity of data is?
   1. Absolute truth
   2. Probability
   3. Lack of support
   4. Truth based on premises
7. What is one risk involved in drawing conclusions?
   1. Draw more from the premises
   2. Make a valid conclusion
   3. Analyze thoroughly
   4. Determine reasonable probability
8. When drawing conclusions thinkers should identify?
   1. Underlying motives
   2. Key factors
   3. Possible outcomes
   4. Underlying assumptions
9. After mixing chemicals, the students are supposed to see what color?
   1. Blue
   2. Green
   3. Pink
   4. Yellow
10. The problem in the case study is an example of whose theory?
    1. Freud
    2. Erikson
    3. Piaget
    4. Dewey

# Module Five: Critical Thinkers (I)

*The ear says more than the tongue.*

*W.S. Graham*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9PDUOZYV\MC900415144[1].wmfWhat are some characteristics of critical thinkers? Are there innate abilities that make some individuals better at thinking critically? In module five and six, we will examine eight characteristic characteristics of critical thinkers. The four characteristics we will discuss in Module five are:

* Active Listening
* Curiosity
* Self-Discipline
* Humility

## Active Listening

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\3YJGCFYP\MC900197844[1].wmfWe have all heard it before the best communicators are active listeners. What does it mean to practice active listening? Active listening means the listener is completely engaged in what the speaker is communicating and judging what is being said. The listener is not formulating his rebuttal or responses to the speaker, or even worse thinking about something else unrelated.

## Be Curious

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\ZKNEI80I\MC900198799[1].wmfCuriosity is yet another skill in developing critical thinking. Some scholars believe that Socrates ultimate goal was not so much to advocate his method as to advocate the self-improvement and sparking of curiosity. The main goal of a teacher is to spark curiosity and engage his or her students. There are many methods to engage curiosity but they all essentially involve rising a question. For instance, Einstein prompted his curiosity by asking questions about how matter and energy functioned.

## Be Disciplined

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\OVV8IZ9R\MC900231048[1].wmfReasoning and rationale are often associated with self-discipline. Critical thinking is a self-disciplined and self-guided action. Critical thinking requires the individual to use his own reasoning skills and ability to evaluate and reflect. One important thing to consider is that people who are critical thinkers commonly are also more empathetic and aware of their world. They show a commitment to self-development and strive to make their environment a better place.

## Be Humble

Humility is defined as the “quality of being modest of opinion or estimate of one’s own importance.” Humility is the opposite of arrogance. Humility relates having an open mind. To be receptive to new information or opinions, the critical thinker would have to be modest of his or her own opinion. Being humble allows you to accept and see information in a way that is not filtered through your ego.

## Case Study

You are on a management team responsible for determining how to reduce the number of returns for defective software products in a large company. No particular department wants to take responsibility for the returns but the problem must be solved because the company is losing revenue and customers.

## Module Five: Review Questions

1. Active listening is:
   1. Engaged listening
   2. Judging what the speaker is saying
   3. Formulating your own thoughts
   4. Selective listening
2. One common obstacle to active listening is:
   1. Formulating own thoughts when listening
   2. Speakers who talk too much
   3. Speakers who use complex language
   4. Good concentration
3. Critical thinking is sparked by:
   1. Thinkers
   2. A match
   3. Curiosity
   4. Debate
4. Questions must be followed by:
   1. Actions
   2. Premises
   3. Facts
   4. Claims
5. Which qualities are often associated with self-discipline?
   1. Stubbornness and resolve
   2. Narrow-mindedness and judgment
   3. Reasoning and rationale
   4. Impatience and lack of perseverance
6. Why is discipline important to critical thinking?
   1. Critical thinking requires technical skills
   2. Critical thinking is difficult to master
   3. Critical thinking requires the individual to rely on others
   4. Critical thinking requires the individual to use their reasoning skills
7. Humility is:
   1. Being of modest opinion of one’s own importance
   2. Being overconfident
   3. Having an inflated ego
   4. Being inconsiderate of others
8. All of the following qualities help promote humility in the critical thinker except for:
   1. Self-discipline
   2. Confidence
   3. Receptivity
   4. Arrogance
9. The case study is about learning how to reduce the number of returns on what type of product?
   1. Software
   2. Clothing
   3. Hair products
   4. Furniture
10. How are the defective products affecting the company?
    1. It is losing revenue only
    2. It is losing revenue and customers
    3. It is losing customers only
    4. Its stock price is dropping

# Module Six: Critical Thinking (II)

*Man is but a reed, the most feeble thing in nature, but he is a thinking reed.*

*Blaise Pascal*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\39XQYYJK\MC900406372[1].wmfIn the previous module, we began to examine characteristics of critical thinkers. In this module, we will continue to look at more characteristics to help us improve our critical thinking capabilities. Four additional topics are presented in this module. They are:

* Seeing the big picture
* Objectivity
* Using your emotions
* Being self-aware

## Seeing the Big Picture

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FTRMPN7N\MC900410297[1].wmfOne of the main functions of thinking is to make connections. Our own ideas gain significance when we can relate or connect them to other ideas. We start to gain insight when we see the similarities between ideas. The way we structure our ideas can be based on how they connect in one of two ways: causal or conceptual relationships. Since many problems arise due to causal changes, we will focus on this aspect. Steps in discovering causal relations include:

* Laying out the account
* Determining a hierarchy
* Interpreting convergences and divergences
  + Convergences are ideas/things that reinforce, supplement, or complement events
  + Divergences are points that do not reinforce events

## Objectivity

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\3YJGCFYP\MC900415928[1].wmfObjectivity is defined as “intentness on objects external to the mind.” In critical thinking, we want have a keen sense of objectivity. This is a heuristic or rules/strategies for problem solving. Objectivity helps us to engage more thoughtfully and deliberately in the critical thinking process. However, we should not completely exclude our emotions and or subjective feelings in the decision making or problem solving process. The most important thing to remember is that evaluating information objectively helps us to be more deliberate or thorough.

## Using Your Emotions

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FTRMPN7N\MC900389028[1].wmfAs mentioned in the previous section, emotions should not be ignored altogether when thinking critically. Emotions play a crucial role in the thinking process. For instance, professionals need empathy when working with others regardless of their occupation in order to vicariously experience what others feel, believe, or wish. The issue with emotions and decision making is to not allow emotions to cloud your judgment.

## Being Self-Aware

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\39XQYYJK\MC900215486[1].wmfSelf-awareness is yet another characteristic of the critical thinker. This characteristic relates to acutely being aware of one’s feelings, opinions, and assumptions. Moreover, it is a starting point for thinking critically. Our assumptions are how the first and strongest filters through we evaluate information.

## Case Study

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9MJXCRQW\MC900397148[1].wmf“You are a financial officer in a medium size company, which has been in business for 10 years. The owner of the company stays abreast of changes and trends in their industry and to use his intuition when making decisions. He not only bases decisions on how he feels but he also acts quickly. Initially, the owner’s way of doing business worked. He seemed to be on a winning streak, so to speak. Now that the economy has changed, the financial manager is concerned. However, the owner continues to makes decisions in the same manner. Recently, the owner has requested funds to purchase a fleet of 20 new cars, hybrids, in the next three months. As the financial officer you are concerned about this decision. ”

## Module Six: Review Questions

1. In evaluating the big picture, what are convergences?
   1. Variances
   2. Similarities
   3. Differences
   4. Non-reinforcing information
2. In evaluating the big picture, what are divergences?
   1. Variances
   2. Consistent information
   3. Complementary information
   4. Reinforcing information
3. What does it mean to be objective?
   1. To be biased
   2. To judge based on opinions
   3. Make external, non-opinionated observations
   4. To base observations on person feelings
4. What is heuristics?
   1. Rules or strategies for organizing information
   2. Rules or strategies for problem solving
   3. Process of evaluation
   4. Way learners memorize information
5. What emotion is important for professionals when working with others?
   1. Empathy
   2. Anger
   3. Impatient
   4. Aggressiveness
6. What is a problem with emotions and decision making?
   1. Clouds an individual’s judgment
   2. Makes it easier to understand the facts
   3. Clarifies the premises
   4. Makes problem solving less complex
7. What does it mean to be self-aware?
   1. To be aware of what is affecting others
   2. For others to provide advice
   3. For others to direct thinking
   4. To be aware of our own thoughts and feelings
8. What is the starting point for critical thinking?
   1. The theories of past thinkers
   2. Information cited in the media
   3. Textbooks
   4. Our own thoughts and feelings
9. How long has the company been in business?
   1. 10 years
   2. 5 years
   3. 7 years
   4. 15 years
10. How many new cars / hybrids would the owner like to purchase in the next three months?
    1. 10
    2. 20
    3. 40
    4. 100

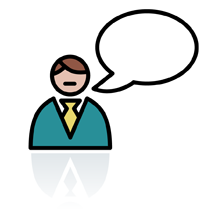
# Module Seven: Evaluate the Information

*True genius resides in the capacity for evaluation of uncertain, hazardous, and conflicting information.*

*Winston Churchill*

A big challenge in the process of critical thinking is how to evaluate information. We have already looked at some steps in evaluating information during the process of logic. In this module, we will delve deeper into evaluation. The best critical thinkers are those people, as Winston Churchill noted, who capable of gleaning through information that may be unclear or conflicting.

## Making Assumptions

As we mentioned in the previous module, self-awareness is a starting point from which we begin to think critically. We based our decisions on assumptions we make about objects or things. Assumptions are the arguments, but the distinguishing feature of an assumption is that it is a statement in which no proof or evidence is provided. Assumptions can be either verbally stated or mentally held (unstated). In most cases, they are unstated.

## Watch out for the Bias

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\1JXY5E11\MC900390810[1].wmfAs we learned in the section on logic, confirmation bias can influence the inferences we draw. Bias is not something that we can completely eliminate. However, when thinking critically, we need to watch out for confirmation bias. We should ensure that we don’t allow our preconceived opinions to influence the way we evaluate data to the degree that we use the data to confirm what we already believe. We can use objectivity to oppose bias.

## Ask Clarifying Questions

As we addressed in an earlier section, asking the right questions is important. Equally important is to ask clarifying questions when making decisions. Clarifying questions are thought-provoking questions and help the thinker acquire more information. Question types can be either generic or specific. With clarifying questions you can expect other questions to arise out of the answers you receive, so be prepared for those.

## SWOT Analysis

SWOT Analysis is also called Strengths, Weaknesses, Opportunities, and Threats. We use this type of analysis to be more objective thinkers. SWOT allows us to think cleanly and clearly, and from a logical point of view and is very helpful in most business and marketing situations, Strengths and Weaknesses are regarded as internal factors, while Opportunities and Threats are regarded as external factors.

|  |  |  |  |
| --- | --- | --- | --- |
| **Strengths and Weaknesses** | Situation inside the company or organization (Internal environment) | Examples:  pricing, products, costs, or performance | Factors tend to be in the present |
| **Opportunities and Threats** | Situation outside the company or organization (External environment) | Examples:  markets, sectors, audience, or trends | Factors tend to be in the future |

## Case Study

Your department has really worked hard over the past 18 months. Your boss wants to implement an employee recognition program spamming a twelve-month period. He wants some form of recognition to take place every month, and at the end of the year when you department has its annual team meeting. He wants a trophy awarded to one outstanding employee and a plaque awarded to section of the department that preformed the best. How will your employee recognition team go about implementing this challenge? What responsibilities and timeline will you follow?

## Module Seven: Review Questions

1. What is an assumption?
   1. A statement in which no proof or evidence is provided
   2. A fact
   3. A state of evidence
   4. The proofs made to assert a claim
2. An assumption that is not clearly stated is an:
   1. Explicit statement
   2. Truth
   3. Valid point
   4. Implied statement
3. What is a function of confirmation bias?
   1. To refute existing assumptions
   2. To support existing assumptions
   3. To validate new information
   4. To help us understand others’ ideas
4. What is the opposite of bias?
   1. Subjectivity
   2. Evaluation
   3. Observation
   4. Objectivity
5. Clarifying questions do what?
   1. Reveal opinions
   2. Help the thinker acquire more information
   3. Delineate details
   4. Help critical thinkers be less objective
6. What is one type of clarifying question discussed in this module?
   1. Factual
   2. Opinion
   3. Generic
   4. Rhetorical
7. What do the S and W represent in SWOT analysis?
8. Subjective, Weak
9. Subjective, Wide
10. Strengths, Wide
11. Strengths, Weaknesses
12. What do the O and T represent in SWOT analysis?
    1. Opposite, Trial
    2. Opponent, Type
    3. Opportunities, Threats
    4. Opportunities, Types
13. The boss would like to implement an employee recognition program spanning what time period?
    1. 18 months
    2. 2 years
    3. 3 months
    4. 12 months
14. At the end of the employee recognition period, what would the boss like to award to an outstanding employee?
    1. Trophy
    2. Company logo items
    3. Paid time off
    4. Plaque

# Module Eight: Benefits of Critical Thinking

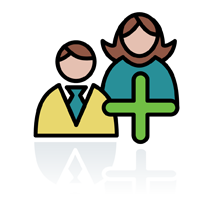
*Life consists of what a man is thinking of all day.*

*Ralph Waldo Emerson*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9MJXCRQW\MC900441515[2].wmfWe have already determined why critical thinking is important. We know in particular that critical thinking helps us make better decisions and to rationally apply information. While there are many benefits of critical thinking, in this module, we will examine only four. They are:

* Being more persuasive
* Better communication
* Better problem solving
* Increased emotional intelligence

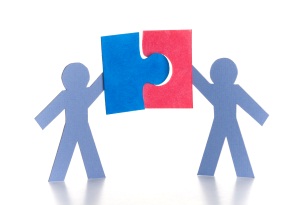
## Being More Persuasive

Persuasiveness is the characteristic of being able to influence others. We normally think of salespersons and politicians when we hear the word persuasiveness. However, all managers or professionals use persuasiveness on a daily basis. Anytime, we want to have others accept our ideas, we do so through the power of persuasion. How will critical thinking make us more persuasive? It is because critical thinking is a deliberate or thoughtful process, and the more deliberate we are, the better we are in expressing our assumptions or ideas and persuading others.

## Better Communication

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\39XQYYJK\MC900282914[1].wmfCritical thinking improves communication for some of the same reasons that it improves persuasiveness. Many of the same factors we use to improve our persuasiveness also make us better communicators in general. For instance, the use of analogies and metaphors is a great persuasion and general communication technique. In addition to helping us in using language more persuasively; critical thinking also helps us use language with more clarity.

## Better Problem Solving

Critical thinking and problem solving are closely related and are almost intertwined. Sometimes we say that to solve logic problems we must use our critical thinking skills. In fact, logic, critical thinking, and problem solving use some of the same cognitive processes. Critical thinkers use their problem solving skills not just their intuition to make decisions or draw conclusions.

## Increased Emotional Intelligence

What is emotional intelligence and how does critical thinking help increase our emotional intelligence? Emotional intelligence is identified as the ability to assess and control the emotions of oneself, others and even groups. Emotional intelligence is being “heart smart” as opposed to “book smart.” Critical thinking helps increase emotional intelligence because one of the characteristics of a critical thinker is self-awareness. Also, critical thinkers know how and when to use their emotions, such as empathy, in making decisions. The more a person uses his or her critical thinking skills the better adept he or she should become at identifying, understanding, and managing his or her emotions. Emotional intelligence in general consists of four abilities:

* Self-awareness
* Self-management
* Social awareness
* Relationship management

## Case Study

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\1JXY5E11\MC900295752[1].wmfYour team of cardiovascular nurses has been assigned the duty of developing some patient education materials. Your patient population is primarily comprised non-English speakers. In the training you must develop education on how to lower the risks of a heart attack. First however, you must identify the risk of hearts attacks. In three weeks, two members of your team will be presenting to 25 patients at a health forum. The problem is how will you design and implement training for these patients? Before the actual forum, your team should have a practice run of the training sessions.

## Module Eight: Review Questions

1. What does it mean to be persuasive?
   1. Promoting discord
   2. Having influence over others
   3. Causing disagreement
   4. Not being convincing
2. All of the following enhance persuasiveness except for:
   1. Empathy
   2. Deliberation
   3. Clearly expressing our ideas
   4. Illogical reasoning
3. What does clear communication and persuasiveness have in common?
   1. They both involve deliberation
   2. They express complex ideas
   3. They express simple ideas
   4. They take a long time to master
4. All of the following are steps in clear communication except for:
   1. Telling the listeners relevant information
   2. Using context to clarify the meaning
   3. Avoid being unnecessarily redundant
   4. Embellishing information or giving inaccurate information
5. How does critical thinking improve problem solving?
   1. Both use logic
   2. It involves analysis
   3. Both are complex
   4. It involves questioning
6. Which of the following is a feature of means-analysis?
   1. Uses hints
   2. Uses brainstorming
   3. Breaks down the problem
   4. Often involves a contradictory component
7. What is emotional intelligence?
   1. Being aware of our opponents views
   2. Being self-aware
   3. Ability to assess and control our emotions and the emotions of others
   4. Ability to vicariously experience what others are feeling
8. What is the first step in raising emotional intelligence?
   1. Use humor to diffuse situations
   2. Determine what the questions are
   3. Connect with others
   4. Calm down and reduce any feelings of being overwhelmed
9. What type of nurses is mentioned in the case study?
   1. Cardiovascular
   2. Medical-Surgical
   3. Acute Care
   4. Ambulatory Care
10. The nursing team will be presenting to how many patients at the health forum?
    1. 10
    2. 30
    3. 25
    4. 15

# Module Nine: Changing Your Perspective

*Everyone sees drama from his own perspective.*

*Jean-Marie Le Pen*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FTRMPN7N\MC900090420[1].wmfThe interesting thing about perspective is that everyone has one. Earlier in this course, we learned how important having an open mind is in critical thinking. One aspect of open-mindedness we learn is that it makes us receptive to other viewpoints. In this module, we will examine further the concept of changing our perspective.

## Limitations of Your Point of View

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\MP321RS9\MC900197955[1].wmfAs mentioned at the beginning of this course, one component of critical thinking is open mindedness. This component as well as bias relate to the critical thinkers point of view. The less open-minded and more biased a person is the more limited his or her point of view. The challenge in critical thinking is avoid limitations of your point of view and not be constrained by cognitive or mental blinders.

## Considering Others Viewpoint

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9MJXCRQW\MC900297401[1].wmfOne reason we find it so difficult to consider others viewpoint is that we are over-concerned with our own opinions and views. A challenge for the critical thinker is to step down from the mountain of self, up to the mountain of the other. Considering others viewpoint is easier when we understand the benefits. For instance, it helps us be more empathetic, it helps to see the bigger picture and it also promotes objectivity.

## Influences on Bias

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\3YJGCFYP\MC900383238[1].wmfIn this course, we have discussed bias and how it influences our conclusions in the logic process. What are some influences on bias? The first thing that can influence bias is the way the person interprets information he or she is receiving. The other influence on bias is the way the presenter or speaker frames questions or information. For instance, researchers have found that hypothetical questions influence behavior and promote bias. The key to not being influenced by hypothetical information is to remember that it is just that and not factual information.

## When New Information Arrives

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\3YJGCFYP\MC900055154[1].wmfWhen the critical thinker receives new information, how should they organize it? One way of and probably the most common way of handling new information is through an organization schema. Schema indicates which role new information plays. It compartmentalizes information into a familiar format, which makes it easier for the critical thinker use.

## Case Study

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FTRMPN7N\MC900432397[1].wmfRonnie owns a spa and salon. Generally her customers leave satisfied and she has developed a loyal client base. However, recently she had an incident where a customer came into the spa to receive a facial and a microdermabrasion. Prior to the service the front desk staff explained the procedures and the risks, which included skin irritation. After the service, the client’s face was red as it normally should be. The client did not indicate any problem as she was checking out. Two days later the client calls the spa to speak to Ronnie. The client is upset because her face is still red and she has an important engagement to attend where she is a speaker. What should Ronnie do?

## Module Nine: Review Questions

1. What is a problem with a limited viewpoint?
   1. It involves objectivity
   2. It easily accepts new information,
   3. It involves bias
   4. It is curious
2. How can we change our viewpoint?
   1. Remove cognitive constraints or blinders
   2. Consider only one viewpoint
   3. Hold onto preconceived views
   4. Over analyze new information
3. Considering the viewpoint of others helps do all of the following except for:
   1. Be empathetic
   2. See the big picture
   3. Be more objective
   4. Be more biased
4. The reason we have difficulty seeing others viewpoint is:
5. We are looking at the big picture
6. We are overwhelmed with information
7. We infer more from the premises than what’s there
8. We are overly concerned with our own views
9. What is an influence on bias?
   1. Hypothetical questions
   2. Clarifying questions
   3. Numerical data
   4. Factual information
10. The way to overcome the factor influencing bias is:
    1. To review data carefully
    2. To double check premises
    3. To accept information at face value
    4. To remember hypothetical information is just hypothetical and not facts
11. For critical thinkers, new information needs to be:
    1. Organized
    2. Made more complex
    3. Ignored
    4. Critiqued
12. One way to organize new information is to:
    1. Store on a computer
    2. Analyze it
    3. Place in schema
    4. File in a folder
13. What type of business does Ronnie own?
    1. Dog Kennel
    2. Restaurant
    3. Bakery
    4. Spa and salon
14. What type of phone call did Ronnie receive from a client?
    1. Service issue
    2. Business suggestion
    3. Recognition of an outstanding employee
    4. Question about directions to the business

# Module Ten: Problem Solving

*We can’t solve problems by using the same kind of thinking we used when we created them.*

*Albert Einstein*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9MJXCRQW\MC900090572[1].wmfA major function of critical thinking is it allows us to solve problems. Regardless of our vocation or profession, we are presented daily with a host of decisions and problems to solve. In this module, we will learn some steps for problem solving for critical thinkers. Some psychologists define a problem as a gap or barrier between where an individual is and where they wish to be. In other words, a problem is the space between point A and B. Problems then essentially consist of the initial state and a goal state. All possible solution paths leading to the goal state are located in the problem space. Some researchers say that problem solving has three primary stages:

1. Preparation or familiarization
2. Production
3. Judgment and evaluation

## Identify Inconsistencies

Much of critical thinking is about how to connect the two points in a problem. However, sometimes critical thinkers are presented with inconsistencies or what scientists call cognitive dissonance. Cognitive dissonance can appear through a discrepancy between attitude and beliefs. Inconsistencies can also be called variances or dissimilarities. It is a natural tendency to want to eliminate inconsistencies when solving a problem. The best way critical thinkers can identify inconsistencies is by using their logic and objectivity to see variances. Identifying inconsistencies would fall under the first stage of problem solving in which we are familiarizing ourselves with the subject.

## Trust Your Instincts

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FZCJR17Y\MC900149724[1].wmf“Trust your instincts” falls under the second stage of problem solving, of which we are now beginning to produce solution paths. Instincts are defined as a natural intuitive power. Intuition or instincts are key pieces in problem solving. When coupled with trial and error, informed guesses, and brainstorming, intuition and instincts can lead to a highly creative process. Many scientific discoveries and inventions were made because the innovator followed his or her instincts. Think of Benjamin Franklin and Thomas Edison, for instance.

## Asking Why?

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\MP321RS9\MC900234625[1].wmfIn a previous module, we discussed how asking the right question is important in logical thinking. Asking why is equally important in problem solving. It is not sufficient to be simply presented with the information or data. Critical thinkers must always be willing to dig deeper and explore various possibilities. Asking why can fall under any of the three stages of problem solving.

## Evaluate the Solution(s)

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\EOAYJ771\MC910217102[1].wmfOnce a possible solution has been derived, problem solvers may feel they can proceed with the solution. However, they should not overlook the all-important step of evaluating all possible solutions. Sometimes, one problem has more than one solution and taking the time to evaluate the efficacy of each alternative is a critical thinking skill. Evaluation is also called judgment, and this is the third stage of problem solving. The critical thinker should evaluate each alterative and judge which one is the best. The following steps are an effective evaluation technique:

1. Make a T-chart to weigh the pros and cons of each possible solution
2. Develop criteria (or requirements) and assign weights to each criteria
3. Prioritize the criteria
4. Rate the proposed solutions using the criteria

## Case Study

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9MJXCRQW\MC900396222[1].wmfA team of account managers need to implement a better system to track their sales. One problem is that some managers say they have generated X amount of leads, but when the team lead looks at the weekly reports the number of leads on the computer do not match what the managers’ report verbally. Another issue is that the sales are promised but transactions do not actually occur until weeks or months later. The sales team has been trying to work with customer service and billing on this issue. After several meetings the account managers and their team lead have decided that they need a task force to solve the problem. Your group is the task force.

## Module Ten: Review Questions

1. What is cognitive dissonance?
   1. Variances in attitudes and beliefs
   2. Mental patterns
   3. Complementary information
   4. Convergences
2. What is one way to identify inconsistencies?
   1. Analyze information only once
   2. Take information in large chunks
   3. Process information quickly
   4. Use objectivity to see variances
3. All of the following coupled with intuition make a creative process, except for:
   1. Trial and error
   2. Informed guesses
   3. Brainstorming
   4. Strictly delineated processes
4. Instincts are defined as:
   1. Natural intuitive power
   2. Excessive emotions
   3. Physical capabilities
   4. Cognitive processes
5. Being presented with information is not enough, critical thinkers must also:
   1. Follow up
   2. Ask questions
   3. Listen carefully
   4. Use technology
6. Questioning helps the critical thinker:
   1. Remain shallow
   2. Explore possibilities
   3. Keep a narrow view
   4. Remain biased
7. What is one step in evaluating solutions?
   1. Review the requirements
   2. Develop a plan
   3. Prioritize the tasks
   4. Rate the proposed solutions using the criteria
8. What kind of chart can we use to evaluate solutions that we discussed in this module?
   1. Venn diagram
   2. Tree diagram
   3. T-chart
   4. Y-chart
9. What type of system did the account managers want to create?
   1. One that better tracks attendance
   2. One that better tracks the demographics of their clients
   3. One that better tracks the amount of vacation time each has
   4. One that better tracks their sales
10. What is the first issue mentioned in the case study?
    1. The number of leads verbally reported does not match the number of leads shown on the computer.
    2. Sales are promised but the transactions aren’t completed until weeks or months later.
    3. Many account managers are taking vacation time that they have not accrued.
    4. Tardiness is a problem among the account managers.

# Module Eleven: Putting It All Together

*Happiness comes from when we test our skills toward some meaningful purpose.*

*John Stossel*

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\MP321RS9\MC900198613[1].wmfWe have learned many new skills for logic and critical thinking. Now, we need to learn how to combine these new skills. A skill is only beneficial if it is easy to apply. In this module, we will in particular learn how to:

* Retain your new skills
* Reflect and learn from mistakes
* Always ask the right questions
* Practice critical thinking

## Retaining Your New Skills

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\OVV8IZ9R\MC900404337[1].wmfNow that we have learned many new critical thinking skills, our next challenge is to retain these skills. There are many methods to help you retain your new critical thinking skills. Developing a schema for organizing and remembering information is one method. The subject of critical thinking and metacognition (thinking about thinking) is vast, so there are many resources both online and in print to help you retain the information from this course. The most effective technique to help you retain and improve your critical thinking skills, however, is for you to practice them regularly.

## Reflect and Learn From Mistakes

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\FZCJR17Y\MC900071005[1].wmfReflection is useful step in the logic process. Reflecting and learning from mistakes is also helpful in critical thinking. You may not be able to reflect every time you engage your critical thinking skills. However, from whenever possible, reflect back on the steps taken to come to major decisions. Particularly, managers should regularly reflect on how they interact with their employees, peers and supervisors or directors.

## Always Ask Questions

The importance of inquisitiveness cannot be overemphasized in the process of critical thinking. One contribution to civilization that Socrates made was that he advocated the questioning process during debate. Furthermore, learning is a process sparked by the desire to know more. The inquisitiveness and curiosity of the individual is the foundation of the learning. Questions lead to possible solution paths and ultimately answers. Critical thinkers should never abandon the questioning process.

## Practicing Critical Thinking

C:\Users\Darren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\OVV8IZ9R\MC900199615[1].wmfThe best way to improve your critical thinking skills is to practice them often. Develop ways to remember and organize the techniques from this course. Develop a schema. The way you organize information will affect the way you think. Additionally, try to improve upon critical thinking and creative thinking as these two types of thinking tend to support each other.

## Case Study

Retailers realize the economy is still recovering, and have been pulling out the stops. A team of retailers on South Congress, a 1 mile run of eclectic homebred businesses located in Austin pulled together the past season to tackle the problem in a unique way. They wanted to encourage local shopping, while promoting the holiday spirit and repeat business. You were on that team and part of the planning included a brainstorming session called ‘Stop the Grinch from getting Christmas.’

## Module Eleven: Review Questions

1. What is metacognition?
   1. Study of “thinking about thinking”
   2. Study of cognitive domains
   3. Study of speed reading
   4. Study of emotions
2. What is the most effective way to retain skills?
   1. To use them infrequently
   2. To take material from a course and file it away
   3. To talk about them once
   4. To practice them regularly
3. Critical thinkers should reflect on: (Big decisions)
   1. Mundane activities
   2. Major decisions
   3. Routine tasks
   4. Minor activities
4. Managers should reflect on: (interactions)
   1. Interactions with employees
   2. Routine tasks
   3. Reporting duties
   4. Procedures
5. What is reciprocal peer questioning?
   1. Asking yourself questions
   2. Asking authorities and experts questions
   3. Asking peers questions and receiving their answers
   4. Seeking employee input
6. What is generic questioning?
   1. Questions that can apply in a variety of contexts
   2. Questions that have to do with how something is produced
   3. Questions that relate to the details
   4. Questions that relate to the overall process
7. What is a schema?
   1. Way of organizing information
   2. Fact
   3. Logic category
   4. Way of applying logic
8. All the following factors relate to critical thinking except:
   1. Curiosity
   2. Empathy
   3. Intuition
   4. Close-mindedness
9. Where is the business in the case study located?
   1. Austin
   2. Dallas
   3. Houston
   4. San Antonio
10. What is the name of the brainstorming session?
    1. Oh Christmas Tree
    2. Stop the Grinch from Getting Christmas
    3. The Twelve Days of Christmas
    4. Silent Night

# Module Twelve: Wrapping Up

*All our dignity lies in thought.*

*Blaise Pascal*

Although this workshop is coming to a close, we hope that your journey to improve your critical thinking skills is just beginning. Please take a moment to review and update your action plan. This will be a key tool to guide your progress in the days, weeks, months, and years to come. We wish you the best of luck on the rest of your travels!

## Words from the Wise

* **MC900370486[1]Alison King**: Good questioners are good thinkers.
* **Henry Ward Beecher:** All words are pegs to hang ideas on.
* **Rudolf Arnheim:** All perceiving is also thinking, all reasoning is also intuition, all observation is also invention.

## Lessons Learned

* Critical thinking has many components and that open-mindedness is the basis for learning.
* Non-linear thinking helps critical thinkers to step out of their comfort zone and be adaptable.
* Logical thinking is a systematic process that helps us draw conclusions.
* Critical thinkers require many characteristics to be effective. These characteristics include qualities such as curiosity, humility, discipline objectivity, self-awareness and active listening.
* Methods critical thinkers use to evaluate information in asking clarifying questions and SWOT analysis.
* Critical thinking has many benefits, such as improving our persuasion skills, communication skills, problem solving skills and increasing our emotional intelligence.
* Critical thinking may require an individual to change his or her perspective to assess new information.
* Problem-solving in critical thinking involves identifying inconsistencies, asking questions, trusting your instincts, and taking the time to evaluate all possible solutions.
* Critical thinking is a lifelong process. To retain critical thinking skills, individuals must practice critical thinking, continue to ask questions and learn from their mistakes.

# Appendix I

## Worksheet 1: Components of Critical Thinking

Activity 1. List as many factors as you and your partner can influencing open-mindedness. (List at least 10). Now, discuss these.

Activity 2. For each of the following three terms, list at least three questions that may come up if you were debating or listening to someone else debate an idea:

Argument –

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Evidence –

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Language –

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## Worksheet 2 Case Study Module 2: Logical Reasoning

A group of physicists have been researching matter and motion for some years. After numerous studies, they have come to the following conclusions:

“No physical activity happens by chance. All chance occurrences are random events. No random events are physical activities.”

1. For the statement above debate whether the concluding thought is true or not. Remember open-minded inquiry as you discuss the topic.
2. Now try to see if you can represent this idea in linear order.
3. Can you draw a Venn diagram to determine if it is a valid statement?
4. Can the statement be negated or refuted? Can they be confirmed? What evidence would you use?
5. How would do you think the physicist went about testing this logic problem? How would you design the experiment? Analyze the challenges you may face.

## Worksheet 3: Non-Linear Thinking and Problem Solving

Activity 1: On a train, Williams, Edwards, and Paul are a teacher, scientist, and a doctor, but NOT respectively. Also aboard the train are three businessmen who have the same names: a Mr. Williams, a Mr. Edwards, and a Mr. Paul.

1. Mr. Edwards Lives in New York.
2. The scientist lives exactly halfway between Chicago and New York
3. Mr. Paul earns exactly $60,000 per year.
4. The scientist’s nearest neighbor, one of the businessmen, earns exactly three times as much as the scientist.
5. Williams beats the teacher in billiards.
6. The passenger whose name is the same as the scientist lives in Chicago.

Who is the doctor? Williams OR Edwards OR Paul

Activity 2:Adapting to Change. In the following examples, provide ways the subjects can adapt to their situation.

1. Right before a teacher is about to start class, she realizes she is short 50 copies of an assignment. The nearest copier is down the hall and someone is running off what looks like 100 copies of War and Peace.
2. A species of warm water fish in the Seychelles is being driven out of its warmer ecosystem to colder waters.
3. An airline is faced with new regulations and higher fuel costs.
4. A new manager realizes that several employees on the team was up for the job she just was assigned. Some of the team members are resentful of the changes and the fact the new manager is much younger than they are.
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* Change your student’s thinking from linear to non-linear
* Get the student’s to better understand the process of logic

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Activity- Each learner will receive a critical thinking characteristics discussed in this module on a piece of paper or index card. You assignment is the role play the following:

You are on a management team responsible for determining how to reduce the number of returns for a defective software product in a large company. No particular department wants to take responsibility for the returns, but the problem must be solved because the company is losing revenue and customers.

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Activity 1 –In the following example problem, identify the convergences and divergences.

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3. Your spouse is really upset. Dinner plans were made at her favorite restaurant, and they were cancelled because you had to work late.
4. A recent report says that employment rates should gradually improve during the next 12 months depending on legislation in congress.
5. Your boss has a way of not giving explicit instructions. Your team is starting a new project and he tells the team, “I want this project to be eye-popping.”

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1. A procurement manager has been told that a large shipment has been lost. The inventory in the shipment is required for production starting Monday, and today is Friday.
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Tricia Q. had a view herself as a servant-leader. Her assumption was that given the right conditions, equipped with the right resources, and with visionary leadership, her employees could achieve almost anything. She believed that people are created with talents and desires. She also believed that we can all improve our position in life. How does this manager’s assumption affect his decisions?

A new teacher at Washington Middle School believed all children have a wish to learn. She believed that children are naturally curious when she began the assignment; she quickly observed that many of the children had difficulty staying on task. Unexpectedly, her first 6 weeks involved putting out many fires. How do you believe, she eventually faired in this position?

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Analyze the following case study for the characteristics of critical thinkers you have learned:

“You are the financial officer in a medium size company, which has been in business for 10 years. The owner of the company stays abreast of changes and trends in their industry and to use his intuition when making decisions. He not only bases decisions on how he feels but he also acts quickly. Initially, the owner’s way of doing business worked. He seemed to be on a winning streak, so to speak. Now that the economy has changed, the financial manager is concerned. However, the owner continues to makes decisions in the same manner. Recently, the owner has requested funds from to purchase a new fleet of 20 new cars, hybrids, in the next three months. As the financial officer you are concerned about this decision. ”

## Worksheet 9: Evaluate the Information

Activity 1 – Identify whether statements are implied or explicit.

1. Raises are likely for the fourth quarter. (We will get raises.)
2. Changes will occur in the department. Several new positions will be added. (The company will be hiring).
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4. The patient may experience side effects from the medication; including nausea, headache, and blurred vision (The medicine might make you sick).
5. He’s a successful lawyer. (He must be smart).

Activity 2 – Bias or not? Determine which statements are biased:

1. All African American students required extra attention.
2. The student from an at-risk background may require extra attention.
3. The director prefers managers to provide reports in digital format.
4. Star coffee is the best in the nation.
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## Worksheet 10: Case Study

**Role play the following case and answer the questions:**

“Your department has really work ward over the past 18 months. Your boss wants to implement an employee recognition program spanning a twelve-month period. He was some form of recognition to take place every month and at the end of the year when your department has its annual team meeting, he wants the a trophy awarded to one outstanding employee and a plaque awarded section of the department that performed the best.

How will your employee recognition team go about implementing this challenge? What responsibilities and timeline will you follow?”

## Worksheet 11: Benefits of Critical Thinking

Activity 1 - Solve the following problem:

A troop of soldiers had been travelling for weeks by foot through a desert landscape which resembled the moon, a barren wasteland. While the troops probably had enough food and water rations to make it to the nearest post, they were becoming physically weak from the constant walking 12 – 14 hours per day. Eventually, the soldiers came upon a huge mass of rock. They knew that they were not too far from their destination now. But the problem was how were they supposed to get past the big rock? Someone suggested climbing it, but at one point, they had left all their rappelling gear behind to lighten their load. Someone suggested blowing up the rock because they still had explosives. Eventually, the troop leader came up with an idea. Can you guess what?

Case Study -

Outline your solution.

Your team of cardiovascular nurses has been assigned the duty of developing patient education materials. You patient population is primarily non-English speakers. In the training, you must develop education on how to lower the risks of a heart attack. First, however, you must identify the risk of heart attacks. In three weeks, two members of your team will be presenting to 25 patients at a health forum. The problem is how will you design and implement training for these patients? Before the actual forum, your team should have a practice run of the training session.

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Case Study - Evaluate the following case study and then act out the roles by changing the perspective:

Ronnie owns a spa and salon. Generally, her customers leave satisfied and she has developed a loyal client base. However, recently she had an incident where a customer came into the spa to receive a facial and microdermabrasion. Prior to the service, the front desk staff explained the procedures and the risks, which included skin irritation. After the service, the client’s face was red as it normally should be. The client did not indicate any problem as she was checking out. Two days later the client calls the spa to speak to Ronnie. The client is upset because her face is still red and she has important engagement to attend where she is a speaker.

What should Ronnie do?

## Worksheet 13: Problem Solving

Activity 1 – Determine at least 3 possible solutions and choose the best solution. Use the techniques from this chapter (Reminder: Use T- chart).

Problem - A company has determined that it needs to make some changes to meet increased customer demand for a seasonal product.

# Post Assessment

1. What is the difference between deductive and inductive reasoning?
   1. Deductive reasoning is based on observations
   2. Deductive reasoning is used to form a hypothesis
   3. Inductive reasoning is used to form a hypothesis
   4. Inductive reasoning infers a conclusion
2. What is a syllogism?
   1. Two or more premises used to come to a valid conclusion
   2. A statement that says things occur in relation to each other based on a certain order
   3. A statement that says if the antecedent is true, then the following consequence must also be true
   4. A statement of probability
3. All of the following can help prevent us from jumping to conclusions except for:
   1. Gathering all of the facts
   2. Reviewing the premises
   3. Ignoring the premises
   4. Evaluating all the pertinent information
4. Premises help all the following except to:
   1. Lead to conclusions
   2. Develop an argument
   3. Provide evidence
   4. Manipulate language
5. What is confirmation bias?
   1. Using premises to support other premises
   2. Using premises to obtain information
   3. Using premises to support what you already believe
   4. Using premises to refute a claim
6. Validity of data is?
   1. Absolute truth
   2. Probability
   3. Lack of support
   4. Truth based on premises
7. One common obstacle to active listening is:
   1. Formulating own thoughts when listening
   2. Speakers who talk too much
   3. Speakers who use complex language
   4. Good concentration
8. Critical thinking is sparked by:
   1. Thinkers
   2. A match
   3. Curiosity
   4. Debate
9. What is a problem with emotions and decision making?
   1. Clouds an individual’s judgment
   2. Makes it easier to understand the facts
   3. Clarifies the premises
   4. Makes problem solving less complex
10. What does it mean to be self-aware?
    1. To be aware of what is affecting others
    2. For others to provide advice
    3. For others to direct thinking
    4. To be aware of our own thoughts and feelings
11. What is an assumption?
    1. A statement in which no proof or evidence is provided
    2. A fact
    3. A state of evidence
    4. The proofs made to assert a claim
12. What is the opposite of bias?
    1. Subjectivity
    2. Evaluation
    3. Observation
    4. Objectivity
13. What is emotional intelligence?
    1. Being aware of our opponents views
    2. Being self-aware
    3. Ability to assess and control our emotions and the emotions of others
    4. Ability to vicariously experience what others are feeling
14. What does it mean to be persuasive?
    1. Promoting discord
    2. Having influence over others
    3. Causing disagreement
    4. Not being convincing
15. The reason we have difficulty seeing others viewpoint is:
16. We are looking at the big picture
17. We are overwhelmed with information
18. We infer more from the premises than what’s there
19. We are overly concerned with our own views
20. For critical thinkers, new information needs to be:
    1. Organized
    2. Made more complex
    3. Ignored
    4. Critiqued
21. What is cognitive dissonance?
    1. Variances in attitudes and beliefs
    2. Mental patterns
    3. Complementary information
    4. Convergences
22. Instincts are defined as:
    1. Natural intuitive power
    2. Excessive emotions
    3. Physical capabilities
    4. Cognitive processes
23. What is the most effective way to retain skills?
    1. To use them infrequently
    2. To take material from a course and file it away
    3. To talk about them once
    4. To practice them regularly
24. What is a schema?
    1. Way of organizing information
    2. Fact
    3. Logic category
    4. Way of applying logic

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