

The most important distinction between humans and the other animals of planet earth is our ability to think. Thinking is our most important tool; our entire life depends upon it. Although we use thinking all the time, we are not always good at it. Our thinking can be of high quality or of low quality, successful or unsuccessful. The quality of our thinking has a profound effect upon the quality of our life. Fortunately, we can learn strategies to improve our thinking and thereby improve our lives. To learn how this can be done, we will investigate the ideas of Dr. Richard Paul, an expert in the field of critical thinking. This reading is a short adaptation of his work.

Much of Our Thinking is Unconscious

Most people do not have a clear understanding of how they think through things. We often are not fully aware of our thinking; we do it so automatically and so quickly that we are often unaware of how we arrived at our conclusions, although we know what we concluded. Much of our thinking happens at an almost unconscious level in our minds. We often don't see the thinking we are doing; we often think without noticing how we are thinking.

The invisibility of our thinking can be compared to the way we use grammar. Native speakers of a language generally use the rules of grammar without realizing they are using them. For instance, they automatically use the correct verb tense. Likewise, so much of our thinking is done automatically and half-consciously that we are not even aware we are using thinking processes.

Unconscious Thinking Lowers the Quality of Our Thinking

The fact that much of our thinking is invisible is a major problem. It is the source of much confusion and pain. Many times we act selfishly, ego-centrally, and for our own vested interest without being fully aware of it. We did not intend to act selfishly, but we did so nonetheless. We did not realize that our unconscious fear of being put down by others prompted us to act cautiously and nervously all the time. We were not fully aware that when we agreed with the politician who called for dramatically cutting taxes that we were only reacting to what was best for ourselves and were not thinking about others or the long term problems our society faces. We did not fully understand that we supported the candidate for Student Council treasurer because we wanted to become a part of his clique, not because he was the best candidate. We did not realize that we never really put any effort into our homework because, that way, when we got a bad grade we could joke it off. We could tell ourselves we didn't even try, rather than face the fact that the

homework was hard, and that it made us feel unintelligent and bad about ourselves.

It is a common tendency for human beings to think automatically and semi-consciously, to be self-serving, and to shield themselves from things they find unpleasant and do not want to face. People often “rationalize.” They have an outcome that they want to have happen and so they find a way to explain to themselves or to others why this should happen. They have not wanted to find the best outcome, but instead are interested in finding a way of justifying the outcome they want.

The problem with the invisibility of our thinking is that we are so used to our automatic, unexamined way of thinking that even when we want to be thoughtful and make good decisions we do not know how to think things through thoroughly and effectively. We do not understand our own thinking processes very well and we are not fully aware of how they work.

The Solution is Becoming Aware of Your Thinking; Making It Visible

If one of the major problems people have with thinking is that they do it invisibly, without awareness of it, then a big part of the solution is for people to become aware of their thinking, to make visible the processes that were previously invisible. This is the crucial first step in becoming a critical thinker; it is the foundation upon which all other critical thinking is built. The first step is learning to see clearly all the elements that go into your thinking, even the parts that may not be in view. The challenge is to pull into awareness the parts of your thinking that are hidden. Once this is accomplished, then the others steps of critical thinking can be undertaken. Without becoming aware of your thinking, it is impossible to be a successful critical thinker.

Awareness in thinking is related to psychology’s goal of helping people gain understanding about their thoughts, feelings, and behaviors. In the field of psychology, bringing into awareness hidden thoughts, feelings, and desires that direct behavior allows a person to gain more complete command of oneself. Becoming aware of one’s inner workings is an essential first step. Critical thinking also has similarities with some spiritual processes for self-improvement. Buddhism and Hinduism, for example, also focus on improving the quality of one’s life by understanding the workings of the mind, the emotions, and our desires. Becoming aware of your thinking, feelings, and desires is a preliminary step in the process of taking command of yourself and weeding out the things that do not work so that you can become a better, happier person. In critical thinking, Psychology, and in many spiritual disciplines becoming aware of thinking is a powerful

first step for improvement.

Thinking is a Complex Process; It Must Be Studied and Practiced

Thinking is studied and improved in the same way that any complex process is studied and improved. Basketball, gymnastics, ballet, playing piano, parenting, reading, and writing are processes similar to thinking; all are complex processes that a person can do poorly or well. To become a good basketball player, a person needs to know and become skilled in the basic elements of basketball. He needs to learn dribbling, pivoting, shooting, the jump stop, the defensive stance. Basketball is not a single skill, but a combination of many separate components. Like basketball, thinking has many different elements that must be understood and which a person must become skilled at using. To improve in the skills of basketball or thinking, it is very helpful to study how good basketball players or good thinkers perform these skills and to try to make your performance more like theirs. By analyzing how you are performing and then practicing and practicing and practicing you can improve your skills.

Defining Critical Thinking and Reasoning

An Informal Definition of Critical Thinking

Critical thinking is simply the art of learning how to do the best possible thinking you can. A critical thinker is a person who becomes a student of thinking, who dedicates herself to learning how the thinking process works and to continually improving the quality of her thinking.

As was discussed above, learning to make our thinking visible is an essential part of the process. In addition, the critical thinker understands that her thinking is a whole mechanism that is made up of separate parts which are tied together in a certain way. Critical thinking is the art of pulling apart the pieces of the whole, like laying out all of the parts of a car on the floor. It is the art of taking each piece and judging it to see if it is a good, functioning part, like holding up the spark plugs and seeing if they work. Finally, it is the art of determining if all of the parts are connected in a logical way so that they work together as a whole, like checking the connection of the motor to the drive shaft to see if the car will run.

A Formal Definition of Critical Thinking:

- A unique kind of conscious, deliberate, purposeful thinking
- in which the thinker systematically and habitually
- uses intellectual standards

- and uses the elements of reasoning
- to guide the construction of her thinking
- and judges the effectiveness of her thinking by how well it meets the intellectual standards and satisfies the purpose of the thinking.

Definition of Reasoning

Reasoning is drawing conclusions on the basis of reasons. In other words, it is when you use some evidence and thinking to arrive at a conclusion. Reasoning is the process of figuring out something. The term reasoning has essentially the same meaning as thinking; the two terms can be used interchangeable.

Explanation of the Elements of Reasoning

The elements of reasoning are the essential parts of thinking that are present in all thinking. They are the steps or parts that must be considered in order to reason through a question successfully. When you think through something, you are always using the basic elements of thought, whether you are aware of them or not. For many minor things that we think about, we do not consider all of the elements of thought. However, when we have to think through something carefully, we improve the quality of our thinking by consciously considering all of the elements of reasoning. A good thinker is always utilizing the elements of thought when they reason through something. They make using the elements of reasoning a habit, employing them in all of their thinking, just as a good basketball player is always utilizing the fundamental skills of the game every time she plays.

The Elements of Reasoning

The Purpose of the Thinking; the goal or objective

Whenever we think about something, we have a purpose, a goal, or an objective that we are trying to accomplish. Why are you thinking about this thing? What do you want to achieve?

The Question at Issue, or problem to be solved

Whenever we attempt to reason something out, there is at least one question at issue or one problem to be solved.

The Information, data, facts, observations, experiences

Whenever we reason, there is something that we are reasoning about. There are some information, data, facts, observations, or experiences to consider.

Interpretation, inferences, conclusions, solutions

When we reason we are always making interpretations or inferences. We make interpretations or inferences when we take facts and draw conclusions. For example, when we see a boy sitting next to a broken bicycle and crying we infer that he is upset that his bike is broken. When the historian sees that a large rise in population preceded the society's shift to agriculture, she concludes that the shift was caused by the need for greater volumes of food.

Concepts, ideas, theories, definitions, laws, models

All reasoning uses some concepts, ideas, or theories. For example, when making a decision about what to cook for dinner, you may use a concept about what a healthy amount of fat, calories, and vitamins should be in the meal. When the leader of the country decides whether or not to respond to the enemy's aggression, she may use the concept that any unchallenged aggression will encourage the aggressor. When trying to figure out why a certain species went extinct, the biologist may employ the theory of the survival of the fittest to explain the occurrence.

Assumptions

All reasoning must begin somewhere. It must take something for granted. The things taken for granted in thinking are called assumptions. For example, say that you were a DJ hired to play music at a 6th grade party and you were given no information about what to play. You would need to make assumptions about who would be at the party and the type of music they would enjoy or permit. You would not know for a fact what type of music to bring, but you would need to make a guess, to assume that you were correct based upon what you know about 6th graders, adults, and music.

Implications and consequences

No matter where we stop our reasoning, it will always have further implications and consequences. When I use reasoning to make a decision about what course of action to take, the action I take will cause other things to happen. For example, a government may want to reduce spending and reasons that it can do so by cutting aid to the poor. To think through the problem effectively, they will need to consider the consequences that will follow if aid to the poor is cut. Will they save money one way, but end up having to spend more in another area? Will the saving in spending be achieved by creating a whole new set of problems? Predicting the implications of our reasoning is a very important step in critical thinking. A good thinker is always looking ahead to understand what the implications and consequences of her thinking will be. Often we can see the hidden problems in our thinking only when we look ahead at the consequences that will follow.

Point of View

All thinking is done within a point of view. A point of view is the position from which one considers something. For example, you might think about what to cook for dinner from your point of view, from what would best meet your needs, or you could also include the point of view of the other people for whom you are cooking.

Explanation of the Universal Intellectual Standards

Determining what makes a person's reasoning of high quality is a fundamental component of critical thinking. In order to live in the world it is essential that we are able to judge whether a person's thinking is good thinking or bad thinking, whether it will help solve our problem or not, whether it will resolve the issue at hand or confound it further.

In order to judge the quality of something, criteria are needed to be able to judge it. For example, if the county fair is going to have a cake baking contest, it must decide what criteria will make a cake a good one. The judges will have to determine what they will look for in the cakes being judged. They may use the criteria of taste, visual appeal, and health consciousness. In gymnastics the judges have very clear criteria with which they grade performances. If the landing is not motionless, without a step back, forward, or to the side, points will be subtracted.

In the same way, there are criteria used to judge thinking. These criteria are called "universal intellectual standards" because no matter what you are reasoning about, your thinking will not be good if it does not meet these standards. In all of the thinking that you do, you should strive to meet these standards.

People often do not use the intellectual standards to judge thinking. Although they may not realize it because they are not fully conscious of their thinking, many people frequently use poor standards for judging their thinking. Richard Paul, a leading scholar of critical thinking, argues that the most popular standards used in America today are irrational and lead to poor thinking. He argues that the most popular standards used are:

It's true because **I** believe it.

It's true because **we** believe it.

It's true because I **want** to believe it.

Paul also thinks that many teachers are confused about standards as well. When teachers want to judge students' thinking or reasoning, they sometimes actually are confusing good thinking with being witty, colorful, using big words, or trying hard. It is very important to understand the standards for thinking so that one can make accurate judgments.

The Universal Intellectual Standards

Clarity

Being clear is the most basic and therefore probably the most important standard. Something is clear when it is understandable, when its meaning can be grasped, when it is not confusing, and doesn't leave you unsure whether it means this or that. If a statement is unclear, we do not even know what is being said and therefore cannot even begin to know if it is correct. Being clear is a crucial standard for thinking.

Accuracy

To be accurate means to be correct. Obviously, if our thinking is inaccurate it will be of poor quality. It may be inaccurate due to flaws in our information, in our conclusions and inferences, in the concepts, or the assumptions we use in our reasoning.

Precision

To be precise means to be exacting, to be very accurate in measurement or explanation, and to get down to a fine level of detail. It is possible to be clear and accurate, but not precise. For example, a psychologist is consulted to help a person figure out why he is having problems. She concludes that the difficulties are caused by his childhood problems. Although this reasoning may be clear and accurate, it is so inexact that it will be of little help. The patient would be correct to conclude that the psychologist's thinking was of poor quality. A key point to understand is that the level of precision needed depends upon the requirements of the situation. Look at measurement for example. In one situation saying you want "a big stick" to play fetch with the dog is acceptable, while you may need to cut a board to the nearest "1/8 inch" to make a successful table. Therefore, a good definition of precision is "to be exact to the necessary level of detail."

Relevance

To be relevant means to be connected to the issue at hand, to relate to it, and to bring something important to the issue being discussed. Something is relevant when it is connected with the issue and helps in considering or solving the matter. A statement can be clear, accurate, and precise, but not relevant to the issue at hand. For example, students sometimes feel that the effort they put into a project should help determine their grade. However, the amount of effort exerted may have nothing to do with the quality of the result. A student may work very hard and still get all of the math problems wrong. The effort exerted would be irrelevant to determining the quality of the student's math reasoning.

Depth

To be deep in one's thinking means to address all the complexities of an issue and to dig down to find the "causal factors," the deepest factors that help to cause something to come about. If your thinking just scratches the surface of a question, then it cannot be considered to be quality reasoning. For example, some people have tried to address the problem of drug abuse by minors with the statement "just say no." "Just say no" is clear, precise, and relevant, but it is not deep. Encouraging children to "just say no" does not address all of the very complex reasons why children turn to drug use, such as poverty, the need to rebel against adults, the distress of dysfunctional families, and the power of role models and the media.

Breadth

To be broad in your thinking means to take into account different points of views, perspectives, and conceptions. A student reasons about the life of Charlemagne and draws conclusions that are clear, accurate, precise, relevant, and deep. However, if he only examines this king's life from the point of view of his Christian followers and does not consider the very different view his many conquered, non-Christian enemies had of him, then his analysis would be narrow and incomplete.

Logic

When we think we bring a variety of thoughts together in some order, hooking them together as if we are making a chain. When one thought correctly leads to the next thought in the chain, when the first thought supports the next thought, then we say that the thinking is logical. Consider the statement "the girl's love of people lead her to be a volunteer at the nursing home and to give very generously of her time and energy." The first fact supports and makes sense of the second and third facts, making this a logical statement. Our reasoning can be illogical when the information used does not support our inferences or conclusions.

Significance

To be significant in our thinking means to deal with what is important, to address the heart of the issues and not merely deal with unimportant side issues. The opposite of being significant is being trivial. For example, a scientist is hired to study why millions of people around the world have starved to death in the last decade. If he focused only on the weather and overlooked the factors of war, local politics, world politics, capitalism, and ethnic relations his analysis would miss a large part of the problem. Therefore, his overall conclusions would be insignificant.

Introduction to Valuable Intellectual Traits or Virtues

Being skilled in the basics of critical thinking, the elements of reasoning and the intellectual standards, is not enough to create the ideal thinker. For a person to realize her full potential as a thinker it is essential that she develop some important internal traits or virtues. A virtue is a beneficial internal quality that shapes one's behavior. The ideal thinker's reasoning is guided by a number of deeply ingrained personal qualities that help to make her thinking of high quality. The intellectual traits or virtues such as intellectual humility, courage, perseverance, and fairmindedness help to make one a better thinker.

There is a great difference between a virtuous critical thinker and a critical thinker who lacks the intellectual virtues. Richard Paul makes a clear distinction between "The Self-Serving Critical Person" and "The Fairminded Critical Person." The Self-Serving Critical Person may be very skilled in critical thinking, but he uses his skills to pursue his own vested interests and desires, not necessarily to pursue the truth. He may not honestly seek the best answers, but may use his thinking skills to rationalize the answers he wants to hear. The boy who wants to go to the amusement park may be able to present a very convincing argument to his parents about why it would be a great idea to take his sister there for her birthday, even if he knows this is not what his sister would like to do. The boy's thinking was not searching to find the best answer to the question of how his parents could give his sister a surprise for her birthday, but rather was searching to find a way to meet his self-serving interests. The politician, businessperson, sports agent, neighbor, or spouse may not seek the best answers to questions, but may instead find ways of rationalizing the answers he or she wants to hear, the answers that are good for him or her. The Fairminded Critical Person uses her thinking skills to pursue the best answers and what is true and virtuous.

Valuable Intellectual Traits or Virtues

Intellectual Humility

To have intellectual humility means to be aware of the limits of what you know and to be able to say when you don't know something. It means that you lack conceit and boastfulness. Sometimes people are defensive when they don't know something or when they are learning something new. They would show intellectual humility if they could abandon their defensiveness and their fear of failure in learning something new that they are not yet "good at."

It also implies being aware of a person's natural tendency to think ego-centrally

and the tendency to shield or blind oneself from that egocentric thinking. People tend to think egocentrically and to not even know they are doing it; they tend to not want to look at their selfish thinking.

It also requires an awareness of your own personal beliefs, prejudice, and bias, and doing your best to go beyond them in order to be fairminded. You need to be aware of your own personal beliefs and points of view and not let them blind you to other beliefs and points of view.

Intellectual Courage

To have intellectual courage means to realize that one needs to investigate fairly ideas, beliefs, and points of view toward which we have strong negative emotions and that we do not like. It means to be able to consider fairly the ideas that you have not been willing to consider previously. It means being aware of the natural tendency to dismiss things we find strange or that go against what we know. People have a tendency to “passively accept” the ideas they are exposed to and to not think through them critically. Therefore, the critical thinker needs to have the courage to examine the beliefs of others and to examine her own deeply held beliefs that were passively accepted. It takes courage because a person’s social group can often severely penalize those who do not conform to the accepted norms. It would take courage for a member of a gang that was robbing stores to think through his actions and decide to change his behavior and go against the beliefs of the gang. It would take courage for a person raised in a sexist family to think through her actions and decide to change her thinking and behavior, to go against the beliefs of the family.

Intellectual Empathy

To have intellectual empathy means to actively pursue putting oneself in the place of others in order to genuinely understand them. People have the egocentric tendency to think that they are correct and others are wrong. To have intellectual empathy you must be able to stand in another’s shoes and be able to accurately explain her point of view and her reasoning. You must be able to think and reason from another person’s point of view, not just from your own. We must be willing to remember occasions when we were wrong even though we were convinced we were right. Remembering that we were deceived before will help us develop intellectual empathy.

Intellectual Integrity

To have integrity means to strictly follow a code of values, to firmly follow what you believe in. To have intellectual integrity means to make sure that you follow the codes

of critical thinking as best you can and to apply strict standards to your own thinking as well as the thinking of others. People have a tendency to hold other people's thinking to high standards, making it pass hard tests before they believe it, but do not make their own thinking pass the same hard tests. People can be hard on others' reasoning and not hard on their own. Having intellectual integrity also means having the honesty to admit the weaknesses in one's own thinking and actions.

Intellectual Perseverance

To have perseverance means to be able to persist or continue to push forward with an undertaking even when the going gets difficult, even when the work gets hard. To have intellectual perseverance means to be willing to push forward in your reasoning even when it gets difficult and frustrating. It means to continue to be rational and reasonable when others around you are thinking or acting irrationally and unreasonably. When you are willing to grapple with challenging questions for a long period of time in order to achieve deeper understanding you are exhibiting intellectual perseverance.

Faith in Reason

To have faith means to believe in something. To have faith in reason means to believe that in the long run the greatest good for yourself and for humankind as a whole will come from the pursuit of reason and thinking things through to find the best solutions. Humankind is best served when people develop their critical thinking skills and use them to come to their own reasoned conclusions. Faith in reason means to believe that critical thinking and reasoning will bring about better results than uncritical or unconscious thinking.

It also means to have faith that all people can learn to reason well and think for themselves, rather than living life passively accepting others ideas.

If you have faith in reason you trust that people can engage in discussions and persuade each other by reason, rather than holding the opposite view, that people or societies are incapable of being persuaded by reason. Critical thinkers recognize that there are strong natural tendencies within people and societies to be unreasonable; they recognize that many people do not believe there is much hope for humankind working out its differences. Critical thinkers believe that we can all become reasonable people and that we can work out our disagreements effectively and can create solutions with the correct tools. Faith in reason means that you believe that reason can help humankind to live together effectively.

Fairmindedness

To be fairminded means to treat all viewpoints equally and to not show favoritism to one view due to your own or your social group's feelings, bias, or vested interests. It means to not play favorites, but to look at all the opposing points of view fairly and to let the most reasonable answer be the winning solution.

Introduction to the Three Types of Questions & Three Systems of Thinking

All of the questions in the universe can be grouped into only three categories. The categories are based on how many "systems" are needed to successfully answer a question. Some questions involve only one system, some involve no system, and some involve multiple systems.

The definition of a "system" is a interdependent group of items forming a unified whole. A "system of thinking" is an established step by step procedure for solving a problem, or a logical set of rules for figuring something out or doing something.

Arithmetic is a system. There are clear step by step procedures for answering questions. If I had ten apples and Billy Joe McAllister threw seven of them off the Tallahatchee Bridge how many apples will I have left? There are clear procedures for answering this question within the system of mathematical thinking. Football is a system. What happens if the team does not move the ball ten yards in four plays? There is a clear answer to this question. Gymnastics is a system. If the gymnast bobbles the landing of the flip, what will be her score? The English language is a system. What does the word convoluted mean and how is it spelled? The internal combustion engine is a system. If the spark plugs are not firing properly what will happen? A computer is a system. What will be the repercussions if the hard drive breaks down? Freeze tag is a system. If the person who is it tags you what will happen?

The Three Categories of Questions and Three Systems of Thinking

Factual Questions: questions in "a single system" with only one right answer

The first category of questions are questions that involve only a single system. To solve an arithmetic problem you only need to use the system of mathematics. To figure out how thick the beams of the roof need to be an architect employs the system of construction principles. The mechanic uses his knowledge of a particular engine to figure out what is wrong with the motor. Single system questions are questions that require the use of only one "system of thinking" to answer them.

Single system questions are commonly called “**factual questions.**” The question of how many people voted for Bill Clinton in the last election is a simple question of fact. To answer the question one simply needs to examine the government records of the election. To find the highest mountain in the world, one needs to use the system of measurement to determine the answer. To learn the boiling point of water one needs to set up a simple scientific experiment, or since this is a common fact, she could look it up in a reference book. To precisely name the color of the paint on the wall one can examine a directory of colors.

Questions that involve a single system have only one right answer. There can be no debate. If the first baseman catches the ball before the runner reaches first base the runner is out. Ten minus seven is three. If you don't pay your taxes you will be breaking the law and will be fined. Mt. Whitney is the highest mountain in the continental United States. Within a single system, questions have a single, clear answer.

Questions of Preference or Opinion: questions with “no systems” that have as many answers as there are people

The second category of questions have no logical, step by step procedures for producing an answer; they have no system of thinking to help answer them. These types of questions are called “**questions of preference or opinion.**” To have a preference means that you like one thing better than another. What is your favorite color? Who is your favorite musician? If you had all the money in the world, what would you do? These questions can not be answered by referring to a reference book or following a step by step process. They are not questions of fact; rather they ask individuals about their personal opinions and preferences, about the things they like or dislike, about the things they would choose or not choose.

The word “opinion” has several different meanings. The word is used here to mean a belief that is not based on reasoning and evidence, but is simply a matter of personal preference, a matter of what a person believes to be so. Therefore, in critical thinking, an **opinion** is considered to be essentially the same thing as a preference.

However, the word can also be used in a different way. In the legal profession, an “opinion” is the name given to the formal statement written by a judge explaining the reasons and principles upon which a legal decision is based. In everyday speech, people often use the word in essentially the same way, as a name for something that they believe to be true that is based on reasoning and evidence. However, critical thinking defines a belief that is based upon reasoning and evidence as “**reasoned judgment.**” In critical

thinking, “reasoned judgment” is very different from “opinion.” The fact that the word “opinion” can be used in these two different ways may possibly add to a common confusion in thinking. People often use the word “opinion” to mean what critical thinking defines as “reasoned judgment.” How this lack of clarity leads to confused thinking will be discussed further in the section below on “reasoned judgment.” The point to emphasize for now is that it is very important to understand how critical thinking defines an opinion and to not confuse it with the other use of the word. In critical thinking, an opinion is a belief that is not based on evidence or reasoning.

Questions of preference or opinion have no “right” answers. No one answer is better than another, since the question simply asks what an individual prefers. The person cannot be wrong about his preferences because he does not need to have any reason or justification for choosing one thing over another. There is no need to “prove” or “support” an answer to a question of preference. If you ask why someone prefers chocolate ice cream, she need give no other response than “because I do.” A person’s answer to a question of preference can not be argued about or debated, but must simply be accepted.

Questions of Reasoned Judgment: questions with “multiple systems” that have “better or worse” answers.

The third category of questions are questions that involve multiple systems. This means that questions of this type can be looked at from multiple points of view or through different systems of thinking. Consider the question of why there is inequality in our country. This question can be approached in numerous ways. I can look at it from the point of view of economics and use the step by step procedures of economic thinking to figure out why there is inequality. I can also look at the question from a legal point of view, analyzing the laws in the U.S. that have contributed to inequality. I can look at the question from an ethnic point of view and look at the effects of prejudice and hatred. Another example is the question of whether or not Okonkwo, from the novel Things Fall Apart, was a great man. This question can be addressed from many points of view. His wives might think one thing, his male peers another, and the Europeans yet another still.

Questions that involve multiple systems or points of view are called “**questions of reasoned judgment.**” When a question has multiple points of view or systems from which it can be addressed then “reasoned judgment” must be used to determine the best answer. Reasoned judgment is the process of drawing conclusions based on evidence. In reasoned

judgment, conclusions must be “**supported**,” meaning that “**evidence**” and “**reasoning**” must be given to “**back up**” the conclusions that are drawn.

Questions of reasoned judgment do not have a single right answer, like questions of fact, or no right answer, like questions of preference. When multiple systems or points of view are needed to answer a question, it is generally impossible to prove that one answer is correct and all others are incorrect. In most instances, judgments can only be made about “**better or worse answers**.” A person’s conclusions based on the evidence can be more or less successful at solving the problem or can be a more or less probable answer to the question. However, sometimes answers can be given that are clearly “incorrect,” where the reasoned judgments are completely illogical and unsupported. The intellectual standards are used to judge the quality of reasoned judgments. Answers to questions of reasoned judgment can be more or less clear, accurate, relevant, deep, broad, and logical. For example, one person may conclude that poverty is caused by a lack of education, shortages of well paying jobs, the break up of the family, and the effects of hopelessness and substance abuse. Another person may conclude that poverty is the result of laziness and bad luck. The two answers can be judged to be “better or worse” or “more or less probable” answers to the question based on the quality of their reasoned judgments-- on how well they meet the intellectual standards of accuracy, depth, and breadth.

Problems from Misunderstanding the Types of Questions

Understanding the difference between the three categories of questions, between questions of fact, opinion, and reasoned judgment, is very important for improving the quality of our thinking. When people do not understand the three types of questions their thinking can fall prey to several mistakes that are all too common in our society.

Dogmatism

A common error in thinking is to be confused about questions of fact. People sometimes do not see that a question is a question of opinion or reasoned judgment and mistakenly treat it as a question of fact. For example, a person might claim her answer to the question of why there is violence in society is a “fact,” that it is correct and can not be debated. However, this is a complex question that can be addressed from the point of view of multiple systems. Therefore, one must try to weigh and balance the conclusions that can be drawn from each separate system. One will have to weigh and judge and decide how to put together the conclusions drawn from criminal psychology, sociology, economics, the legal system, and the penal system. This is such a complex,

multidimensional problem that there is no way to prove one answer to be correct. There is no step by step procedure for weighing and judging all these different variables that will produce a definite, certain answer.

A person who claims that her answer to this question is a “fact” has gone too far. Her answer is an example of what is called “**dogma**,” an opinion or judgment that is claimed to be certain even though there is no proof that it is so. A dogmatist is a person who claims her ideas to be absolutely correct when there is no basis for her certainty. A dogmatist does not see that the question they think is a question of fact is actually a question of opinion or reasoned judgment. Claiming as fact that Nikes are the best sneakers, that chocolate is the best ice cream, that classical Western music is the greatest, that poverty is caused by laziness, and that the way to end the world’s problems is for it to adopt democracy are all dogmatic statements.

Relativism

Many people believe that there are only two categories of questions, questions of fact and opinion. They overlook entirely the category of reasoned judgment. This leads to a confusion that is common in our society. As was noted above, people frequently think that questions of reasoned judgment are questions of opinion; they often think that all questions that are not factual, with one right answer, must be questions of opinion. Since everyone’s opinion or preference is valid and cannot be wrong, they think that all answers to non-factual questions are equally good. For example, a person could conclude that global warming was caused by the exercise craze, by all the heat people were giving off when they exercise. She could then argue that her answer was as good as anybody else’s answer, because it was “her opinion.” You could point out to her that it was not very well reasoned and that it lacked sufficient support or proof. She might answer back, “That’s what I think. That’s my opinion. That’s what I believe, so how can you argue with my opinion. Can’t everyone have an opinion?”

The problem is that this person does not understand questions of reasoned judgment. She does not understand that questions with multiple points of view have “better and worse” answers. She does not understand that answers are judged by the quality of the reasoning and the intellectual standards. Answers to these questions must use “evidence” and “reasoning” to “support” or “prove” their ideas. Answers that provide no evidence and reasoning are not valid. People who argue that their “answers” or “opinions” are right and give no more evidence than “its right because I think its right; its right because it is my opinion” are not good thinkers. They wrongly believe that

questions with multiple points of view don't need evidence and reasoning to support their answers, and that all answers are equally good, because no person's answer is better than another person's answer.

People who believe this are called "**relativists.**" They believe that each person has his or her own point of view, his or her own way of looking at things. They believe that all ideas are based on the point of view of the thinker and that each person's point of view is as valid as another person's point of view. Therefore, they see one idea as being as good as another; they see all ideas as being equally valid. Relativists think whatever a person thinks is true for that person, although it may not be true for another person. For example, one person may believe that capitol punishment is a good thing and another person thinks it is bad. A relativist would say that both are right, that each person's answer is the right one from his or her perspective. The problem that arises from this relativistic belief is that it can make it impossible for people to come to conclusions when there is any difference of opinion. A relativist argues that there are not "correct" or "better or worse" answers to anything. This view has a profound effect on the way one thinks about life and the nature of the world.

The Importance of Understanding the Three Types of Questions

The main point to remember about the three types of questions is that whenever you are faced with a question, it is essential to figure out which one of the three types of questions it is so that you can approach and answer the question correctly. If it is a question of fact, the critical thinker knows that giving a straightforward factual answer is often sufficient, although in some instances she may need to give some evidence or reasoning to explain the point. If it is a matter of preference or opinion, she knows that all that is needed is her answer, that no support or evidence is required. If it is a question of reasoned judgment, she knows that she must support her answer with evidence and reasoning. If she does not understand what type of question is being asked, it will be difficult to answer the question correctly.

Defining the Domains of Thinking

The final universal feature of thinking to consider is the "domains of thought." A "domain" is a "sphere of interest or action," a "field," or "area of an activity." The "**domains of thinking**" are the distinct "**disciplines,**" "**subjects,**" or "**fields**" of intellectual thought, such as mathematics or history. Imagine that all human knowledge, that all the questions humankind has sought to answer, formed a huge circular space. Questions

about numbers are grouped together in one area of this space called the “field of mathematics.” Questions about what has happened to people in the past are in another area called “the discipline of history.” Questions about plants are in another area called “the subject of botany.” Some of the other domains in this space of human knowledge are economics, political science, sociology, anthropology, psychology, biology, physics, and religion.

In all the various parts of this great expanse of human knowledge, the elements of thinking, the intellectual standards, the intellectual virtues, and the three types of questions are used to reason through all the questions humankind has sought to answer. All the different subject areas share in common the universal features of critical thinking. However, since each discipline is answering questions and addressing issues that are very different, the type of thinking that needs to be done varies widely in each area of questioning.

Arithmetic deals within a single system, with category one questions, and therefore has clear-cut, factual answers; it deals very little with the elements of assumption, point of view, or interpretation. History deals with mostly category three questions, complex questions of reasoned judgment, that require much interpretation and inference, and, therefore, the concepts of history are not certain, not factual, but are open to debate and counter-debate. Musicology on the one hand has many factual questions and solid concepts, but also requires category two questions, questions of subjective preference. Good mathematical thinking emphasizes aspects of thinking that are different from those emphasized in good historical thinking or good musicological thinking. Good economic thinking is different from good medical thinking. In each field, thinking is directed in different directions and therefore the thinking required in each discipline has its own unique flavor, has its own distinct emphasis.

The Importance of Understanding the Domains of Thinking

The critical thinker needs to understand how thinking varies in each of the domains in order to answer complex, category three questions. Questions of reasoned judgment often require the use of multiple subject areas to be answered successfully. To answer why there is social inequality requires looking at the question from multiple domains. The disciplines of economics, law, sociology, and political science can all help to answer the question. A good critical thinker understands that looking at a problem from the vantage point of numerous disciplines will improve the quality of her answer. A good critical

thinker understands the system of thinking of many of the domains; she knows how to think scientifically, historically, and psychologically.

We have finished exploring the universal features of critical thinking, the elements, standards, domains, and three systems of questions. We have been introduced to the main parts of the process of critical thinking and have the basic tools to reason through something critically.

The Powerful Role of Critical Thinking in All Learning

Now our discussion will step back to take a look at the big picture; we will explore how critical thinking fits into the grand scheme of learning. This is a crucial topic to examine because it will help us to better understand why, how, and when to use critical thinking. It will help us to better understand the power of critical thinking.

Why and How Humans Pursue Knowledge

Gaining a clear understanding of critical thinking helps to illuminate the nature and purpose of learning itself. It helps us to understand what the pursuit of knowledge is and how it works, and it helps us to be clear about the goals of learning and schooling.

Why do we seek knowledge? Why do we learn? Why are human beings so focused on learning? When we seek knowledge, what are we seeking, what are we after? How do we learn? To learn about something, what must we do? Sometimes in the middle of schooling, when we are immersed in learning and teaching, we can lose track of what we are doing and why we are doing it.

If we imagine a time millions of years ago, when human life was less complex, it will be easier to get at the heart of these questions. To survive, early humans had to seek to understand their world. They observed the animals, the plants, and the weather in search of “**patterns**,” for the keys to how things worked. By observing the behavior and habits of a particular type of animal they would increase their chances of being able to hunt it successfully. By observing the ways in which their spears failed, they could make better spears. By observing the seasonal cycles of plants, they could better predict when the plants could be relied upon for food. They searched to understand the nature of things in order to live a better life, as still today, humans continue to probe into the unknown to improve modern life. To learn is to seek to find the nature of things in order to figure out how things work.

The Human Intellectual Paradigm

The way in which humans learn and construct knowledge has remained the same

for these millions of years. A term to describe “the way in which we learn and construct knowledge” is “**the human intellectual paradigm.**” A **paradigm** is a form, a format, a mold, a template, a pattern, an archetype. The human intellectual paradigm is the form or pattern of how our intellect constructs knowledge. Knowledge has to be built, to be created; it is not simply absorbed passively like the earth’s soil accepting the rain.

The format for human learning has always begun with the **observation** of specific items and incidents. As we observe specific events, we often desire to figure them out and the first step in doing this is to formulate **questions** about them. Our questions are simply the things we want to figure out. The essence of learning is the desire to figure something out.

From our observations of specific items and events we formulate “concepts.” A “**concept**” is a general idea or understanding that is derived from specific instances. A “concept” is a **generalization** about what, how, or why things are that is formulated by seeing the common patterns in a number of specific examples. By observing the behavior of many different dogs, a concept about urination and the marking of territory is formulated. By observing the performance of many different throwing techniques, the concept is formulated about the most effective way to throw a spear.

The creation of one concept generally leads to the creation of other concepts. The observation that a tiny, round, brown thing broke open and a green shoot of plant grew from it lead to the concept of seeds. If this seedling was growing on the dark side of a log, this could have lead to the concept that plants bend toward the light. The concept of seeds must have lead to a new conception of fruit. This could have helped to develop a concept about the annual cycle of plants with the changing seasons. As concept after concept is formulated, they fit together into a larger whole. The numerous concepts are not individual, separate entities, but join together into “**systems,**” creating a greater whole that is made up of many smaller conceptual parts.

There are very definite “**logical interrelationships**” between the many parts of the whole. One concept fits together with another in a precise way. Seeds relate to fruit and the cycle of seasons in a particular way, and the growth of a plant relates to light in a clear way.

To put together these systems of ideas requires that we use “**intellectual discipline,**” so that we think in a precise, logical fashion. It requires that we use the “**elements of thinking**” to make our thinking sound. Without considering the elements of thought, the concepts and systems could not be built. To ensure that our concepts and

systems are correct, we need to judge them by the “**intellectual standards**,” to determine whether they are clear, logical, and deep.

In all areas of knowledge, whether they be botany, mathematics, the making of leather, basketball, playing the piano, baking bread, or throwing a spear, the human intellectual paradigm-- the format used for constructing knowledge-- remains the same. By observing specific incidents and asking questions, concepts are formulated. Numerous ideas join together to form a system with logical interrelationships between the parts. The intellectual discipline of the elements of reasoning and the intellectual standards are required to build these systems and to ensure that they are accurate.

All Knowledge and Domains of Thought Are Systems of Thinking

In the vast breadth of human knowledge, all knowledge is grouped together into an enormous, uncounted number of systems, or sets of interrelated concepts. The systems are not completely separate, isolated wholes, but instead they overlap and share concepts. They are not precisely ordered boxes of knowledge. Rather, human knowledge is like an immense web of concepts and systems that interweave and crisscross, making connections all over the place. As was stated above, if we imagine all of human knowledge as a vast space containing all the questions we have sought to answer, then the domains of thought or subjects of study are the divisions of these questions. They are the section of questions about the human mind, psychology, the section of questions on numbers, mathematics, and so on.

However, to get a more complete understanding of the domains of thinking or the disciplines, we must conceive of them as more than a set of questions we ask about a particular topic. Obviously, the disciplines are more than simply the questions, but are the answers to these questions as well. However, they are still even more than this.

One of the most important principles in critical thinking is the idea that each discipline is actually a unique **mode of thinking** or a way to figure something out. All subjects are “things” that we are interested in “figuring out.” The “things” we want to “figure out” are simply the “questions” we have about the topic. The only way we have to figure out the answers to our questions is to learn how to think them through, to use thinking to develop answers. In biology, we figure out the answers to our questions about how living things function. In psychology, we figure out the answers to our questions about how the human mind and human behavior works.

The key point is that the disciplines of biology or psychology are not simply the answers to the questions asked, they are also the methods of thinking used to figure out

the answers. "Biology" is not just a collection of facts, it is a "mode of thinking" through questions about living organisms. A "biologist" is not a person who is merely stuffed with "biological facts," but is a person who can "think biologically" to figure out "biological questions." To think biologically a person must be able to understand the concepts of biology and to understand the logical interrelationships between the concepts. To understand one part of a discipline requires that you figure out how it fits with other parts of the discipline. To understand circulation, one must understand the concepts of veins, arteries, blood, respiration, and pressure. The parts of a subject are logically interconnected with each other, forming a united whole or a "system." Therefore, all of the subjects are actually "**systems of thought.**" To understand a part one must understand how it relates to the whole; one must figure out the system of interconnections between the parts. Biology is a system of thinking; it is the "logic of biology" or the way in which biological concepts fit together. Psychology is a system of thinking; it is "psycho logic," the way of thinking psychologically. "Anthro logic," anthropology, is the system of thinking about humankind.

In summary, a discipline or domain of thinking is the questions humans have about a particular field, the facts and concepts that answer those questions, the system of logical connection between the concepts, and the mode of thinking used to answer questions in the subject. Therefore, the essence of learning a discipline is to learn its mode of thinking, the way in which it figures things out.

True Learning is Learning for Understanding, not Memorization

Understanding precisely how critical thinking views the human intellectual paradigm and defines the domains of thought is very important because it helps to make clear what true learning is. It is common for many educators and students to think that learning a subject is simply a matter of learning the facts of the subject. With such a belief, learning becomes a mere game of memorizing the collection of facts presented in the textbook or lectures. Critical thinking argues that a person can memorize the facts and have very little real understanding of a subject. Memorization is very different from understanding, although many people think them to be the same thing. **Memorization** is simply "**recall,**" being able to recite information that is committed to memory. Developing a deep understanding of a subject is not a matter of memorizing facts and concepts. To **understand** something means being able to work with it, to apply it in novel situations, and to be able to explain its logic.

In the eyes of critical thinking, learning a discipline means to be able to think in its

mode of thinking, not simply to be able to memorize its facts or concepts. The more common approach to learning, learning for recall, requires that I memorize facts and explain ideas. **Learning for thinking** requires that I memorize facts, explain ideas, and be able to take them apart, understanding how the parts fit together as a whole and why they do. It requires that I be able to apply the ideas to unique situations and reason through the results. Learning for thinking requires a much deeper understanding of the material.

However, beware of a typical confusion about this philosophy of learning. Critical thinking does not believe that knowing facts is unimportant, as some people wrongly think it does. Critical thinking believes that knowing the facts is important, because without the facts there is nothing to think about. It simply argues that in addition to knowing the facts one must understand how to think in the disciplines.

The critical thinker understands that to be a good sociology student she needs to understand the mode or system of sociological thinking. She needs to get inside the system of sociology, to see how the parts or concepts fit together to create a whole system of sociological thinking, and to be able to think sociologically to solve sociological problems. The goal of teaching, therefore, is to help students think biologically, think mathematically, and to become a historical thinker, a historian, or an economic thinker, an economist. The goal of learning is to understand how to think, to know both the universal features of thinking and many of the different disciplines' systems of thinking.

The Power of Seeking the Logic of Things

Great power is given to the person who understands the way in which knowledge is constructed-- the human intellectual paradigm-- and who adopts the philosophy that the goal of learning is to learn how to think. With these two potent tools, he will attack all of his learning. With the insight derived from these two tools he understands that all learning is the drive "to seek the logic of things." This is the phrase that critical thinkers should carve into their wrists, that they should put into gold and wear close to their hearts. It is their guiding light; it is a key that unlocks all unintelligible doors. Through constant use, it should become so deeply ingrained into their being that it never leaves their lips or fails to illumine their minds. The critical thinker is the one who seeks to find the logic of things.

"**To seek the logic of things**" is a concise phrase that combines the wisdom gained from understanding the human intellectual paradigm and the idea that learning is thinking. The critical thinker knows that all human knowledge is a construction of concepts with logical interrelationships into systems of thinking. Memorization alone will not give real understanding; real knowledge is only gained when one can think through and manipulate

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Adapted from the work of Dr. Richard Paul, by John Trapasso

the concepts, their interrelationships, and the whole of the system. Therefore, the critical thinker knows that to understand anything they must seek the logic of it. They must understand deeply the logic of how it fits together.

The critical thinker will seek the logic in everything they do while learning. When he reads, he does not simply absorb the words on the page. He actively stops, questions, and builds a replica of the logic of the author in his mind as he proceeds. He does not simply collect the bits of information presented one by one by one. Rather, he takes each piece and looks to understand its relationship to the other pieces and its place in the whole. When he listens to class discussions, when he writes, and when he thinks through questions, he knows that his goal is to understand the logic of the material, to discover how it fits together, and to find the glue of the relationships that unite it. The critical thinker realizes that there is a logic to everything and he strives to figure it out. To the critical thinker, nothing stands alone; everything is related to something else; everything is a puzzle to be figured out.

Our investigation into critical thinking returns finally to the questions with which it began. Why do we learn? When we seek knowledge, what are we seeking? What are we after? How do we learn? To learn about something, what must we do? The critical thinker has clear answers to these questions. Why we learn is to seek the logic of things. How we learn is by seeking the logic of things. To be a critical thinker, wear these thoughts close to your heart.

Note: This investigation of critical thinking is a short adaptation of the work of Dr. Richard Paul, a leading expert in the field. It was written by John Trapasso for use at San Francisco Day School.