

PRINCIPLES OF
**CRITICAL
THINKING**
— AND —
**PROBLEM
SOLVING**

TOM DESTINY NAMWAMBA



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please contact:

BLUEROSE PUBLISHERS
www.BlueRoseONE.com
info@bluerosepublishers.com
+91 8882 898 898
+4407342408967

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DEDICATION

“For Zenane, Nate, and Xolani: catalysts for clarity, reason,
ingenuity, and intellectual humility. Nothing is more
important.”

ACKNOWLEDGEMENT

Beyond the multitude conformists that feed on the conventional fustian, there are still some shrewd and intelligible thinkers; the few good men and women who have faith in the supremacy of reason; those who believe that progressive and judicious thinking is fundamental to human survival. To this cadre of the creative minority, I acknowledge and honour.

My mother Agatha Mayina - the exemplary midwife of intellectual potency; my curious and evaluative children - Zenane, Nanyingi and Xolani - true embodiments of cognitive inspiration; family anchor Celestina Chepkorir – a blossoming flower of humility and mental serenity; my brother, H.E. Amb. Ababu Terrah Namwamba - the uncontestable prodigy in the management of public affairs; my academic mentor Professor Robert Murungi - an invaluable lens of intellectual rectitude and supremacy; unwavering friend Nasimiyu Wekesa, OGW - substratum of sanity, sobriety and professional decorum; Mathias ‘Budii’ Namwamba and Emilio Ababu - emblems of discipline, responsibility and patience; Dr. Maxwell Mumasi, - the mark of honesty, selflessness and honor; Patrick Chiriswa Andika, Dr. John Mosu Nzioka, Francis Mwangi Njenga, and the very many unmentioned heroes that made this work possible. I am equally, and deeply indebted to my academic colleagues, peers, and the generations of students whose sharp debates have continually refined my own understanding of these principles.

I salute you all in unlimited words.

FOREWORD

We inhabit a profound epistemic paradox: while the sum of human knowledge rests at our fingertips, our collective capacity for discernment has rarely felt more compromised. In an era defined by hyper-connectivity and rapid global shifts, the mind is not merely overwhelmed by data, but actively disoriented by a carefully engineered cacophony of competing truth-claims and systemic misinformation. This crisis is fundamentally philosophical, exposing the stark divergence between information - which is cheap and abundant; and wisdom, which requires rigorous, deliberate cultivation. Because we mistake the mere accumulation of facts for genuine understanding, we routinely misdiagnose our most critical structural challenges, miscalculate existential risks, and default to reactive, emotionally driven heuristics. Consequently, we find ourselves culturally and intellectually adrift, drowning in an unprecedented ocean of noise while starving for the foundational frameworks required to synthesize clarity from chaos.

As an academic and researcher in philosophy specializing in epistemology, praxis, and the mechanics of decision-theory, the author has dedicated a career to diagnosing the structural pathologies of human cognition, uncovering why our reasoning falters, and designing architectures for cognitive optimization. This trajectory has exposed a foundational critique of contemporary pedagogy: traditional educational systems are largely preoccupied with the passive transmission of institutional knowledge - evaluating what to think - while systematically neglecting the scaffolding required for metacognitive self-regulation, or how to think. This volume, *Principles of Critical Thinking and Problem Solving*,

represents the synthesis of that lifelong inquiry, designed to bridge the chasm between abstract academic theory and pragmatic reality. By translating the formal rigor of the seminar room into an actionable, real-world framework, this book equips the reader with the intellectual discipline necessary to transform reactive instinct into systematic, deliberate judgment

Conversely, this work is driven by a belief that goes far beyond pure academic theory. The author is a staunch believer that embracing critical thinking is not merely an intellectual exercise; it is an ethical imperative and a humanitarian necessity.

By mastering clear reasoning, we unlock our truest mental prowess. Critical thinking allows us to address the actual root causes of our problems rather than just treating their symptoms. It equips us to identify risks before they manifest, make optimal choices under uncertainty, and even predict future occurrences with greater accuracy. When we think clearly, we gain the foresight required to proactively prevent human suffering.

Ultimately, this book is built on the conviction that a sharper mind leads to a kinder, more equitable world. Critical thinking is the ultimate equalizer. When we dismantle the chronic cough of ethnicity, cognitive biases, and unexamined dogmas, we pave the way for a cohesive society - one that fundamentally cares for everyone, regardless of race, color, socio-economic status, or gender. True rationality demands empathy, intellectual humility, faith in reason, and justice.

This text is structured to take you from foundational awareness to strategic execution. Whether you are navigating academic research, making high-stakes professional choices, or analyzing daily life, this book provides the structural tools you need.

I invite you to approach these pages not just to absorb information, but to actively reshape your cognitive habits. The quality of our collective future depends entirely on the quality of our thinking. Let us use our intelligence to address the right problems, and to build a better world together.

Nathan Nanyingi

CONTENTS

Chapter One	
Philosophy	1
Chapter Two	
Levels of (Thought) Thinking.....	15
Chapter Three	
The Socratic Questioning Method	34
Chapter Four	
Critical Thinking	43
Chapter Five	
Tools of Critical Thinking	71
Chapter Six	
Fallacies	84
Chapter Seven	
Logic	113
Chapter Eight	
Barriers to Critical Thinking.....	124
Chapter Nine	
Problem-Solving and Decision Making.....	137
Chapter Ten	
Appearance and Reality	152
Chapter Eleven	
Education and Human Development	166
Chapter Twelve	
Thinking for Oneself – Rene Descartes’ Model	177
Chapter Thirteen	
On Liberty of Thought and Individuality - John Stuart Mill	194
Appendices	212

CHAPTER ONE

PHILOSOPHY

Brainteasers

What am I?

I talk, but I do not speak my mind
I hear words, but I do not listen to thoughts
When I wake, all see me
When I sleep, all hear me
Many heads are on my shoulders
Many hands are at my feet
The strongest steel cannot break my visage
But the softest whisper can destroy me
The quietest whimper can be heard.
What am I?

2. You die then you find yourself in limbo, and you see two doors. One of them leads you to hell and the other one to heaven. They are being guarded by two guardians. The guardian guarding the doorway to heaven always tells the truth and the guardian guarding the doorway to hell always lies. What is the one question you will ask to either of the guardians to find out which door will lead you to heaven?

Introduction

This chapter is intended to equip the learner with the knowledge, skills, and positive attitudes towards understanding and appreciating the role of philosophy in human life and endeavors. It covers the definition, meaning, branches, and uses of philosophy in the cultivation of better thinking and meaningful living.

Chapter Objectives

By the end of the chapter, the learner should be able to:

- a. Define the term Philosophy.
- b. Explain the meaning and relevance of Philosophy.
- c. Discuss the main branches of Philosophy.
- d. Explain the uses of Philosophy.
- e. Discuss the practical nature of philosophy.

Definitions and Meaning of Philosophy

The word 'philosophy' is derived from the combination of two ancient Greek words; '*philos*', which means 'love', and '*sophia*', which means 'wisdom'- φιλοσοφία (*philosophia*). Literary philosophy means “love of wisdom.”

Meaning of Philosophy

Philosophy has various but closely related definitions, among the very relevant ones are:

- a. The systematic study of the world and our place in it. This entails a critical examination of reality characterized by rational inquiry that aims at the Truth for the sake of attaining wisdom.
- b. It is a system of beliefs about reality that entails one's integrated view of the world.
- c. It is not a body of doctrine, but an activity of actualizing reality that aims at the logical clarification of thoughts.
- d. Is the foundation of knowledge from which all other disciplines derive and the standard by which ideas are integrated and understood.

Philosophy begins in wonder, it nurtures curiosity, and it is able to fancy everything different from what it is.

- It sees the familiar as if it were strange, and the strange as if it were familiar.
- It rouses us from our native dogmatic slumber and breaks up our caged prejudices.
- It embraces a critical and systematic approach and relies on rational argument.
- It is the standard by which ideas are integrated and understood.
- It is the foundation of knowledge from which all other disciplines derive and the standard by which ideas are integrated and understood.

As a discipline of study, Philosophy seeks:

- a. to establish standards of evidence,
- b. to provide rational methods of resolving conflicts, and;
- c. to create techniques for evaluating ideas and arguments.

The objective of philosophy is to consider the rational justification of:

- i. logical inferences,
- ii. human values,
- iii. criteria for establishing the claims of knowledge and certainty, and;

And for interpretations of the nature of reality.

- i. It contributes resources to stimulate contemporary thinking in each of the domains of its concern.

In addition, philosophy is also a conceptual inquiry dealing with fundamental issues relating to life, knowledge, and values. By conceptual inquiry we mean an inquiry that relies primarily on critical reasoning.

This includes:

- a. Analyzing the meaning of concepts

- b. Identifying logical connections between theories
- c. Evaluating arguments and exposing fallacies

Traditional Branches of Philosophy

There are 4 main traditional branches of philosophy, namely Axiology (ethics and aesthetics), epistemology, metaphysics, and logic.

1. ***Axiology***, (from Greek *axios*, “worthy”; *logos*, “science”) refers to the philosophical study of values. Various terms have been used in reference to axiology: –Theory of Value, the philosophical study of goodness or basically value. The significance of axiology as a field of study lies first in the considerable expansion of the term that has eventually given a wider meaning to the term value and secondly in the unification that it has provided for the study of a variety of questions—economic, moral, aesthetic, religious, political and even logical values that had often been considered in relative isolation. In Philosophy the study of values is divided into two sets; Ethics and Aesthetics.
 - i. ***Ethics*** is the study of practical reasoning and the normative questions to which it gives rise to. Ethics can be defined as the philosophical study of moral values. The study involves systematizing, analyzing, evaluating, applying, defending, and recommending concepts of right and wrong behaviour. In general terms, morality has to do with the dos and don’ts as expected of a rational human person. In modern times, Philosophers have divided ethical theories into three general subject areas: meta-ethics, normative ethics, and applied ethics.

- ii. ***Aesthetics*** is the study of Art and beauty. It mainly deals with beauty, art, enjoyment, sensory-emotional values, perception and matters of taste and sentiment. It includes what art consists of as well as the purpose behind it. Major aesthetical questions are:- Does art consist of music, literature, and painting? Or does it include a good engineering solution or a beautiful sunset? What is beauty? These are some of the questions aimed at in Aesthetics. It also studies methods of evaluating art and criteria of judgement of art. Is art or beauty in the eye of the beholder? Does anything that appeals to you fit under the umbrella of art? Or does it have a specific nature? Does it accomplish a goal?
2. ***Epistemology***: The term “epistemology” is derived from the ancient Greek word ‘*episteme*’ meaning ‘knowledge’. The word therefore denotes the philosophical study of knowledge, its justification and of the family of concepts which are involved in our assessing claims to knowledge or justified belief. As a theory of knowledge, epistemology seeks to establish the process of claiming to know and on what certainty basis are such claims founded. In its broadest sense, epistemology is the study of the method of acquiring and processing knowledge. It answers the question, “How do we know?”, “How do we justify our knowledge claims?” “What are the sources of our knowledge claims?”, “What is the difference between knowledge and beliefs?” etc. Epistemology encompasses the nature of concepts, the constructing of concepts, the validity of the senses, logical reasoning, as well as thoughts, ideas, memories, emotions, and all things mental. It is concerned with

how our minds are related to reality, and whether these relationships are valid or invalid. It is concerned with how we know what we do, what justifies us in believing what we do, and what standards of evidence we should use in seeking truths about the world and human experience.

3. ***Metaphysics*** is the branch of philosophy responsible for the study of existence. As a term, metaphysics is derived from two ancient Greek words ‘*meta*’ which means beyond and ‘*physicea*’ which refers to material substance or objects of experience. Metaphysics means the study of the essence of being beyond the physical entities. The word metaphysics was coined by Aristotle, a student of Plato when he undertook the task of categorising the works and writings of his teacher. Aristotle discovered that Plato wrote on many topics some of which dealt with issues of the physical entity while others dealt with abstract concepts that could not be comprehended by senses. Such abstract conceptual topics are what Aristotle classified under the discipline of metaphysics. They included the concepts of being, existence, immortality, God, spiritual beings, time, identity, consciousness, cause, essence, space, constancy etc. Being the foundation of a worldview and essence of beings, it answers the question “What is?” Metaphysics encompasses the conceptual study of everything that exists, as well as the nature of existence itself. It investigates whether the world and existence is real, or merely an illusion. Metaphysics is the study of the fundamental conceptual view of the world around us and it is divided into two wide domains: Ontology which is the study of being and Cosmology—the study of the universe.

4. **Logic** is the science that directs the mind in the process of reasoning and subsidiary processes as to enable it to attain clearness, consistency, and validity in those processes. The aim of logic is to secure clearness in the definition and arrangement of our ideas and other mental images, consistency in our judgments and validity in our processes of inference.

The Greek word *logos* meaning “reason”, is the origin of the term *logic-logike* (*techen, pragmateia, or episteme*, understood), as the name of a science first occurs in the writings of the Stoics. Aristotle, the founder of the science, designates it as “*analytic*” and the Epicureans use the term *canonic*. From the time of Cicero, however, the word logic is used almost without exception to designate this science. The names *dialectic* and *analytic* are also used simultaneously.

Generally Logic is the study of the methods and principles used to distinguish good (correct) from bad (incorrect) reasoning. In its broadest sense, Logic deals with the study of the evidential link between the premises and conclusions.

Uses of Philosophy

Much of what is learned in philosophy can be applied in virtually any endeavor. This is both because philosophy touches on so many subjects and especially because many of its methods are usable in any field.

a) General Uses of Philosophy

- i. *General Problem Solving.* The study of philosophy enhances one's problem-solving capacities. It helps one to analyze concepts, definitions, arguments, and problems. It contributes to one's capacity to organize ideas and issues, to deal with questions of value, and extract what is essential from masses of information. It helps one both to distinguish fine differences

between views and to discover common ground between opposing positions. And it helps one to synthesize a variety of views or perspectives into a unified whole.

- ii. *Communication Skills.* Philosophy contributes to the development of expressive and communicative powers. It provides the basic tools of self-expression—for instance, skills in presenting ideas through well-constructed, systematic arguments. It helps one to express what is distinctive of one's view; enhances one's ability to explain difficult material; and helps one to eliminate ambiguities and vagueness from one's writing and speech.
- iii. *Persuasive Powers.* Philosophy provides training in the construction of clear formulations, good arguments, and apt examples. It helps one develop the ability to be convincing. One learns to build and defend one's own views, to appreciate competing positions, and to indicate forcefully why one considers one's own views preferable to alternatives. These capacities can be developed not only through reading and writing in philosophy, but also through the philosophical dialogue, in and outside the classroom, that is so much a part of a thoroughgoing philosophical education.
- iv. *Writing Skills.* Philosophy teaches interpretive writing through its examination of challenging texts, comparative writing through emphasis on fairness to alternative positions, argumentative writing through developing students' ability to establish their own views, and descriptive writing through the detailed portrayal of concrete examples: the anchors to which generalizations must be tied. Structure and technique, then, are emphasized in philosophical writing. Originality is also encouraged, and students are

generally urged to use their imagination and develop their own ideas.

b) Uses of Philosophy in Educational Pursuits

The general uses of philosophy just described are obviously of great academic value. It should also be clear that the study of philosophy has intrinsic rewards as an unlimited quest for understanding of important challenging problems. But philosophy has further been used in deepening education, both in college and in the many activities, professional and personal, that follow graduation.

- i. *Understanding Other Disciplines.* Philosophy is indispensable for this. Many important questions about a discipline, such as the nature of its concepts and its relation to other disciplines, do not belong to that discipline, are not usually pursued in it, and are philosophical in nature. Philosophy of science, for instance, is needed to supplement the understanding of the natural and social sciences which one derives from scientific work itself. Philosophy of literature and philosophy of history are of similar value in understanding the arts. Philosophy is moreover, essential in assessing the various standards of evidence used by other disciplines. Since all fields of knowledge employ reasoning and must set standards of evidence, logic and epistemology have a general bearing on all these fields.
- ii. *Development of Sound Methods of Research and Analysis.* Still another value of philosophy in education is its contribution to one's capacity to frame hypotheses, do research, and put problems into manageable form. Philosophical thinking strongly emphasizes the clear formulation of ideas and problems, the selection of relevant data, and objective methods for assessing

ideas and proposals. It also emphasizes the development of a sense of the new directions suggested by the hypotheses and questions one encounters in doing research. Philosophers regularly build on both the successes and the failures of their predecessors. A person with philosophical training can readily learn to do the same in any field.

c) Practicality of Philosophy in Non-Academic Careers

i) Philosophy and Job Placement

It should be stressed immediately that the non-academic value of a field of study must not be viewed mainly in terms of its contribution to obtaining one's first job after graduation. Often students are mostly preoccupied with getting their first job, but even from a narrow vocational point of view it would be short-sighted to concentrate on that at the expense of developing potential for success and advancement once hired. What gets graduates initially hired may not yield promotions or carry them beyond their first position, particularly given how fast the needs of many employers alter with changes in social and economic patterns. It is therefore crucial to see beyond what a job description specifically calls for.

To this end, philosophy need not be mentioned among a job's requirements in order for the benefits derivable from philosophical study to be *appreciated* by the employer, and those benefits need not even be explicitly appreciated in order to be *effective* in helping one advance. It should also be emphasized here that—as recent studies show—employers want and reward many of the capacities that the study of philosophy develops: for instance, the ability to solve problems, to communicate, to organize ideas and issues, to assess pros and cons and to boil down complex data. These capacities represent *transferable skills*. They are transferable not only from

philosophy to non-philosophical areas but from one non-philosophical field to another.

For this reason, people trained in philosophy are not only prepared to do many kinds of tasks; they can also cope with change or even move into new careers more readily than many others.

ii) Philosophy and Business

Regarding current trends in business, a writer in the *New York Times* reported that

“...businessmen are coming to appreciate an education that at its best produces graduates who can write and think clearly and solve problems” (June 23, 1981).

A recent long-term study by the Bell Telephone Company moreover, determined that majors in liberal arts fields, in which philosophy is a central discipline, “continue to make a strong showing in managerial skills and have experienced considerable business success” (*Career Patterns*, by Robert E. Beck). The study concluded that “there is no need for liberal arts majors to lack confidence in approaching business careers.”

A related point was made by a Senior Vice President of the American Can Company:

“Students with any academic background are prepared for business when they can educate themselves and can continue to grow without their teachers, when they have mastered techniques of scholarship and discipline, and when they are challenged to be all they can be” (*Wall Street Journal*, February 2, 1981).

As all this suggests, there are people trained in philosophy in just about every field. They have gone not only into such professions as teaching (at all levels), medicine, and law, but

into computer science, management, publishing, sales, criminal justice, public relations, and other fields. Some professionally trained philosophers are also on legislative staffs, and the work of some of them, for a senior congressman, prompted him to say:

“Philosophy is one of the most important endeavors in human history. It informs nearly every aspect of human life and positive aspirations. The prima facie principle to philosophy is critical thinking without which our ability to transform society and grow business for the good of humanity is an attempt in futility.” (The Chronicle, October 21, 1994)

Principal Functions of Philosophy

The relevance and practical significance of philosophy cannot be underestimated. As regards human experiential existence, philosophy is instrumental in the following:

1. *Integration of experience:* The universe as we experience it is both diverse and unified. Reasoned thought helps us to integrate and harmonize these apparently opposed aspects of reality.
2. *Nurturing of awareness and sensitivity:* Reasoned thought assists us to not only understand the universe but also ourselves as part of it. Self-examination enhances the consciousness of our own limitations and capabilities. This awareness and sensitivity is crucial in assisting us to adapt to the challenging and complex situations of life.
3. *Clarification and justification of belief:* Beliefs are the basis of our actions. Reasoned thought about our beliefs enables us to ensure that they are well-founded and thus rationally justifiable. If our actions are to be effective in enhancing our well-being, they should be

founded on explicit, clear, distinct, and rationally justifiable beliefs.

4. *Bridging the gap between theory and practice:* Philosophy raises questions regarding the meaning, foundations, purpose, justification, verification and application of theories in the pragmatic context. This is useful in ensuring that theories inform practice appropriately. Philosophy also evaluates practice and raises questions regarding the extent to which practice confirms and conforms to theory and why.
5. *Providing a condition for the freedom of the mind:* Philosophy seeks to liberate us from the slavery of ignorance and irrationality. It helps us to examine our own beliefs, assumptions, and prejudices. It assists us to act rationally and justly. This in turn broadens our realm of freedom and enhances our capacity to act and respond responsibly, intelligently, and creatively.

Self-Assessment Questions

1. Define philosophy and show its relevance in human life.
2. What are the uses of philosophy?
3. Discuss ***any two*** of the following branches (areas) of Philosophy
 - a. Logic
 - b. Epistemology
 - c. Metaphysics
 - d. Ethics
 - e. Aesthetics
4. The best way to rid Kenya of underdevelopment and massive corruption is to have a philosopher president. Discuss.

5. By way of examples, show the relationship between Philosophy and Critical thinking.
6. To what extent is philosophy a First order discipline?
7. Examine the view that logic is more of a first order principle to philosophy than its branch.
8. "Philosophy is about the nature of and essence of reality itself." Discuss.
9. "Everyone who is capable of thinking is a philosopher so there is no need of studying philosophy." Discuss.
10. "Philosophers do make life more difficult than it is" Do you agree with this statement? Give reasons.
11. What is the difference between a Philosopher and an African sage?

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CHAPTER TWO

LEVELS OF (THOUGHT) THINKING

Brainteasers

1. Mystery

it cannot be seen,
cannot be felt,
cannot be heard,
cannot be smelt.
it lies behind stars
and behind hills,
and empty holes it fills.
it comes first and
follows after,
ends life, kills laughter.

2. The Ruins Town

This is a thing that is devoured by all things; flowers,
trees, beasts, birds; bites steel, gnaws iron; grinds hard
stone to meal; beats mountain down, ruins town, and
slays king. What is it?

1. Walking On Four Legs

What walks on 4 legs when it is morning, on 2 legs at noon,
and on 3 legs in the evening?

Introduction

This chapter is intended to examine various levels of thinking;
from the pre-conventional, conventional to post-conventional

levels of thought. It aims at equipping you with knowledge of how human mind progress in development as to reach the point of discerning between what is correct and what is wrong through the use of intellect. It covers various stages definitive of human ability to think, namely: unreflective thinker (pre-conventional level of thought), the challenged thinker (Conventional level of thought), the beginning thinker, the practicing thinker, the advanced thinker, and the accomplished thinker.

Chapter Objectives

By the end of this chapter the participant should be able to:

- a. Discuss various levels of human thought (thinking)
- b. Explain some of the obstacles to advancing in levels of thinking
- c. Explain the differences between various levels of thought
- d. Discuss the nature and characteristics of each level of thought.
- e. Identify various levels of thinking capacities among colleagues and prisoners

Levels of Human Thought (Thinking)

In the article *Critical Thinking Development: A Stage Theory* (2010), Elder Linda and Paul Roberts discuss various stages of critical thinking and problem solving that can enable us to explain different levels of thought among human beings. They argue that significant gains in the intellectual quality of student work cannot be achieved except to the degree that their teachers recognize that skilled critical thinking develops, only when properly cultivated, and only through predictable stages. Earlier, philosophers had categorized human levels of thinking into three categories, namely: pre-conventional level (the lowest level of thinking common in infants, children, and

to some extent delinquents), conventional level – which is the standard level of thinking common in the majority of people, often uncritical, and the post-conventional level which is manifest in critical thinkers - those who base their arguments on reason and rational justification.

The two authors presents six stages of thinking, namely:

- a) *Stage One:* The Unreflective Thinker
- b) *Stage Two:* The Challenged Thinker
- c) *Stage Three:* The Beginning Thinker.
- d) *Stage Four:* The Practicing Thinker.
- e) *Stage Five:* The Advanced Thinker.
- f) *Stage Six:* The Accomplished Thinker.

1. Stage One: The Unreflective Thinker (Pre-Conventional)

Defining Feature: Unreflective thinkers are largely unaware of the determining role that thinking is playing in their lives and of the many ways that problems in thinking are causing in their lives. Unreflective thinkers lack the ability to explicitly assess their thinking and improve it thereby.

Knowledge of Thinking: Unreflective thinkers:

- a. Lack the knowledge that high-quality thinking requires regular practice in taking thinking apart, accurately assessing it, and actively improving it.
- b. Are largely unaware of thinking as such; hence fail to recognize thinking as involving concepts, assumptions, inferences, implications, points of view, etc.
- c. Are largely unaware of the appropriate standards for the assessment of thinking: such as clarity, accuracy, precision, relevance, logicalness, etc.

Skill in Thinking: Unreflective thinkers may have developed a variety of skills in thinking without being aware of them.

However, these skills are inconsistently applied because of the lack of self-monitoring of thought. Prejudices and misconceptions often undermine the quality of thought of the unreflective thinker

Some Implications for Instruction: We must recognize that in the present mode of instruction it is perfectly possible for students to graduate from high school, or even college, and still be largely unreflective thinkers. Though all students think, most students are largely unaware of how their thinking is structured or how to assess or improve it.

When they experience problems in thinking, they lack the skills to identify and “fix” these problems. Most lecturers do not seem to be aware of how unaware most students are of their thinking. Little is being done at present to help students “discover” their thinking. This emphasis needs shifting.

2. Stage Two: The Challenged Thinker (Conventional Level)

Defining Features: Thinkers move to the challenged stage when they:

- a. become initially aware of the determining role that thinking play in their lives and
- b. Become aware of the fact that problems in their thinking are causing them serious and significant problems.

Principal Challenge: To become initially aware of the determining role of thinking in one’s life and of basic problems that come from poor thinking.

Knowledge of Thinking: Challenged thinkers, unlike unreflective thinkers are:

- a) Becoming aware of thinking as such.

- b) Aware that high quality thinking requires deliberate reflective thinking about thinking (in order to improve thinking).
- c) They recognize that their thinking is often flawed, although they are not able to identify many of these flaws.
- d) Challenged thinkers may develop an initial awareness of thinking as involving concepts, assumptions, inferences, implications, points of view, etc., and
- e) as involving standards for the assessment of thinking: clarity, accuracy, precision, relevance, logicalness, etc., though they have only an initial grasp of these standards and what it would take to internalize them.
- f) Challenged thinkers also develop some understanding of the role of self-deception in thinking, though their understanding is limited.
- g) At this stage the thinker develops some reflective awareness of how thinking operates for good or ill.

Skill in Thinking: Most challenged thinkers have very limited skills in thinking. However, like unreflective thinkers, they may have developed a variety of skills in thinking without being aware of them, and these skills may (ironically) serve as barriers to development. At this stage thinkers with some implicit critical thinking abilities may more easily deceive themselves into believing that their thinking is better than it actually is, making it more difficult to recognize the problems inherent in poor thinking. To accept the challenge at this level requires that thinkers gain insight into the fact that whatever intellectual skills they have are inconsistently applied across the domains of their lives.

Relevant Intellectual Trait: The fundamental intellectual trait at this stage is intellectual humility, in order to see that problems are inherent in one's thinking.

Some Implications for Instruction: We must recognize the importance of challenging our students - in a supportive way - to recognize both that they are thinkers and that their thinking often goes awry. We must lead class discussions about thinking. We must explicitly model thinking (e.g., thinking aloud through a problem). We must design classroom activities that explicitly require students to think about their thinking. We must have students examine both poor and sound thinking, talking about the differences. We must introduce students to the parts of thinking and the intellectual standards necessary to assess thinking. We must introduce the idea of intellectual humility to students; that is, the idea of becoming aware of our own ignorance. Perhaps children can best understand the importance of this idea through their concept of the “know-it-all” which comes closest to their recognition of the need to be intellectually humble.

3. Stage Three: The Beginning Thinker (Conventional Advanced)

Defining Feature: Those who move to the beginning thinker stage are actively taking up the challenge to begin to take explicit command of their thinking across multiple domains of their lives. Thinkers at this stage recognize that they have basic problems in their thinking and make initial attempts to better understand how they can take charge of and improve it. Based on this initial understanding, beginning thinkers begin to modify some of their thinking, but have limited insight into deeper levels of the trouble inherent in their thinking. Most importantly, they lack a systematic plan for improving their thinking; hence their efforts are hit and miss.

Principal Challenge: To begin to see the importance of developing as a thinker, to begin to seek ways to develop as a thinker and to make an intellectual commitment to that end.

Knowledge of Thinking: Beginning thinkers, unlike challenged thinkers are becoming aware not only of thinking as such, but also of the role in thinking of concepts, assumptions, inferences, implications, points of view, etc. Beginning thinkers are also at some beginning stage of recognizing not only that there are standards for the assessment of thinking: clarity, accuracy, precision, relevance, logicalness, etc., but also that one needs to internalize them and thus begin using them deliberately in thinking. They have a beginning understanding of the role of egocentric thinking in human life.

Skill in Thinking: Beginning thinkers are able to appreciate a critique of their powers of thought. Beginning thinkers have enough skill in thinking to begin to monitor their own thoughts, though as beginners; they are sporadic in that monitoring. They are beginning to recognize egocentric thinking in themselves and others.

Relevant Intellectual Traits: The key intellectual trait required at this stage is some degree of intellectual humility in beginning to recognize the problems inherent in thinking. In addition, thinkers must have some degree of intellectual confidence in reason, a trait which provides the impetus to take up the challenge and begin the process of active development as critical thinkers, despite limited understanding of what it means to do high quality reasoning. In addition, beginning thinkers have enough intellectual perseverance to struggle with serious problems in thinking while yet lacking a clear solution to those problems (in other words, at this stage thinkers are recognizing more and more problems in their thinking but have not yet discovered how to systematize their efforts to solve them).

Some Implications for Instruction: Once we have persuaded most of our students that much of their thinking—left to itself—is flawed and that they, like all of us, are capable of improving as thinkers, we must teach in such a way as to help them to see

that we all need to regularly practice good thinking to become good thinkers. Here we can use sporting analogies and analogies from other skill areas. Most students already know that you can get good in a sport only if you regularly practice. We must not only look for opportunities to encourage them to think well, we must help them to begin to understand what it is to develop good HABITS of thinking. What do we need to do regularly in order to read well? What must we do regularly and habitually if we are to listen well? What must we do regularly and habitually if we are to write well. What must we do regularly and habitually if we are to learn well? We must recognize that students are not only creatures of habit, but like the rest of us, they are largely unaware of the habits they are developing. They are largely unaware of what it is to develop good habits (in general), let alone good habits of thinking. If our students are truly “beginning” thinkers, they will be receptive to the importance of developing sound habits of thought. We must emphasize the importance of beginning to take charge of the parts of thinking and applying intellectual standards to thinking. We must teach students to begin to recognize their native egocentrism when it is operating in their thinking.

4. Stage Four: The Practicing Thinker (Post Conventional Moderate)

Defining Feature: Thinkers at this stage have a sense of the habits they need to develop to take charge of their thinking. They not only recognize that problems exist in their thinking, but they also recognize the need to attack these problems globally and systematically. Based on their sense of the need to practice regularly, they are actively analyzing their thinking in a number of domains. However, since practicing thinkers are only beginning to approach the improvement of their thinking in a systematic way, they still have limited insight into deeper

levels of thought, and thus into deeper levels of the problems embedded in thinking.

Principal Challenge: To begin to develop awareness of the need for systematic practice in thinking.

Knowledge of Thinking: Practicing thinkers, unlike beginning thinkers are becoming knowledgeable of what it would take to systematically monitor the role in their thinking of concepts, assumptions, inferences, implications, points of view, etc. Practicing thinkers are also becoming knowledgeable of what it would take to regularly assess their thinking for clarity, accuracy, precision, relevance, logicalness, etc. Practicing thinkers recognize the need for ‘systematicity’ of critical thinking and deep internalization into habits. They clearly recognize the natural tendency of the human mind to engage in egocentric thinking and self-deception.

Skill in Thinking: Practicing thinkers have enough skill in thinking to critique their own plan for systematic practice, and to construct a realistic critique of their powers of thought. Furthermore, practicing thinkers have enough skill to begin to regularly monitor their own thoughts. Thus, they can effectively articulate the strengths and weaknesses in their thinking. Practicing thinkers can often recognize their own egocentric thinking as well as egocentric thinking on the part of others. Furthermore, practicing thinkers actively monitor their thinking to eliminate egocentric thinking, although they are often unsuccessful.

Relevant Intellectual Traits: The key intellectual trait required to move to this stage is intellectual perseverance. This characteristic provides the impetus for developing a realistic plan for systematic practice (with a view to taking greater command of one’s thinking). Furthermore, thinkers at this stage have the intellectual humility required to realize that thinking in all the domains of their lives must be subject to

scrutiny, as they begin to approach the improvement of their thinking in a systematic way.

Some Implications for Instruction: What are the basic features of thinking that students must command to effectively become practicing thinkers? What do they need to do to take charge of their thinking intellectually, with respect to any content? We must teach in such a way that students come to understand the power in knowing that whenever humans reason, they have no choice but to use certain predictable structures of thought: that thinking is inevitably driven by the questions, that we seek answers to questions for some purpose, that to answer questions, we need information, that to use information we must interpret it (i.e., by making inferences), and that our inferences, in turn, are based on assumptions, and have implications, all of which involves ideas or concepts within some point of view. We must teach in such a way as to require students to regularly deal explicitly with these structures (more on these structures presently).

Students should now be developing the habit—whenever they are trying to figure something out —of focusing on: purpose, question, information, inferences, assumptions, concepts, point of view, and implications. The result of this emphasis in instruction is that students begin to see connections between all the subject matter they are learning. In studying history, they learn to focus on historical purposes and questions.

When studying math, they clarify and analyze mathematical goals and problems. When studying literature, they reflect upon literary purposes and questions. They notice themselves making historical, mathematical, and literary assumptions. They notice themselves tracing historical, mathematical, and literary implications. Recognizing the “moves” one makes in thinking well is an essential part of becoming a practicing thinker.

Students should be encouraged to routinely catch themselves thinking both egocentrically and socio-centrally. They should understand, for example, that most of the problems they experience in learning result from a natural desire to avoid confusion and frustration, and that their inability to understand another person's point of view is often caused by their tendency to see the world exclusively within their own egocentric point of view.

5. Stage Five: The Advanced Thinker (Post Conventional Smart)

Defining Feature: Thinkers at this stage have now established good habits of thought which are “paying off.” Based on these habits, advanced thinkers not only actively analyze their thinking in all the significant domains of their lives but also have significant insight into problems at deeper levels of thought. While advanced thinkers are able to think well across the important dimensions of their lives, they are not yet able to think at a consistently high level across all of these dimensions. Advanced thinkers have good general command over their egocentric nature. They continually strive to be fair-minded. Of course, they sometimes lapse into egocentrism and reason in a one-sided way.

Principal Challenge: To begin to develop depth of understanding not only of the need for systematic practice in thinking, but also insight into deep levels of problems in thought: consistent recognition, for example, of egocentric and socio-centric thought in one's thinking, ability to identify areas of significant ignorance and prejudice, and ability to actually develop new fundamental habits of thought based on deep values to which one has committed oneself.

Knowledge of Thinking: Advanced thinkers are actively and successfully engaged in systematically monitoring the role in their thinking of concepts, assumptions, inferences,

implications, points of view, etc., and hence have excellent knowledge of that enterprise. Advanced thinkers are also knowledgeable of what it takes to regularly assess their thinking for clarity, accuracy, precision, relevance, logicalness, etc. Advanced thinkers value the deep and systematic internalization of critical thinking into their daily habits. Advanced thinkers have keen insight into the role of egocentrism and socio-centrism in thinking, as well as the relationship between thoughts, feelings and desires.

They have a deep understanding of the powerful role that thinking plays in the quality of their lives. They understand that egocentric thinking will always play a role in their thinking, but that they can control the power that egocentrism has over their thinking and their lives.

Skill in Thinking: Advanced thinkers regularly critique their own plan for systematic practice, and improve it thereby. Practicing thinkers regularly monitor their own thoughts. They insightfully articulate the strengths and weaknesses in their thinking. They possess outstanding knowledge of the qualities of their thinking. Advanced thinkers are consistently able to identify when their thinking is driven by their native egocentrism; and they effectively use a number of strategies to reduce the power of their egocentric thoughts.

Relevant Intellectual Traits: The key intellectual trait required at this stage is a high degree of intellectual humility in recognizing egocentric and socio-centric thought in one's life as well as areas of significant ignorance and prejudice. In addition the thinker at this level needs: a) the intellectual insight and perseverance to actually develop new fundamental habits of thought based on deep values to which one has committed oneself, b) the intellectual integrity to recognize areas of inconsistency and contradiction in one's life, c) the intellectual empathy necessary to put oneself in the place of others in order to genuinely understand them, d) the

intellectual courage to face and fairly address ideas, beliefs, or viewpoints toward which one has strong negative emotions, e) the fair-mindedness necessary to approach all viewpoints without prejudice, without reference to one's own feelings or vested interests. In the advanced thinker these traits are emerging, but may not be manifested at the highest level or in the deepest dimensions of thought.

Some Implications for Instruction: For the foreseeable future most of our students will not become advanced thinkers – if at all – until college or beyond. Nevertheless, it is important that they learn what it would be to become an advanced thinker. It is important that they see it as an important goal. We can help students move in this direction by fostering their awareness of egocentrism and socio-centrism in their thinking, by leading discussions on intellectual perseverance, intellectual integrity, intellectual empathy, intellectual courage, and fair-mindedness. If we can graduate students who are practicing thinkers, we will have achieved a major break-through in schooling. However intelligent our graduates may be, most of them are largely unreflective as thinkers, and are unaware of the disciplined habits of thought they need to develop to grow intellectually as a thinker.

6. Stage Six: The Accomplished Thinker (Post Conventional Ultimate)

Defining Feature: Accomplished thinkers not only have systematically taken charge of their thinking, but are also continually monitoring, revising, and re-thinking strategies for continual improvement of their thinking. They have deeply internalized the basic skills of thought, so that critical thinking is, for them, both conscious and highly intuitive. As Piaget would put it, they regularly raise their thinking to the level of conscious realization. Through extensive experience and practice in engaging in self-assessment, accomplished thinkers are not only actively analyzing their thinking in all the

significant domains of their lives, but are also continually developing new insights into problems at deeper levels of thought. Accomplished thinkers are deeply committed to fair-minded thinking, and have a high level of, but not perfect, control over their egocentric nature.

Principal Challenge: To make the highest levels of critical thinking intuitive in every domain of one's life, to internalize highly effective critical thinking in an interdisciplinary and practical way.

Knowledge of Thinking: Accomplished thinkers are not only actively and successfully engaged in systematically monitoring the role in their thinking of concepts, assumptions, inferences, implications, points of view, etc., but are also regularly improving that practice. Accomplished thinkers have not only a high degree of knowledge of thinking, but a high degree of practical insight as well. Accomplished thinkers intuitively assess their thinking for clarity, accuracy, precision, relevance, logicalness, etc. Accomplished thinkers have deep insights into the systematic internalization of critical thinking into their habits. Accomplished thinkers deeply understand the role that egocentric and socio-centric thinking plays in the lives of human beings, as well as the complex relationship between thoughts, emotions, drives and behavior.

Skill in Thinking: Accomplished thinkers regularly, effectively, and insightfully critique their own use of thinking in their lives, and improve it thereby. Accomplished thinkers consistently monitor their own thoughts. They effectively and insightfully articulate the strengths and weaknesses inherent in their thinking. Their knowledge of the qualities of their thinking is outstanding. Although, as humans they know they will always be fallible (because they must always battle their egocentrism, to some extent), they consistently perform effectively in every domain of their lives. People of good sense seek out master thinkers, for they recognize and value the

ability of master thinkers to think through complex issues with judgment and insight.

Relevant Intellectual Traits: Naturally inherent in master thinkers are all the essential intellectual characteristics, deeply integrated. Accomplished thinkers have a high degree of intellectual humility, intellectual integrity, intellectual perseverance, intellectual courage, intellectual empathy, intellectual autonomy, intellectual responsibility and fair-mindedness. Egocentric and socio-centric thought is quite uncommon in the accomplished thinker, especially with respect to matters of importance. There is a high degree of integration of basic values, beliefs, desires, emotions, and action.

d. Some implications for Instruction: For the foreseeable future the vast majority of our students will never become accomplished thinkers — any more than most high school basketball players will develop the skills or abilities of a professional basketball player or student writers the writing skills of a published novelist. Nevertheless, it is important that they learn what it would be like to become an accomplished thinker. It is important that they see it as a real possibility if practicing skills of thinking becomes a characteristic of how they use their minds day to day.

General Implications for Instruction

We believe that the thinking of students will remain invisible to them unless they are supportively challenged to discover the problems in their thinking. This is not possible unless they receive careful introduction into the intellectual workings of the human mind. Students need to be exposed to dynamics of thought and be helped to realize that mental laziness and lack of exercise in dealing with issues that demand attention and solutions is catastrophic to the development of a critical and creative mind.

Discovering Parts of Thinking

What then, are the basic features of thinking that students need to know to effectively take charge of their thinking intellectually and in life, with respect to any content? First, they must come to realize that whenever humans' reason, they have no choice but to use certain elements, without which their thinking would be intellectually unintelligible.

According to the two authors, thinking is inevitably driven by the questions we seek to answer, and the purpose for which we seek to answer them. To answer questions, we need information which is in fact meaningful to us only if we interpret it (i.e., by making inferences). Our inferences, in turn, are based on assumptions and require that we use ideas or concepts to organize the information in some way from some point of view. Last but not least, our thinking not only begins somewhere intellectually (in certain assumptions), it also goes somewhere - that is, has implications and consequences.

Thus, whenever we reason through any problem, issue, or content we are well advised to take command of these intellectual structures: purpose, question, information, inferences, assumptions, concepts, point of view, and implications. By explicitly teaching students how to take command of the elements of reasoning we not only help them take command of their thinking in a general way; we also provide a vehicle that effectively enables them to critically think through the content of their classes, seeing connections between all of what they are learning

Teach/Learn for Critical thinking

When lecturers become advocates of quality thinking and learning, they ought to teach in such a way that students are regularly required to:

- a) state and explain goals and purposes,

- b) clarify the questions they need to answer and the problems they need to solve,
- c) gather and organize information and data,
- d) explicitly assess the meaning and significance of information you give them,
- e) demonstrate that they understand concepts,
- f) identify assumptions,
- g) consider implications and consequences,
- h) examine things from more than one point of view,
- i) state what they say clearly,
- j) test and check for accuracy,
- k) stick to questions, issues, or problems; and not wander in their thinking,
- l) express themselves precisely and exactly, deal with complexities in problems and issues,
- m) consider the point of view of others,
- n) express their thinking logically,
- o) distinguish significant matters from insignificant ones.

Consequently, there are many ways to teach/learn for thinking. However, if we are to do so, we must focus on the mind and have the capacity to grasp the stages that learners must progress through. We must recognize that we can all develop incrementally as thinkers, and, that the progress to do so is directly dependent on our level of intellectual knowledge and commitment. Put in a different way, if I am to develop my critical thinking ability I must both "discover" my thinking and must intellectually take charge of it. To do this, I must make a deep commitment towards this end.

Why is this so important? Precisely because the human mind left to its own, pursues that which is immediately easy, that which is comfortable, and that which serves immediate selfish

interests. At the same time, the weak mind will naturally resist that which is difficult to understand, that which involves complexity, and that which requires delving into the thinking and predicaments of others.

Self-Assessment Questions

1. Discuss the importance of critical thinker understanding of various levels of thinking.
2. What is the difference between uncritical thinker and a beginning thinker?
3. Discuss some of the characteristics of an accomplished thinker.
4. Explain any two types (levels) of thinking and in each case highlight the necessary traits in training to overcome the barriers in the level.
5. What is the relationship between an advanced thinker and an accomplished thinker?
6. As a university student/a self-learner, which stage of thinking do you think you fit? Give reasons for your answer?

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CHAPTER THREE

THE SOCRATIC QUESTIONING METHOD

Introduction

Socrates was a Greek philosopher whose way of life, character, thought and teaching exerted a profound influence on ancient and modern philosophy. This topic introduces you to the teaching/Questioning method and how the method has continued to impact on the nature and characteristics of critical thinking. The section covers a brief history of Socrates, his beliefs, his teaching/questioning method and the relevance of his method to the subject of critical thinking.

Chapter Objectives

By the end of this chapter, you will be able to:

1. Understand who Socrates was.
2. Explain Socrates' beliefs.
3. Explain the Socratic Teaching/questioning method.
4. Apply the Socratic Method to the evaluation of arguments.

Watch:

<https://www.youtube.com/watch?v=Ja7XDdGSGHQ#:~:text=The%20Socratic%20method%20can,critical%20thinking.>

The Puzzle: The Paradox of the "Just" Thief

- *The Scenario:* You are an ancient Athenian judge. A philosopher named Polemarchus claims: "*Justice is giving every person exactly what they are owed.*"

To test his definition, you must use the Socratic Method. You can only ask questions that force Polemarchus to agree with statements that eventually contradict his original claim.

The Clues:

- ✓ *Fact A:* A friend lends you a weapon while perfectly sane.
- ✓ *Fact B:* The friend returns later, demanding the weapon back, but they have gone completely mad and are violent.
- ✓ *Fact C:* Polemarchus agrees that returning the weapon is giving the friend "what is owed."
- ✓ *Fact D:* Polemarchus agrees that causing harm to a friend is not a just act.

The Puzzle: What single question can you ask Polemarchus to expose the contradiction in his definition of justice?

Introduction: Socrates

Socrates lived between 469 and 399 BC. He was a classical Greek philosopher who has been credited as one of the founders of Western philosophy. Socrates is an enigmatic figure known chiefly through the accounts of later classical writers, especially the writings of his students Plato and Xenophon, and the plays of his contemporary Aristophanes. He never wrote anything and possibly Plato's dialogues are the most comprehensive accounts of him that have survived from antiquity.

Through his depiction in Plato's dialogues, Socrates has become renowned for his contribution to the field of ethics and to the concepts of Socratic irony and the Socratic Method. The

Socratic Method remains a commonly used tool in a wide range of discussions and is a type of training in which a series of questions are asked not only to draw individual answers but also to encourage fundamental insight into the issue at hand. It informed the rise of critical thinking as a subject or field of study.

Socratic Beliefs

Socrates believed that an unexamined life is not worth living. He emphasized the need for people to think through what they hold to be true and to live lives informed by decisions clearly interrogated and known to be binding. He discovered that by a method of systematic probing questionings, people could not rationally justify their confident claims to knowledge. Confused meanings, inadequate evidence, or self-contradictory beliefs often lurked beneath smooth but largely empty rhetoric. Socrates established the fact that one cannot depend upon those in "authority" to have sound knowledge and insight. He demonstrated that persons may have power and high position and yet be deeply confused and irrational. He established the importance of asking deep questions that probe profoundly into thinking before we accept ideas as worthy of belief. He established the importance of seeking evidence, closely examining reasoning and assumptions, analyzing basic concepts, and tracing out implications not only of what is said but of what is done as well. His method of questioning is now known as "Socratic questioning" and is the best-known Critical thinking teaching strategy. In his mode of questioning, Socrates highlighted the need in thinking for clarity, precision and logical consistency.

Socrates set the agenda for the tradition of Critical thinking, namely, to reflectively question common beliefs and explanations, carefully distinguishing those beliefs that are reasonable and logical from those which, however appealing

they may be to our native egocentrism, however much they serve our vested interests, however comfortable or comforting they may be-lack adequate evidence or rational foundation to warrant our belief.

The Socratic Method

a) Meaning of Socratic Questioning

Socratic questioning is a mode of questioning that deeply probes the meaning, justification, or logical strength of a claim, position, or line of reasoning. Socratic questioning can be carried out in a variety of ways and adapted to many levels of ability and understanding.

Socratic Questioning is the oldest and still the most powerful training tactic/method for fostering Critical thinking. It focuses on giving people questions, not answers; it models an inquiring, probing mind by continually probing into the subject with pertinent questions aimed at nurturing and cultivating the mind into self-knowing. It's to this background that Socrates considered himself *the midwife of knowledge*. The abilities we gain by focusing on the elements of reasoning in a disciplined and self-assessing way, and the logical relationships that result from such disciplined thought, prepare us for the Socratic questioning/teaching method that characterizes the subject of critical thinking.

Thankfully, there is a predictable set of relationships that hold for all subjects and disciplines which bear relevance to what Socrates intended. This is to be found in the general logic of reasoning. In the Socratic approach, every subject is developed by those who had:

1. shared goals and objectives (which defined the subject focus)

2. shared questions and problems (whose solution they pursued)
3. shared information and data (which they used as an empirical basis)
4. shared modes of interpreting or judging that information
5. shared specialized concepts and ideas (which they used to help them organize their data)
6. shared key assumptions (that gave them a basis from which to collectively begin)
7. a shared point of view (which enabled them to pursue common goals from a common framework)

Each of the elements above represents a dimension into which one can delve in questioning a person. We can question goals and purposes. We can probe into the nature of the question, problem, or issue that is on the floor. We can inquire into whether or not we have relevant data and information. We can consider alternative interpretations of the data and information. We can analyze key concepts and ideas. We can question the assumptions being made. We can ask learners to trace out the implications and consequences of what they are saying. We can consider alternative points of view. All of these, and more, are the proper focus of the Socratic questioner.

As a tactic and approach, Socratic questioning is a highly disciplined process. The Socratic questioner acts as the logical equivalent of the inner critical voice which the mind develops when it develops critical thinking abilities. All of the thoughts must be dealt with and they must be dealt with carefully and fairly. By following up all answers with further questions, and by selecting questions which advance the discussion, the Socratic questioner forces the class to think in a disciplined, intellectually responsible manner, while yet continually aiding the learners by posing facilitating questions.

A Socratic questioner should therefore: i) keep the discussion focused; and, ii) keep the discussion intellectually responsible by: a) stimulating the discussion with probing questions; b) periodically summarizing what has and what has not been dealt with and/or resolved; and, iii) drawing as many learners/listeners/participants as possible into the discussion.

Three Categories for Socratic Questions: Crucial Distinctions

Many pseudo (self-styled) critical thinking approaches present all judgments as falling into two exclusive and exhaustive categories: fact and opinion. Actually, the kind of judgment most important to educated people and the kind we most want to foster falls into a third, very important, and now almost totally ignored category, that of reasoned judgment that Socrates exemplified. For example;

Case Study 1: A judge in a court of law is expected to engage in reasoned judgment; that is, the judge is expected not only to render a judgment but also to base that judgment on sound, relevant evidence and valid legal reasoning. A judge is not expected to base his judgments on his subjective preferences, or on his personal opinions, as such.

Thus, judgment based on sound reasoning goes beyond and is never to be equated with, fact alone or mere opinion alone. Facts are typically used in reasoning, but good reasoning does more than state facts. Furthermore, a position that is well-reasoned is not to be described as simply an opinion. Of course, we sometimes call the judge's verdict an "opinion," but we not only expect, we demand that it be based on relevant and sound reasoning.

Only the third kind of question is a matter of sheer opinion. The second kind is a matter of reasoned judgment- we can rationally evaluate answers to the question (using universal intellectual standards such as clarity, depth, consistency and so forth).

When questions that require better or worse answers are treated as matters of opinion, pseudo-critical thinking occurs. This creates a situation where individuals uncritically assume that everyone's "opinion" is of equal value. Their capacity to appreciate the importance of intellectual standards diminishes, and we can expect to hear questions such as: i) what if I don't like these standards? ii) Why shouldn't I use my own standards? iii) Don't I have a right to my own opinion? iv) What if I am just an emotional person? v) What if I like to follow my intuition? vi) What if I don't believe in being "rational?" vii) Why should I listen to you?

They begin to fail to see the difference between offering legitimate reasons and evidence in support of a view and simply asserting the view as true. The failure to teach people to recognize, value, and respect good reasoning is one of the most significant failings in organizations; the absence of a critical component in institutions.

Lessons learnt from Socrates and his method

The life and teaching of Socrates embody many lessons and amplifies various traits which are relevant to us today. Among those traits are: courage, honesty, perseverance, creativity, criticality, commitment of purpose, professional etiquette and moral uprightness, tolerance, pedagogical inclusivity and collaboration, specificity, resilience

Summary

The philosopher Socrates remains, as he was in his lifetime (469–399 B.C.E.), an enigma, an inscrutable individual who,

despite having written nothing, is considered one of the handful of philosophers who forever changed how philosophy itself was to be conceived and the dynamics of critical thought. Believing as he did, Socrates never feigned knowledge, he believed that the capacity to know is in-built in individuals and what those individuals need is a trigger to awaken the critical spirit within in order for them to actualize their mental potential. One Socrates is far much better than a thousand tyrant fools. Socrates is a true catalyst to criticality and effective problem solving

Study Activities

1. Explain the importance of having shared goals as a basis for reasoning in academic and state institutions.
2. Analyze the relevance of applying Socratic questioning to the process of clarifying concepts and information at the workplace.

Self-Assessment Test

1. Based on Socrates' belief, explain how you could motivate your colleagues to value the purpose of life.
2. Explain the importance of engaging fellow students or fellow employees in a Socratic model dialogue.
3. Evaluate the relevance of the following quotations from Socrates to effective thinking:
 - a) *"I know that I am intelligent because I know that I know nothing".*
 - b) *"I cannot teach anybody anything; I can only make them think."*
 - c) *"By all means marry: if you get a good wife, you'll become happy; if you get a bad one, you'll become a philosopher" (Socrates)*

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CHAPTER FOUR

CRITICAL THINKING

Puzzles

- ✓ *The 3-Litre and 5-Litre Jug:* Measure exactly 4 liters of water using only a 3-liter bucket and a 5-liter bucket with no measuring marks.
- ✓ *The Light Bulb Switch:* Three switches are outside a closed room with three light bulbs inside. You can only enter the room once. How do you find out which switch goes to which bulb?
- ✓ *The Odd One Out:* Find deeper hidden rules rather than surface traits, such as identifying why "Petrol" doesn't belong with milk, water, coffee, and juice even though all are liquids

Introduction

This chapter is intended to stir the mind of the learner and equip him/her with knowledge and positive attitudes for critical thinking and problem-solving skills. It covers definitions of critical thinking, the nature and characteristics of critical thinking and problem solving, uses and importance of critical thinking and problem-solving.

Chapter Objectives

By the end of this chapter, you should be able to:

- a) Define critical thinking.
- b) Explain the necessary dispositions of critical thinking.
- c) Discuss the nature and characteristics of a critical thinker.

- d) Discuss the importance of critical thinking in service delivery, and in an individual's life
- e) Apply critical thinking skills to thinking, decision-making and problem-solving
- f) Discuss and apply the uses and relevance of critical thinking and problem-solving in life

Brainteasers

1. A man is walking to Kisumu town. He comes to a fork in the road, with the two branches leading in two different directions. He knows that one of them goes to Kisumu, but he doesn't know which one. He also knows that in the house right beside the fork in the road there are two brothers, identical twins, both of whom know the road to Kisumu. He knows that one brother always lies and the other always tells the truth, but he cannot tell them apart. What single question can he ask to whoever answers his knock on the door which will indicate to him the correct road to Kisumu?

2. Tom survives a shipwreck in deep waters by hanging on a lifesaver balloon. As the balloon shifts to a shore of an island, Tom soberly identifies the island two kilometers away from the coastline. The island is inhabited by two distinct tribes, a fact Tom is very much aware of. One of the tribes is called the Nobles while the other the Savages. These two tribes have very distinct characters; The Nobles *always tell the truth* while the Savages *always tell lies*. Tom is aware of these characteristics and he would like to identify himself with the nobles for positive assistance. As the balloon shifts, Tom sees a man at the shore and he calls out to him: "Are you a noble or a Savage? But when the man answers back, a wave breaks at the shore and Tom fails to hear the answer. The balloon shifts further on and Tom spots another man and he asks him the same question: "Are you a noble or a savage?" The second man points to the first man and says: "He said he is a noble" and

then he adds, “I am a noble.” The balloon is pushed further south by the wind and Tom spots yet another man, the third one. To him, the same question is asked: “Are you a noble or a savage?” The third man points in the direction of the first two men and he says: “Both are liars, they are savages” then he adds, “I am a noble”.

1. Is the data given sufficient to tell us any man’s tribe?
Give reasons for your answer.
2. Is the data given sufficient to tell us each man’s tribe?
Give reasons for your answer.
3. To what extent can this puzzle ease our understanding of critical thinking?

Introduction

We live in a world that is constantly and increasingly under uncertainties: pressure, challenges, conflicting ideas, and opinions abound and continue to overwhelm us. The contemporary world seems to be on a spin with itself as changes continue to unfold.

Our ability to adeptly navigate these challenges determines how best we can live and manage the world.

Our ability to think critically, to effectively address and solve the ever-emerging problems; and to effectively understand key methods and skills for criticality, effective problem solving, and decisive decision-making will enable us to effectively address the right problems, identify risks and make better decisions.

At the same, humans are not always good thinkers. We discriminate against ‘others’, we conform, blindly obey, exaggerate our own good intentions, and we see evil in those who disagree with us.

However, we also have the potential to take control of our thinking – to examine it and improve it. By learning to think critically we can use our intelligence to create a better world, prevent suffering and build a better society.

Definitions

Definitions of Critical thinking and problem-solving abound. Depending on the orientation and the disciplinary inclination, scholars seem not to agree on a specific definition. But as evidenced in our examination below, there is a general agreement on the basic ingredients constitutive of critical thinking and problem-solving.

Creative thinking refers to the formation of possible solutions to a problem or possible explanations of a phenomenon. It entails bringing into being something that did not exist before, either as a product, a process, or a thought, or working on the old with a view of producing a harmonized new.

Creativity is demonstrated when we:

- a) Invent something which has never existed before
- b) Invent something which exists elsewhere but you are not aware of
- c) Invent a new process for doing something
- d) Reapply an existing process or product into a new or different market
- e) Develop a new way of looking at something (bringing a new idea into existence)
- f) Change the way someone else looks at something

We are all creative in a way because we are constantly changing the ideas which we hold about the world around us. Creativity does not have to be about developing something new to the world, it is more to do with developing something new to ourselves with a view of making our situations better. When we change ourselves, the world changes with us; both

in the way that the world is affected by our changed actions and in the changed way that we experience the world.

Creativity can be used to open up understanding and make the product of thinking, its processes, and services between the sources and recipients better, least to mention that it can be used to create them in the first place. It is expected that increasing our creativity will help us, our institutions, organizations, and global interactions more transparent and lead to an improvement in the quality of our thinking output.

This observation is compelled by the belief that creative thinking is the process that we use when we come up with new and constructive ideas. It is the merging of ideas that have not been merged before. Brainstorming is one form of creative thinking: it works by merging someone else's ideas with your own to create a new one; using the ideas of others as a stimulus for our own.

The creative thinking process can be accidental or deliberate. Without using special techniques, creative thinking does still occur, but usually in an accidental way; like a chance happening to make you think about something in a different way and then discovering a beneficial change. Other changes happen slowly through the pure use of intelligence and logical progression. Using the accidental mode of creative thinking is chancing with human progress whereas the use of a logical progressive process often produces desired products to develop and improve upon. In an accelerating and competitive world this is obviously advantageous and positive.

Using special techniques, deliberate creative thinking can be used to develop new ideas. These techniques force the emergence of a wide range of ideas to spark off new thoughts and processes. As earlier mentioned, Brainstorming is one of these special techniques, but traditionally it starts with

unoriginal ideas but with a sense of caution not to fall into prejudices and biases.

The development of a balanced and acceptable approach to proper thinking can occur much more rapidly using these deliberate techniques than by accident and imposition. Many people are known for being creative use these techniques, with or without being aware they are doing so either because they have been or have not been formally trained in them. If these deliberate techniques are used during the initial policy design and decision-making stage, a balanced approach is attainable at the implementation and execution stage.

With practice, ongoing creative thinking (the continuous investigation, questioning, and analysis that develops through education, training, and self-awareness) occurs all the time. On-going creativity can maximize both accidental and deliberate creative thinking. Ongoing creativity takes time and deliberate practice to become skillful at, but it's surprising how quickly it becomes an attitude, not a technique if married to the process of policy evaluation and implementation.

The first step to take is to learn creative thinking techniques so that we can deliberately use them to come up with new ideas. We can then be at an immediate advantage over those who don't know how to use them. This given, we can then practice the techniques to increase our skills at ongoing creative thinking in various realms of our thinking processes. (After a while you may even find it unnecessary to use specific techniques because you may be having too many ideas anyway.)

In simple terms, creative thinking is generally considered to be involved with the creation or generation of ideas, processes, experiences or objects. As mentioned earlier, most men and women are capable of generating some ideas. But ideas generated, depending on the motive can either be biased,

mixed up or even just confused. The really problem begins when we have to sort them out and make sense of them. When we need to apply them to the practical situation and when we need, as a baseline, these ideas to appeal to the greatest number. This is when the notion of evaluation becomes important and so is Critical thinking.

Critical thinking

Whereas creative thinking is concerned with the formation of possible solutions to a problem or possible explanation of a phenomenon, critical thinking deals with the testing and evaluation of the proposed solutions to a problem or the proposed explanations of a phenomenon.

By critical thinking, we mean the ability to use cognitive skills and strategies effectively in order to increase the probability of a desirable outcome. It is the kind of thinking that is purposeful, reasoned, and goal-directed; the thinking that is involved in effective problem-solving, calculation of likelihoods, formulation of inferences, and decisive decision-making. As a way of thinking, critical thinking involves evaluating our thinking process: the reasoning that informs the conclusions we arrived at, and the kinds of factors we consider in making our decisions; it is that kind of thinking directed at the desired outcome

Critical thinking can also be understood as the act of analysing facts to understand a problem or topic thoroughly. The thinking process typically includes steps such as collecting information and data, asking thoughtful questions, and analysing possible solutions. The kind of thinking mainly concerned with having faith in the supremacy of reason, honesty, integrity, fair-mindedness, courage, empathy, and open-mindedness. It is a way of strengthening and improving thinking in order to develop accurate and reliable knowledge

In its broadest sense, critical thinking is the intellectually disciplined process of actively and skilfully conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. As a way of thinking critical thinking aims at reasoning through multi-faceted ways; analysing information and facts presented as to attain the highest desirable good; evaluating facts as to authenticate and establish their truth value and reliability; problem-solving in order to satisfy the worth of reasoning, and; decision making as a means to attain solutions to the myriad problems confronting the contemporary world.

In other words, Critical thinking is the disciplined, self-directed art of testing ideas against universal standards to guide wise human action. At its core, this mental practice functions as an epistemic method where the thinker refuses to passively receive information. Instead, you actively build, dissect, and synthesize data born from your observations, lived experiences, and reasoning. This process is governed by a strict axiological standard - a set of intellectual values like clarity, precision, depth, and fairness that cut across all academic disciplines. Ultimately, critical thinking serves a vital teleological purpose. It evaluates claims to find objective truth, solves complex problems through multi-faceted logic, and equips you to make decisions that bring order and moral value to a chaotic modern world.

As a way of thinking, Critical thinking has two components:

1. a set of skills to process and generate information and beliefs, and

2. the habit, based on intellectual commitment, of using those skills to guide behaviour.

It is thus to be contrasted with:

1. the mere acquisition and retention of information alone, (because it involves a particular way in which information is sought and treated,)
2. the mere possession of a set of skills, (because it involves the continual use of them,) and
3. the mere use of those skills ("as an exercise") without acceptance of their results.

The MCC General Education Initiative observes that Critical thinking includes the ability to respond to material by distinguishing between facts and opinions or personal feelings, judgments and inferences, inductive and deductive arguments, and the objective and subjective. It also includes the ability to generate questions, construct, and recognize the structure of arguments, and adequately support arguments; define, analyze, and devise solutions for problems and issues; sort, organize, classify, correlate, and analyze materials and data; integrate information and see relationships; evaluate information, materials, and data by drawing inferences, arriving at reasonable and informed conclusions, applying understanding and knowledge to new and different problems, developing rational and reasonable interpretations, suspending beliefs and remaining open to new information, methods, cultural systems, values and beliefs and by assimilating information."

Accordingly, we understand Critical thinking to be purposeful, self-regulatory judgement that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, 'criteriological', or contextual considerations upon which that judgement is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one's personal and civic life. While not

synonymous with good thinking, critical thinking is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgements, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing critical thinking skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society.

From the foregoing, we can now make a clear and precise definition of critical thinking as the rational justification by which judgement of ultimate reality is arrived at. Note that this summation does not contradict our observations above. Rather, it takes into consideration the basic tenets and concepts at the bottom of the definition, namely: reason, judgement, reality, and the process of its attainability.

Thus, as a way of thinking, critical thinking involves:

- a) following evidence where it leads;
- b) considering all possibilities;
- c) relying on reason rather than emotion;
- d) being precise;
- e) considering a variety of possible viewpoints and explanations;
- f) weighing the effects of motives and biases;
- g) being concerned more with finding the truth than with being right;
- h) not rejecting unpopular views out of hand;

- i) being aware of one's own prejudices and biases, and
- j) not allowing them to sway one's judgement.

Characteristics of Critical Thinking

Wade (1995) identifies 8 (Eight) characteristics of Critical thinking. Critical thinking involves asking questions, defining a problem, examining evidence, analysing assumptions and biases, avoiding emotional reasoning, avoiding oversimplification, considering other interpretations, and tolerating ambiguity. Dealing with ambiguity is also seen by Strohm & Baukus (1995) as an essential part of Critical thinking, "Ambiguity and doubt serve a critical-thinking function and are a necessary and even a productive part of the process"

Critical Thinking Skills

Critical thinking skills are cognitive processes that underlie the performance of critical thinking tasks (Bailin, Coombs et al., 1999; Facione, 1998; Siegel, 1985).

These cognitive capacities form the architectural blueprint of critical thinking, which is not merely passive thought, but a disciplined, self-directed practice of intellectual excellence. The process begins with *observation*, the critical thinker's sharp awareness that gathers objective data from the environment without bias. This raw material is instantly refined by *interpretation* to decode its underlying meaning, followed by *analysis* to dissect complex arguments into their core structural components. From there, the thinker utilizes *inference* to draw logical, evidence-based conclusions from known facts, while constantly applying rigorous *evaluation* to test the credibility of sources and the validity of statements. This entire processing engine relies heavily on objective *reasoning*, ensuring that thoughts follow a strict, logical sequence free

from emotional distortion. Ultimately, this internal rigor manifests externally: first through *explanation*, which communicates clear and justified arguments to others, and finally through *problem-solving*, the ultimate pragmatic goal of critical thinking where refined intellect meets and resolves the complex challenges of reality. Some of the skills are explained below.

1. Observation

Observational skills are the starting point for critical thinking. People who are observant can quickly sense and identify a new problem. Those skilled in observation are also capable of understanding why something might be a problem. They may even be able to predict when a problem might occur before it happens based on their experiences.

Improve your observation skills by slowing down your pace of processing information and training yourself to pay closer attention to your surroundings during and outside of work to thoroughly examine what you're hearing or seeing. Then, consider if you notice trends in behaviour, transactions or data that might be helpful for you to address.

2. Analysis

Once a problem has been identified, analytical skills become essential. The ability to analyse and effectively evaluate a situation involves knowing what facts, data or information about the problem is important. This also often includes gathering unbiased research, asking relevant questions about the data to ensure its accurate and assessing the findings objectively.

Improve your analytical skills by taking on new experiences. For example, you might read a book about a concept you're unfamiliar with or take an online math class to push yourself

to think in new ways and consider new ideas. Doing so can help you build the skills to interpret new information and make rational decisions based on sound analysis.

3. Inference

Inference is a skill that involves drawing conclusions about the information you collect and may require you to possess technical or industry-specific knowledge or experience. When you make an inference that means you are developing answers based on limited information. For example, a car mechanic may need to infer what is causing a car's engine to stall at seemingly random times based on the information available to them.

Improve your inference skills by placing focus on making educated guesses rather than quickly drawing conclusions. This requires slowing down to carefully look for and consider as many clues as possible - such as images, data or reports that might help you evaluate a situation.

4. Communication

Communication skills are important when it comes time to explain and discuss issues and their possible solutions with colleagues and other stakeholders. Improve your communication skills within the context of critical thinking by engaging in difficult discussions, for example, in situations when you and another participant may disagree about the topic. Maintain good communication habits, such as active listening and respect, understanding other points of view, and being able to explain your ideas in a calm, rational manner. Doing so can help you evaluate solutions more effectively with your colleagues.

5. Problem-solving

After you've identified and analysed a problem and chosen a solution, the final step is to execute your solution. Problem-solving often requires critical thinking to implement the best solution and understand whether or not the solution is working as it relates to the goal.

Improve your problem-solving skills by setting goals to acquire more industry knowledge within your field. Problem-solving at work typically becomes easier if you have a strong understanding of industry-specific information. It can also be helpful to observe how others around you solve problems at work. Take note of their techniques and ask questions about their process.

Critical Thinking Traits

For a long time now, we've talked about how important critical thinking skills are for today's learners (and for *everyone*) to build on. Every educator knows how crucial it is to cultivate them in our classrooms and indeed throughout our whole lives. But what does the ideal critical thinker look like? What are the most crucial defining traits of effective critical thinkers?

Let us begin by stating that effective critical thinkers' function by way of different thought processes in different circumstances. After all, figuring out how to make it to work on time when your car breaks down in rush hour traffic requires critical thinking application as much as negotiating world peace does. Both scenarios facilitate such skills in far different settings, and with different stakes and outcomes, but they call upon these skills nonetheless.

The question is about what universal traits the effective critical thinkers in each circumstance, and all those in between, would share. That's the mystery we intend to solve here by offering suggestions of what the most important defining traits of a

critical thinker would be, namely: curiosity, compassion, awareness, decisiveness, honesty, willingness, creativity, criticality, sensitivity to context, innovativeness, tolerance, perseverance, faith in reason.

- a) **Curiosity:** effective critical thinkers are inherently curious about a wide range of topics and generally have broad interests. They tend to have a healthy inquisitiveness about the world and about people. An understanding of and appreciation for the diversity of cultures, beliefs, and views that encompass humanity are one of the hallmarks of a great critical thinker. This is also part of what makes them lifelong learners.
- b) **Compassion:** as we seek to gift our readers and learners with these indispensable skills, we must not forget that they embrace the emotional and instinctual as much as the intellectual. Effective critical thinkers' act as much with their hearts as they do with their minds. The world is full of enough judgment and segregation, much of it from a lack of a clear understanding of one another's secret history of perseverance through often unimaginable suffering.

Effective critical thinkers are inherently curious about a wide range of topics and generally have broad interests.

Each one of us has a story of our own that makes us who we are, as well as personal trials and challenges that have shaped us. Critical thinkers recognize this and compassionately celebrate the uniqueness in everyone, and are willing to help us see the best in ourselves and others.

- c) **Awareness:** opportunities to apply critical thinking skills are all around us every moment. Effective critical thinkers remain tuned into this and are always alert for chances to apply their best thinking habits to any situation. A desire to think critically about even the simplest of issues and tasks indicates a desire for constructive outcomes.

Effective critical thinkers don't take anything at face value, either. They never stop asking questions and enjoy exploring all sides of an issue and the deeper facts hiding within all modes of data. As such, those who think critically also tend to be instinctual problem solvers. This ranks as probably the most important skill we can help our learners build upon.

- d) **Decisiveness:** many situations that call for critical thinking also call for quick and decisive action. When we think critically, we weigh our options and imagine the outcomes in the moment with speed and clarity and are able to put aside fear when it comes to making decisions. In essence, critical thinkers like to move things forward rather than moving backward or procrastinating, because they thrive on progression.

In addition to this, often choices have to be made even when we don't have all the information; we need to make them with confidence. When facing any kind of a challenge, often someone has to take the lead and make the hard decisions others shy away from. Effective critical thinkers realize that, more often than not, it's necessary to take the initiative and make a decision even if it ends up being the wrong one. To them, that's preferable to not making any decision at all.

- e) **Honesty:** Honesty is important in any sense, but it is especially important to critical thinking. Moral integrity, ethical consideration and action, and global citizenship practices are all hallmarks of effective critical thinkers. It's not a surprise that honesty resides at the core of all these things. We see in such people a strong desire for harmony and fulfilment in the world, and part of attaining this involves pursuing honesty in all endeavours and relationships.

Many situations that call for critical thinking also call for quick and decisive action.

The practice of honesty in critical thinking also extends to how one looks within oneself to embrace what resides there. It takes into account the processes behind managing our emotions, controlling our impulses, and recognizing any attempts at self-deception. Critical thinkers are as equally aware and accepting of themselves as they are of others.

- f) **Willingness:** willingness and flexibility encompass a number of key considerations for the critical thinker. They include but aren't limited to things like the ability to:

- learn from their own personal mistakes and shortcomings
- challenge the status-quo when the need arises
- open-mindedly embrace other opinions and views that challenge their own
- reconsider and revise their opinions in the wake of new evidence

- listen actively rather than simply wait for their turn to talk
 - constantly improve, learn, and excel
- g) **Creativity:** there's no question that effective critical thinkers are also largely creative thinkers. Creativity has unquestionably defined itself as a requisite skill for having in the collaborative modern workforce. Critical thinking in business, marketing, and professional alliances relies heavily on one's ability to be creative. When businesses get creative with products and how they are advertised, they thrive in the global marketplace.

Key Features of critical thinking

Key features of critical thinking include: objectiveness, rationality, creativity, open-mindedness, reflectiveness, modesty, observation, and, desire to learn more.

Essential aspects of critical thinking

In the book, *Critical thinking*, Beyer elaborately explains what he sees as essential aspects of Critical thinking. These are:

1. *Dispositions:* Critical thinkers are sceptical, open-minded, value fair-mindedness, respect evidence and reasoning, respect clarity and precision, look at different points of view, and will change positions when reason leads them to do so.
2. *Criteria:* To think critically, one must apply criteria. Need to have conditions that must be met for something to be judged as believable. Although the argument can be made that each subject area has different criteria, some standards apply to all subjects. "... an assertion must... be based on relevant, accurate

facts; based on credible sources; precise; unbiased; free from logical fallacies; logically consistent, and strongly reasoned" (p. 12).

3. *Argument*: Is a statement or proposition with supporting evidence. Critical thinking involves identifying, evaluating, and constructing arguments.
4. *Reasoning*: The ability to infer a conclusion from one or multiple premises. To do so requires examining logical relationships among statements or data.
5. *Point of View*: The way one views the world, which shapes one's construction of meaning. In a search for understanding, critical thinkers view phenomena from many different points of view.
6. *Procedures for Applying Criteria*: Other types of thinking use a general procedure. Critical thinking makes use of many procedures. These procedures include asking questions, making judgements, and identifying assumptions.

Why study critical thinking?

Fundamentally, Critical thinking deals with the use of reason in the pursuit of truth. While there is serious doubt about the power of reason to discover any "new" truth, the "rules" of logic concern the truth and the way it can be preserved as we make inferences - one or more statements to support or justify another statement. Taken this way, there is no great "mystery" to the concepts of Logic. At the very core of logic is the idea that certain "patterns of inference" - i.e., models for combining statements that support with that which are supposedly supported will, if the supporting statements are true, guarantee the truth of the statement supported by them. In studying logic, we identify, study, and apply these patterns or principles of logical reasoning and express them in some general way - a way that is independent of the subject being

reasoned about. Critical thinking facilitates the application of logical skills to proper reasoning.

So, if we are interested in knowing the truth, then the answer is obvious: Critical thinking, by way of logical reasoning extends our grasp of the truth, from the information we have to what can be inferred from that information.

But why should we be interested in the truth? On the one hand, much of who we are, of the people we have become (and are yet to become) is due to our ideas and beliefs. And the background of beliefs and ideas we bring to it also determines what we do and how we react to any situation. Without getting too philosophical here, what sort of life would you consider more worthwhile-- one based on truth, or one based on lies and groundless illusions?

If we believed only what popped into our heads, perhaps we could count on its being true. [Could we? And what should we do when the opposite idea pops into our head - give up the earlier one, or keep them both?]. But often the source of our beliefs is other people - parents, pals, preachers, pundits, politicians, and others. Who we are, and how we spend our life's energies, is based to a large extent on what we picked up from others. But (in case you never noticed) they don't all give us the same message - so who are we to believe? Could a liar ever blunder onto the truth? Could a decent person ever make a mistake? Which statement is more rational to accept - one unsupported by any reasons, one supported by bad reasons, or one supported by good reasons?

If we are to be in control of our own beliefs and to somehow gain an understanding of the truth, then we must know what good reasoning is, and be aware of the ways in which our reasoning (and that of others) can go astray.

Value and Importance of Critical thinking

The value and importance of Critical thinking and problem-solving is self-manifest:

- a) Critical thinking and problem solving inculcate habits of thought- the ability to think without the box and use reason as the engine to existence.
- b) Encourages breadth of vision- the ability to see things from different points of view
- c) It gives us a sense of self-perspective in our activities, and our lives: the ability to examine alternatives and choose those relevant to ensure we live an examined and worthy life.
- d) Its concerns are very abstract but with immense practical value: the ability to translate ideas (theory) into practice through action.
- e) Its interest and value lie in its ability in helping us to understand ourselves and our world better and more deeply than we otherwise would, and in permanently altering our approach to our lives and our relations to others through encouraging a lifelong habit of reflection on them.
- f) It immensely enrich one's life, and can open to one view that would otherwise be closed or overlooked.
- g) It greatly enhance one's analytical, critical, evaluative, and interpretive abilities,
- h) Its grasp greatly enhances one's ability to express oneself clearly and to formulate and respond to arguments in speech and writing effectively.
- i) Critical thinking and problem solving provide one with general problem-solving skills, skills in analysing concepts, definitions, arguments, and problems.

- j) It enables one to organize ideas and issues and to extract what is central to an issue from a mass of information.
- k) It enhances one's ability to question deeply one's own framework of thought
- l) Critical thinking and problem solving equips an individual with the ability to reconstruct sympathetically and imaginatively the strongest versions of points of view and frameworks of thought opposed to one's own
- m) It inculcates in one the ability to reason dialectically (multi-logically) in such a way as to determine when one's own point of view is at its weakest and when an opposing point of view is at its strongest
- n) It helps one both to make fine distinctions and to find what common ground between opposing positions is.
- o) Critical thinking and problem solving encourages one to synthesize or bring together a range of different views into one more comprehensive and coherent position.
- p) Critical thinking and problem solving improves one's communication skills, through improving one's ability to present ideas in well-constructed, systematic arguments, to express what is unique about one's views, and to explain difficult material.
- q) These skills in presenting well-thought-out arguments, clear formulations, and apt examples, in turn lend one's arguments persuasive power.
- r) The give and take of critical thinking and problem-solving based discussions improves one's ability to think on one's feet, and to indicate why one's own views are to be preferred to others.
- s) Critical thinking and problem-solving aids one in recognizing when and in what respect one's own views

may be incorrect, and what must be revised or discarded and what can be retained.

- t) Critical thinking and problem-solving lays emphasis on clarity and rigor of argument, the apt use of example and illustration, and sensitivity to the strengths and weaknesses both of views one is examining and of one's own view thus making ideas that determine good living more explicit and relevant.
- u) Critical thinking and problem solving plays an important role in social change- institutions in any society (courts, governments, schools, businesses etc.) - are products of a certain way of thinking.
- v) Critical thinking and problem-solving help us in uncovering biases and prejudices.
- w) Critical thinking and problem-solving is a path to freedom from half-truths and deceptions as it opens up one's mind in seeing things independent of emotions, native biases, and from different perspectives.
- x) The willingness to change one point of view as we continue to examine and re-examine ideas that may seem obvious is a major component of critical thinking and problem-solving. Such thinking takes time and the willingness to say three subversive words: "*I don't know.*" Means need to learn and not an expression of ignorance.

Essential characteristics of a critical thinker and effective problem solver

Critical thinkers elevate the human intellect by employing rigorous, logical analysis driven by evidence rather than emotion, characterized by an open yet disciplined approach to knowledge. By actively seeking alternative perspectives, accepting criticism, and demonstrating intellectual

humility, these individuals synthesize diverse information into a unified, reflective understanding of the world.

To engage in critical thinking is to commit to an arduous mode of existence. It is a deliberate departure from passive intellectual consumption, transforming the mind into an active crucible of truth. Philosophically, critical thinking is not merely a set of cognitive skills, but a comprehensive worldview - an ethical and existential commitment to clarity, integrity, and depth. A critical mind charts its journey from the foundational supremacy of logic to the expansive realms of interdisciplinary wisdom.

i. The Primacy of Logos: Reason as the Foundation of Thought

At the core of the critical mind lies a steadfast commitment to the supremacy of reason as the ultimate beacon of existence. In a world frequently swayed by transient sentiments and ideological currents, the critical thinker grounds reality in the classical concept of logos. This orientation demands structured, sequential thinking that deliberately operates without appealing to primal emotions.

By prioritizing evidence over impulse, the thinker cultivates a rare diagnostic clarity. This framework enables the individual to easily identify structural arguments, accurately isolate central issues, and distinguish valid deductions from fallacious rhetoric. Misleading persuasion loses its power against an intellect trained to spot cognitive errors, ensuring that all ultimate judgments rest securely upon verified ideas and demonstrable facts.

ii. The Epistemic Quest: Diligence, Action, and Expression

The pursuit of truth is not a static state of being; it is an active, demanding journey. The critical thinker exhibits an unyielding diligence in seeking out truth, viewing knowledge not as a commodity to own, but as an ever-receding horizon to pursue. This quest requires a sophisticated dual awareness: the thinker remains deeply in touch with their personal thoughts, yet looks outward to evaluate and solve problems the moment they emerge.

Far from being a silent observer, the thinker is eager to express their thoughts on a topic. This expression is not driven by vanity, but by a civic and intellectual duty to contribute to the marketplace of ideas. Truth is tested through exposure; by externalizing their reflections, the thinker invites dialectical refinement, transforming solitary thought into a vibrant, living philosophy.

iii. The Crucible of Intellect: Courage, Endurance, and Humility

The path of rigorous inquiry demands profound psychological stamina and moral fortitude. Intellectual progress often halts without the highest level of patience and a willingness to spend time reflecting deeply on complex ideas. True clarity is rarely instantaneous.

Therefore, the critical thinker must possess the intellectual courage to pursue complex issues to their ultimate conclusion, regardless of how uncomfortable that conclusion might be. This journey requires the capacity to persevere and endure through confusion and cognitive friction. When this rigorous process reveals a personal error, the thinker manifests the rarest form of intellectual

humility: the willingness to accept mistakes, actively correct them, and offer an apology.

The Hospitable Mind: Ambiguity and Radical Openness

A rigid intellect is vulnerable to breaking when confronted with reality. In contrast, the critical thinker develops a remarkable ability to tolerate ambiguity, comfortably inhabiting the space between losing an old certainty and finding a new truth. Instead of retreating into dogmatic comfort, they actively act as seekers of alternative views on every topic.

This radical openness manifests as a genuine willingness to welcome new ideas that may completely contradict their previous positions. When fresh, discordant evidence is introduced, the thinker does not react defensively. Instead, they systematically reassess their views, demonstrating that their primary loyalty belongs to the truth rather than to their own established ego or past opinions.

iv. The Synthesis of Knowledge: Dialectics and Interdisciplinary Vision

Ultimately, the critical mind refuses to confine itself within narrow, isolated compartments. The thinker possesses a bold willingness to take a critical stance on pressing issues, refusing to hide behind neutrality when justice or truth demands a verdict. They challenge assumptions by asking penetrating, thought-provoking questions that strip away superficial layers to reveal foundational premises.

This dynamic inquiry is enriched by an ability to see hidden connections between seemingly disparate topics. By seamlessly utilizing knowledge from multiple disciplines,

the critical thinker enhances their reading, learning, and lived experiences. They transform the world from a collection of fragmented fragments into a beautifully interconnected tapestry of universal understanding.

Consequently, the architecture of a critical thinker is built on a harmonious balance of strength and flexibility. By elevating reason, pursuing truth with diligence, enduring intellectual discomfort, maintaining radical openness, and synthesizing diverse knowledge, the critical mind achieves true autonomy. In an era marked by rapid information and deep polarization, this philosophical blueprint serves as more than an intellectual guide - it provides a vital compass for preserving human wisdom.

Self-Assessment Questions

1. Define Critical thinking and show its relevance in the life of a university student.
2. “All holders of public offices in Kenya should be taught critical thinking and decision making”. Discuss.
3. Discuss the importance of the characteristics of Critical thinking to Kenya’s legislators.
4. Discuss the value of the essential aspects of critical thinking to the work of public servants in Kenya.
5. In your view how does critical thinking help an individual to become a self-directed and independent thinker?

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CHAPTER FIVE

TOOLS OF CRITICAL THINKING

Introduction

Our earlier discussion revealed that true reason demands an active stewardship of the mind, wherein no thought may claim the title of critical reflection until it submits to rigorous self-interrogation. For any intellectual exercise to transcend basic problem-solving, it must reject unexamined assumptions presented at face value, deliberately measuring every idea against the eternal pillars of clarity, precision, relevance, depth, breadth, and logical coherence. Yet, enforcing these objective standards is impossible without maps to navigate the internal architecture of our own minds.

This is because critical thinking requires deep self-awareness; all human reasoning operates inside a specific point of view and a defined purpose. Every thought builds upon data, which must be interpreted through core concepts that inherently rest on hidden assumptions. Our conclusions, or inferences, always carry further implications. Because errors can disrupt any of these interconnected parts, thinkers must constantly monitor their own mental process. Mastering analytical tools is therefore essential for sound and effective reasoning.

There are three sets of tools used in the articulation and actualization of critical thinking and problem solving; they include: Tools of Analysis (dimensions or elements of thinking), Tools of Evaluation (Universal intellectual

Standards), and Tools of Transformation (valuable intellectual Traits)

This chapter is intended to introduce the learner to relevant instruments used in critical thinking and problem solving in the analysis and evaluation of arguments and formulation of rational statements.

Chapter Objectives

By the end of this chapter, you should be able to:

- a) Explain tools of analysis, evaluation and transformation.
- b) Demonstrate the relevance of tools of critical thinking to the thinking process
- c) Explain tools of critical thinking and problem solving
- d) Distinguish between different tools of critical thinking
- e) Apply tools of critical thinking to problem solving and decision making
- f) Explain the relationship between tools of critical thinking.
- g) Discuss the importance of critical thinking tools of evaluation
- h) Apply critical thinking tools to the thinking process

Tools of Analysis - Elements of Reasoning

Reasoning has a distinct architecture. Its analytical tools form an epistemic scaffold. We use this structure to navigate complex existential dilemmas. These dimensions are vital ontic components. They require strict interrogation when problems arise. They govern the informational substrate of our minds. From this substrate, we synthesize conclusive knowledge. This framework forces truth-seekers to dissect

their *telos*. This *telos* is the ultimate purpose driving the inquiry. We must also confront our specific *aporia*. This *aporia* is the core conceptual impasse at hand. Rigor demands that we unpack our axioms. These are the unexamined assumptions anchoring thought. We must balance them against our *weltanschauung*. This is our unique horizon of perspective.

This intellectual journey merges empirical data with *noema*. These *noema* are the abstract concepts governing our minds. We process these inputs through disciplined hermeneutics. This acts as our engine of inference and interpretation. The thinker uses it to unlock deeper meaning. Finally, we trace these insights to their teleological concomitants. These are the inescapable long-term implications of our thoughts. They are the ethical consequences of our choices. They echo through every conclusion we forge. They include *purpose, issue or problem or Question at hand, assumptions, points of view, data, Information and evidence base, concepts and ideas, inferences or interpretations, and implications and Consequences*.

Let us explanations what exactly our reasoning entails;

1. All reasoning has a *Purpose*.
 - Take time to state your purpose clearly.
 - Distinguish your purpose from related purposes.
 - Check periodically to be sure you are still on target.
 - Choose significant and realistic purposes.
2. All reasoning is an attempt to Figure something out, to settle some question, to solve some problem.
 - Take time to clearly and precisely state the question at issue.
 - Express the question in several ways to clarify its meaning and scope.

- Break the question into sub-questions.
 - Identify if the question has one right answer, is a matter of opinion, or requires reasoning from more than one point of view.
3. All reasoning is based on *Assumptions*.
 - Clearly identify your assumptions and determine whether they are justifiable.
 - Consider how your assumptions are shaping your point of view.
 4. All reasoning is done from some *Point of view*.
 - Identify your point of view.
 - Seek other points of view and identify their strengths as well as weaknesses.
 - Strive to be fair-minded in evaluating all points of view.
 5. All reasoning is based on Data, information and evidence.
 - Restrict your claims to those supported by the data you have.
 - Search for information that opposes your position as well as information that support it.
 - Make sure that all information used is clear, accurate, and relevant to the question at issue.
 - Make sure you have gathered sufficient information.
 6. All reasoning is expressed through, and shaped by, *Concepts* and *Ideas*.
 - Identify key concepts and explain them clearly.
 - Consider alternative concepts or alternative definitions to concepts.

- Make sure you are using concepts with care and precision.
7. All reasoning contains *Inference* or *Interpretations* by which we draw *Conclusions* and give meaning to data.
 - Infer only what the evidence implies.
 - Check inferences for their consistency with each other.
 - Identify assumptions that lead you to your inferences.
 8. All reasoning leads somewhere or has *Implications* and *Consequences*.
 - Trace the implications and consequences that follow from your reasoning.
 - Search for negative as well as positive implications.
 - Consider all possible consequences

With the above in mind, let us now turn our attention to some intellectual standards which constitute a necessary condition to proper and clear thinking- the Tools of Evaluation.

Tools of Evaluation - Universal Intellectual Standards

Universal intellectual standards serve as the foundational evaluative criteria through which the integrity of human reasoning is measured against any given problem or reality. To master critical thought is to internalize these evaluative norms, transforming external metrics of accountability into an active, disciplined inner voice that continuously refines our judgments and decisions. At the heart of this philosophical inquiry into the quality of thought lie seven paramount standards: *Clarity* to illuminate meaning, *Accuracy* to verify

truth, *Precision* to exact detail, *Relevance* to anchor the issue, *Depth* to penetrate complexity, *Breadth* to encompass alternative horizons, and *Logic* to ensure coherent progression.

The relationship between the Universal Intellectual Standards (the tools of evaluation) and the Elements of Thought (the tools of analysis) is a dynamic, matrix-like intersection where the standards act as quality filters for each component of our reasoning. While the elements allow us to disassemble and map the structure of a problem, the standards measure how well that structure holds up to philosophical and critical scrutiny. They include:

- a. **Clarity:** Could you elaborate further on that point? Could you express that point in another way? Could you give me an illustration? Could you give me an example? Clarity is the gateway standard. If a statement is unclear, we cannot determine whether it is accurate or relevant. In fact, we cannot tell anything about it because we don't yet know what it is saying. For example, the question, "What is thinking?" seems to be unclear. In order to address the question adequately, however, we would need to have a clearer understanding of what the person asking the question is considering the "problem" to be. A clearer question might be "What can the teachers of critical and creative thinking do to ensure that the process both succeeds and answers to the needs of different disciplines and across the curriculum?"
- b. **Accuracy:** Is that really true? How could we check that? How could we find out if that is true? A statement can be clear but not accurate, as in "You are either with us or against us."
- c. **Precision:** Could you give more details? Could you be more specific? - A statement can be both clear and accurate, but not precise, as in "Saddam supports

terrorism." (We don't know how he does this; training, arming etc.)

- d. **Relevance:** How is that connected to the question? How does that bear on the issue? - A statement can be clear, accurate, and precise, but not relevant to the question at issue. For example, most globalizing agents often think that the amount of effort they put into the economic arm of globalization should be used in emphasizing the worth of the process since it opens up international markets and improves the economic standards of the recipient nations. Often, however, the "effort" does not measure the quality of life of the people, and *when this is so*, the effort is irrelevant to their appropriate well-being.
- e. **Depth:** How does your answer address the complexities in the question? How are you taking into account the problems in the question? Is that dealing with the most significant factors? - A statement can be clear, accurate, precise, and relevant, but superficial (that is, lack depth). For example, the statement "Just say No" which is often used to discourage children and teens from using drugs, is clear, accurate, precise, and relevant. Nevertheless, it lacks depth because it treats an extremely complex issue, the pervasive problem of drug use among young people, superficially. It fails to deal with the complexities of the issue.
- f. **Breadth:** Do we need to consider another point of view? Is there another way to look at this question? What would this look like from a conservative standpoint? What would this look like from the point of view of...? - A line of reasoning may be clear, accurate, precise, relevant, and deep, but lack breadth (as in an argument from either the conservative or liberal standpoint which gets deeply into an issue, but

only recognizes the insights of one side of the question.)

- g. **Logic:** Does this really make sense? Does that follow from what you said? How does that follow? But before you implied this and now you are saying that; how can both be true?

The culmination of critical thought lies in the structural integration of our ideas. When we think, we assemble an array of disparate concepts, evidence, and assumptions into a deliberate mental order. If this combination of thoughts is mutually supportive, harmonious, and unified, the reasoning achieves the standard of logical coherence. Conversely, when these thoughts contradict one another, lack systemic alignment, or fail to form a rational whole, the framework is inherently flawed.

The ultimate goal of critical inquiry is to move past the temporary application of these frameworks and achieve complete internalization. When the tools of analysis (the elements of thought) and the tools of evaluation (the universal standards) transcend mere theory, they fundamentally alter our perception of the world and our approach to human difficulties. By weaving these matrices into our core identity, we undergo an existential shift. We break free from the passivity of passive conformism and transform into genuinely autonomous, independent thinkers.

Tools of Transformation - Valuable intellectual traits

To enter the domain of transformation is to cultivate the profound virtues of the mind, shifting from mere reactive thought to a deliberate, ethical architecture of reason. These valuable intellectual traits are not passive attributes; they are the active, vital instruments through which the thinker achieves a mature and steady objectivity, anchoring daily deliberations in absolute rationality and sober consistency.

By committing to this internal discipline, the individual embraces a framework of seven essential virtues: the vulnerability of *Intellectual Humility*, the boldness of *Intellectual Courage*, the resonance of *Intellectual Empathy*, the alignment of *Intellectual Integrity*, the endurance of *Intellectual Perseverance*, a foundational *Faith in Reason*, and the radical justice of *Fair-mindedness*. Together, these traits transmute ordinary cognition into a deeply philosophical way of being, allowing the thinker to transcend personal bias and engage the world with authentic, enlightened clarity.

These transformational traits act as the essential bridge that animates the structural mechanics of both analysis and evaluation. During the phase of analysis, where the mind deconstructs arguments to lay bare their hidden assumptions and logical implications, virtues like humility and empathy ensure that this mapping is executed without bias or self-deception. When the thinker shifts to evaluation - judging the validity of evidence, the credibility of sources, and the weight of truth - *Intellectual Integrity* and a foundational *Faith in Reason* guarantee that the scales of judgment are never tilted. Ultimately, the tools of analysis and evaluation remain empty formulas until they are infused with these virtues, transforming a passive processor of information into an enlightened agent of true societal transformation. The tools include'

- ***Intellectual Humility***. Having the knowledge of the limits of one's knowledge, including sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias, prejudice and limitations of one's viewpoint. Intellectual humility depends on recognizing that one should not claim more than one actually knows. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, boastfulness, or conceit, combined with insight into

the logical foundations, or lack of such foundations, of one's beliefs.

- ***Intellectual Courage:*** Having the knowledge of the need to face and fairly address ideas, beliefs or viewpoints toward which we have strong negative emotions and to which we have not given a serious hearing. This courage is connected with the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part) and that conclusions and beliefs inculcated in us are sometimes false or misleading. To determine for ourselves which is which, we must not passively and uncritically "accept" what we have "learned." Intellectual courage comes into play here, because inevitably we will come to see some truth in some ideas considered dangerous and absurd, and distortion or falsity in some ideas strongly held in our social group. We need courage to be true to our own thinking in such circumstances. The penalties for non-conformity can be severe.
- ***Intellectual Empathy:*** Having the knowledge of the need to imaginatively put oneself in the place of others in order to genuinely understand them, this requires the consciousness of our egocentric tendency to identify truth with our immediate perceptions of long-standing thought or belief. This trait correlates with the ability to reconstruct accurately the viewpoints and reasoning of others and to reason from premises, assumptions, and ideas other than our own. This trait also correlates with the willingness to remember occasions when we were wrong in the past despite an intense conviction that we were right, and with the ability to imagine our being similarly deceived in a case-at-hand.

- ***Intellectual Integrity:*** Recognition of the need to be true to one's own thinking; to be consistent in the intellectual standards one applies; to hold one's self to the same rigorous standards of evidence and proof to which one holds one's antagonists; to practice what one advocates for others; and to honestly admit discrepancies and inconsistencies in one's own thought and action.
- ***Intellectual Perseverance:*** Having the knowledge of the need to use intellectual insights and truths in spite of difficulties, obstacles, and frustrations; firm adherence to rational principles despite the irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time to achieve deeper understanding or insight.
- ***Faith In Reason:*** Confidence that, in the long run, one's own higher interests and those of humankind at large will be best served by giving the freest play to reason, by encouraging people to come to their own conclusions by developing their own rational faculties; faith that, with proper encouragement and cultivation, people can learn to think for themselves, to form rational viewpoints, draw reasonable conclusions, think coherently and logically, persuade each other by reason and become reasonable persons, despite the deep-seated obstacles in the native character of the human mind and in society as we know it.
- ***Fairmindedness:*** Having the knowledge of the need to treat all viewpoints alike, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community or nation; implies adherence to intellectual standards without

reference to one's own advantage or the advantage of one's group.

Both the intellectual traits of mind and the universal standards are relevant and necessary in any activity aimed at enhancing critical thought.

a. Study Questions

1. “The reason why the world is embroiled in many problems is not because people don’t think but because most people don’t think critically” Discuss this statement with reference to Kenya today.
2. Critically examine the seven traits of mind and then show their relevance in enhancing roles and responsibilities of self-management.
3. Discuss the characteristics of Critical thinking and then show their relationship to the universal intellectual standards.
4. By way of examples show the relationship between Critical thinking tools of analysis and tools of evaluation.
5. “The reason why most institutions in Kenya perform dismally is because they are managed by people whose thinking is characterized by lack of criticality” Discuss
6. Give examples to illustrate the main elements of critical thinking. How do reasoning skills, self-esteem and interactive learning fit in?
7. Using examples to illustrate your answer, discuss the following:
 - a. Common core thinking skills
 - b. The essential components of critical thinking
 - c. The dispositions to be cultivated by a critical thinker

8. With reference to critical thinking explain the meaning of the following phrases:
- a) Intellectual Courage
 - b) Empathy
 - c) Faith in reason
 - d) Self-examination

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CHAPTER SIX

FALLACIES

Puzzle: The Debate Trap

- ✓ *The Scenario:* Speaker A says, "We should redirect 5% of the city's budget from building new roads to improving public parks." Speaker B responds, "My opponent wants to completely destroy our transit system and leave our citizens stranded with nowhere to drive!"
- ✓ *The Puzzle:* What tactic did Speaker B use to win the argument?

Introduction

In the contemporary intellectual landscape, an epistemic demand dictates that claims to truth must be legitimized through rigorous argumentation. Assertions are rarely accepted *prima facie*; rather, agents are consistently required to demonstrate the justificatory grounds for their interpretations. This systemic emphasis on logical validity establishes critical thinking not as an innate capacity, but as a dynamic, cultivable discipline. Consequently, the pursuit of dialectical strength requires a systematic understanding of how propositions are formulated and validated.

From a structural perspective, an argument functions as a composition of distinct propositional components: *the premises*, which provide the evidential or rational foundation, and *the conclusion*, which represents the primary thesis derived from those assertions. The epistemic validity of any claim depends entirely on the correct logical arrangement of these

components. However, the cognitive impulse to infer conclusions from premises often introduces structural vulnerabilities. When the formal or informal link between evidence and assertion is compromised under the guise of validity, the argument devolves into a fallacy - an illusory inference that undermines the integrity of rational discourse.

Commonly, one can make his arguments stronger by:

- a) using good premises (ones you have good reason to believe are both true and relevant to the issue at hand),
- b) making sure your premises provide good support for your conclusion (and not some other conclusion, or no conclusion at all),
- c) checking that you have addressed the most important or relevant aspects of the issue (that is, that your premises and conclusion focus on what is really important to the issue),
- d) not making claims that are so strong or sweeping that you can't really support them, and
- e) failure to present all of your ideas in an orderly manner that your audience can follow.

This chapter describes some ways in which arguments often fail to serve the above objectives; these failings are called fallacies.

It is particularly easy to slip and commit a fallacy when you have strong feelings about your topic; if a conclusion seems obvious to you, you're more likely to just assume that it is true and to be careless with your evidence. The purpose of this chapter, though, is not to argue for any particular position, but to illustrate weak reasoning, which can happen in pretty much any kind of argument.

Chapter Objectives

By the end of this chapter, you should be able to:

- a) Define fallacy
- b) Distinguish between formal and informal fallacies
- c) Distinguish between fallacies of relevance and fallacies of ambiguity
- d) Explain various types of informal fallacies
- e) Explain how to avoid fallacious reasoning

What is fallacy?

A fallacy is a systemic defect in reasoning or inference that fundamentally undermines the structural integrity of an argument. Epistemically, fallacies constitute illegitimate logical maneuvers or irrelevant premises that fail to provide adequate evidentiary support for their central claims. Consequently, they give rise to mistaken beliefs derived from unsound premises. Because they rely on logically incorrect reasoning, they invalidate the rational basis of the argument, serving as a core mistake in inference that ultimately causes the analytical framework to collapse.

When subjected to rigorous critical examination, a fallacy fails to satisfy the objective criteria of good reasoning. These defects operate as manipulative rhetorical devices that actively weaken an argument under intellectual scrutiny. In contemporary argumentation theory and informal logic, these errors are broadly classified into two primary categories: Fallacies of Ambiguity, which arise from linguistic imprecision, and Fallacies of Relevance (or Contextual Fallacies), which occur when the premises lack a logical connection to the conclusion. Developing the critical capacity to identify these structural flaws in both academic writing and discourse enhances our ability to rigorously evaluate truth claims.

Despite their structural flaws, fallacious arguments are ubiquitous within public discourse and possess significant psychological persuasion, particularly to the casual reader or listener. Dozens of empirical examples of this deceptive reasoning populate contemporary media, political rhetoric, and commercial advertisements, where emotional appeal often eclipses logical validity. Evaluating these arguments requires deep dialectical scrutiny, as identifying a fallacy is frequently impossible without critically investigating the underlying motive and rhetorical intent animating the discourse.

Furthermore, logical evaluation reveals that argumentation exists on a complex continuum of epistemic strength, ranging from entirely weak to robustly valid. Complex, multi-staged arguments often feature a hybrid structure, containing highly persuasive, valid segments alongside deeply flawed inferences. Mastering the conceptual taxonomy used to distinguish fallacious from fallacy-free reasoning equips us with the metacognitive tools necessary to critically audit our own intellectual output. Ultimately, this rigorous self-assessment allows us to systematically elevate our discourse, driving our claims away from structural weakness toward the strong end of the argumentative continuum.

Division of Fallacies

Fallacies are divided into two broad realms: the structural shadow of formal reasoning and the human frailty of informal mistakes. Formal fallacies occur when an argument breaks the strict laws of deductive logic. They often mimic valid structures, bearing a superficial resemblance to sound patterns of inference while remaining internally broken. Informal fallacies, on the other hand, exist outside the pure mechanics of form. They arise from how we interact with our subject matter or how we construct our statements.

We typically stumble into these informal errors through two primary human weaknesses: carelessness and ambiguity. Carelessness causes us to lose focus on the reality of our subject matter, leading to inattention and broken reasoning. Ambiguity occurs when the slippery nature of language twists our definitions and leads our arguments astray.

For this topic, we will leave the rigid architecture of formal logic behind. Our exploration will focus exclusively on informal missteps, specifically examining Fallacies of Relevance - where premises fail to connect to the conclusion, and, Fallacies of Ambiguity, where shifting language creates a false illusion of truth.

Fallacies of Relevance

Contextual or fallacies of relevance arises depending on the context or circumstances in which sentences are used and constructed. Common to arguments that commit this fallacy is the fact that their premises are logically irrelevant to and therefore incapable of establishing the truth of their conclusions.

Fallacies of Ambiguity

Fallacies of ambiguity (also called *fallacies of clearness*) occur in arguments whose formulations contain ambiguous words or phrases, and whose meanings shift and change more or less subtly in the course of the argument, rendering them fallacious. They are of two types: i) *equivocation* -where a single word can be used in two different senses; and, ii) *amphiboly* - where ambiguity arises due to sentence structure (often due to dangling participles or the inexact use of negatives), rather than the meaning of individual words.

Types of Informal Fallacies

a. Hasty generalization

Definition: Here, a conclusion based on insufficient or biased evidence is derived or arrived at. In other words, you rush to a conclusion before you have all the relevant facts; making assumptions about a whole group or range of cases based on a sample that is inadequate (usually because it is atypical or too small). Stereotypes about people (“librarians are shy and smart,” “wealthy people are snobs,” etc.) are a common example of the principle underlying hasty generalization.

Example: “My roommate said her philosophy class was hard, and the one I’m in is hard, too. All philosophy classes must be hard!” Two people’s experiences are, in this case, not enough on which to base a conclusion.

Tip: Ask yourself what kind of “sample” you’re using: Are you relying on the opinions or experiences of just a few people, or your own experience in just a few situations? If so, consider whether you need more evidence or perhaps a less sweeping conclusion. (Notice that in the example, the more modest conclusion “Some philosophy classes are hard for some students” would not be a hasty generalization.)

b. Straw Man

Definition: One way of making our own arguments stronger is to anticipate and respond in advance to the arguments that an opponent might make. In the straw man fallacy, the arguer sets up a weak version of the opponent’s position and tries to score points by knocking it down. This move oversimplifies an

opponent's viewpoint and then attacks that hollow argument.

But just as being able to knock down a straw man (like a scarecrow) isn't very impressive, defeating a watered-down version of your opponent's argument isn't very impressive either.

Example: “Feminists want to ban all pornography and punish everyone who looks at it! But such harsh measures are surely inappropriate, so the feminists are wrong: porn and its fans should be left in peace.” The feminist argument is made weak by being overstated. In fact, most feminists do not propose an outright “ban” on porn or any punishment for those who merely view it or approve of it; often, they propose some restrictions on particular things like child porn or propose to allow people who are hurt by porn to sue publishers and producers, not viewers for damages. So, the arguer hasn't really scored any points; he or she has just committed a fallacy.

Tip: Be generous to your opponents. State their arguments as strongly, accurately, and sympathetically as possible. If you can knock down even the best version of an opponent's argument, then you've really accomplished something—negative.

c. **Appeal to authority**

Definition: Often, we add strength to our arguments by referring to respected sources or authorities and explaining their positions on the issues we're discussing. If, however, we try to get readers to agree with us simply by impressing them with a famous name or by appealing to a supposed authority who really isn't much of an expert, we commit the fallacy of appeal to authority.

Example: “We should abolish the death penalty. Many respected people, such as actor Guy Handsome, have publicly stated their opposition to it.” While Guy Handsome may be an authority on matters having to do with acting, there’s no particular reason why anyone should be moved by his political opinions—he is probably no more of an authority on the death penalty than the person writing the paper.

Tip: There are two easy ways to avoid committing appeal to authority: First, make sure that the authorities you cite are experts on the subject you’re discussing. Second, rather than just saying “Dr. Authority believes X, so we should believe it, too,” try to explain the reasoning or evidence that the authority used to arrive at his or her opinion. That way, your readers have more to go on than a person’s reputation. It also helps to choose authorities who are perceived as fairly neutral or reasonable, rather than people who will be perceived as biased.

d. Ad populum

Definition: The Latin name of this fallacy means “to the people.” There are several versions of the ad populum fallacy, but in all of them, the arguer takes advantage of the desire most people have to be liked and to fit in with others and uses that desire to try to get the audience to accept his or her argument. One of the most common versions is the bandwagon fallacy, in which the arguer tries to convince the audience to do or believe something because everyone else (supposedly) does.

Example: “Gay marriages are just immoral. 70% of Americans think so!” While the opinion of most Americans might be relevant in determining what

laws we should have, it certainly doesn't determine what is moral or immoral: there was a time where a substantial number of Americans were in favor of segregation, but their opinion was not evidence that segregation was moral. The arguer is trying to get us to agree with the conclusion by appealing to our desire to fit in with other Americans.

Tip: Make sure that you aren't recommending that your readers believe your conclusion because everyone else believes it, all the cool people believe it, and people will like you better if you believe it, and so forth. Keep in mind that the popular opinion is not always the right one.

e. **Ad populum/Bandwagon Appeal**

Definition: This is an appeal that presents what most people or a group of people think, in order to persuade one to think the same way. Getting on the bandwagon is one such instance of an ad populum appeal.

Example: If you were a true American you would support the rights of people to choose whatever vehicle they want.

In this example, the author equates being a "true American," a concept that people want to be associated with, particularly in a time of war, with allowing people to buy any vehicle they want even though there is no inherent connection between the two.

f. **Ad hominem and tu quoque**

Definitions: Like the appeal to authority and ad populum fallacies, the ad hominem ("against the person") and tu quoque ("you, too!") fallacies focus our attention on people rather than on arguments or

evidence. In both of these arguments, the conclusion is usually “You shouldn’t believe So-and-So’s argument.” The reason for not believing So-and-So is that So-and-So is either a bad person (*ad hominem*) or a hypocrite (*tu quoque*). In an *ad hominem* argument, the arguer attacks his or her opponent instead of the opponent’s argument.

Examples: “Andrea Dworkin has written several books arguing that pornography harms women. But Dworkin is just ugly and bitter, so why should we listen to her?” Dworkin’s appearance and character, which the arguer has characterized so ungenerously, have nothing to do with the strength of her argument, so using them as evidence is fallacious.

In a *tu quoque* argument, the arguer points out that the opponent has actually done the thing he or she is arguing against, and so the opponent’s argument shouldn’t be listened to. Here’s an example: imagine that your parents have explained to you why you shouldn’t smoke, and they’ve given a lot of good reasons - the damage to your health, the cost, and so forth. You reply, “I won’t accept your argument, because you used to smoke when you were my age. You did it, too!” The fact that your parents have done the thing they are condemning has no bearing on the premises they put forward in their argument (smoking harms your health and is very expensive), so your response is fallacious.

Tip: Be sure to stay focused on your opponents’ reasoning, rather than on their personal character. (The exception to this is, of course, if you are making an argument about someone’s character—if your conclusion is “President Jones is an untrustworthy

person,” premises about her untrustworthy acts are relevant, not fallacious.)

g. Appeal to pity

Definition: The appeal to pity takes place when an arguer tries to get people to accept a conclusion by making them feel sorry for someone.

Examples: “I know the exam is graded based on performance, but you should give me an A. My cat has been sick, my car broke down, and I’ve had a cold, so it was really hard for me to study!” The conclusion here is “You should give me an A.” But the criteria for getting an A have to do with learning and applying the material from the course; the principle the arguer wants us to accept (people who have a hard week deserve A’s) is clearly unacceptable. The information the arguer has given might feel relevant and might even get the audience to consider the conclusion—but the information isn’t logically relevant, and so the argument is fallacious. Here’s another example: “It’s wrong to tax corporations—think of all the money they give to charity, and of the costs they already pay to run their businesses!”

Tip: Make sure that you aren’t simply trying to get your audience to agree with you by making them feel sorry for someone.

h. Appeal to ignorance (Argumentum ad ignorantiam)

Definition: In the appeal to ignorance, the arguer basically says, “Look, there’s no conclusive evidence on the issue at hand. Therefore, you should accept my conclusion on this issue.”

Example: “People have been trying for centuries to prove that God exists. But no one has yet been able to prove it. Therefore, God does not exist.” Here’s an opposing argument that commits the same fallacy: “People have been trying for years to prove that God does not exist. But no one has yet been able to prove it. Therefore, God exists.” In each case, the arguer tries to use the lack of evidence as support for a positive claim about the truth of a conclusion. There is one situation in which doing this is not fallacious: if qualified researchers have used well-thought-out methods to search for something for a long time, they haven’t found it, and it’s the kind of thing people ought to be able to find, then the fact that they haven’t found it constitutes some evidence that it doesn’t exist.

Tip: Look closely at arguments where you point out a lack of evidence and then draw a conclusion from that lack of evidence.

i. Red herring

Definition: This is a diversionary tactic that avoids the key issues, often by avoiding opposing arguments rather than addressing them. Partway through an argument, the arguer goes off on a tangent, raising a side issue that distracts the audience from what’s really at stake. Often, the arguer never returns to the original issue.

Example: “Grading this exam on a curve would be the fairest thing to do. After all, classes go more smoothly when the students and the professor are getting along well.” Let’s try our premise-conclusion outlining to see what’s wrong with this argument:

Premise: Classes go more smoothly when the students and the professor are getting along well.

Conclusion: Grading this exam on a curve would be the fairest thing to do.

When we lay it out this way, it's pretty obvious that the arguer went off on a tangent; the fact that something helps people get along doesn't necessarily make it fairer; fairness and justice sometimes require us to do things that cause conflict. But the audience may feel like the issue of teachers and students agreeing is important and be distracted from the fact that the arguer has not given any evidence as to why a curve would be fair.

Tip: Try laying your premises and conclusion out in an outline-like form. How many issues do you see being raised in your argument? Can you explain how each premise supports the conclusion?

j. Post hoc ergo propter hoc (also called false cause)

This fallacy gets its name from the Latin phrase “post hoc, ergo propter hoc,” which translates as “after this, therefore because of this.” Here, a conclusion assumes that if 'A' occurred after 'B' then 'B' must have caused 'A.' Example:

Definition: Assuming that because B comes after A, A caused B. Of course, sometimes one event really does cause another one that comes later, for example, if I register for a class, and my name later appears on the roll, it's true that the first event caused the one that came later. But sometimes two events that seem related in time aren't really related as cause and event. That is, correlation isn't the same thing as causation.

Examples: “President Jones raised taxes, and then the rate of violent crime went up. Jones is responsible for

the rise in crime.” The increase in taxes might or might not be one factor in the rising crime rates, but the argument hasn’t shown us that one caused the other.

Tip: To avoid the post hoc fallacy, the arguer would need to give us some explanation of the process by which the tax increase is supposed to have produced higher crime rates. And that’s what you should do to avoid committing this fallacy: If you say that A causes B, you should have something more to say about how A caused B than just that A came first and B came later.

k. Missing the point

Definition: The premises of an argument do support a particular conclusion - but not the conclusion that the arguer actually draws.

Example: “The seriousness of a punishment should match the seriousness of the crime. Right now, the punishment for drunk driving may simply be a fine. But drunk driving is a very serious crime that can kill innocent people. So, the death penalty should be the punishment for drunk driving.” The argument actually supports several conclusions; “The punishment for drunk driving should be very serious,” in particular - but it doesn’t support the claim that the death penalty, specifically, is warranted.

Tip: Separate your premises from your conclusion. Looking at the premises, ask yourself what conclusion an objective person would reach after reading them. Looking at your conclusion, ask yourself what kind of evidence would be required to support such a conclusion, and then see if you’ve actually given that evidence. Missing the point often occurs when a

sweeping or extreme conclusion is being drawn, so be especially careful if you know you're claiming something big.

1. Slippery slope

Definition: The arguer claims that a sort of chain reaction, usually ending in some dire consequence, will take place, but there's really not enough evidence for that assumption. The arguer asserts that if we take even one step onto the "slippery slope," we will end up sliding all the way to the bottom; he or she assumes we can't stop partway down the hill.

Example: "Animal experimentation reduces our respect for life. If we don't respect life, we are likely to be more and more tolerant of violent acts like war and murder. Soon our society will become a battlefield in which everyone constantly fears for their lives. It will be the end of civilization. To prevent this terrible consequence, we should make animal experimentation illegal right now." Since animal experimentation has been legal for some time and civilization has not yet ended, it seems particularly clear that this chain of events won't necessarily take place. Even if we believe that experimenting on animals reduces respect for life, and loss of respect for life makes us more tolerant of violence that may be the spot on the hillside at which things stop, we may not slide all the way down to the end of civilization. And so, we have not yet been given sufficient reason to accept the arguer's conclusion that we must make animal experimentation illegal right now.

Like post hoc, slippery slope can be a tricky fallacy to identify, since sometimes a chain of events really can be predicted to follow from a certain action. Here's an

example that doesn't seem fallacious: "If I fail English 101, I won't be able to graduate. If I don't graduate, I probably won't be able to get a good job, and I may very well end up doing temporary work or riding boda boda for the next year."

Tip: Check your argument for chains of consequences, where you say "if A, then B, and if B, then C," and so forth. Make sure these chains are reasonable.

m. Weak analogy

Definition: Many arguments rely on an analogy between two or more objects, ideas, or situations. If the two things that are being compared aren't really alike in the relevant respects, the analogy is a weak one, and the argument that relies on it commits the fallacy of weak analogy.

Example: "Guns are like hammers, they're both tools with metal parts that could be used to kill someone. And yet it would be ridiculous to restrict the purchase of hammers - so restrictions on purchasing guns are equally ridiculous." While guns and hammers do share certain features, these features (having metal parts, being tools, and being potentially useful for violence) are not the ones at stake in deciding whether to restrict guns. Rather, we restrict guns because they can easily be used to kill large numbers of people at a distance. This is a feature hammers do not share - it would be hard to kill a crowd with a hammer. Thus, the analogy is weak, and so is the argument based on it.

If you think about it, you can make an analogy of some kind between almost any two things in the world: "My paper is like a mud puddle because they both get bigger when it rains (I work more when I'm stuck

inside) and they're both kind of murky." So, the mere fact that you can draw an analogy between two things doesn't prove much, by itself.

Arguments by analogy are often used in discussing abortion - arguers frequently compare fetuses with adult human beings, and then argue that treatment that would violate the rights of an adult human being also violates the rights of fetuses. Whether these arguments are good or not depend on the strength of the analogy: do adult humans and fetuses share the properties that give adult humans rights? If the property that matters is having a human genetic code or the potential for a life full of human experiences, adult humans and fetuses do share that property, so the argument and the analogy are strong; if the property is being self-aware, rational, or able to survive on one's own, adult humans and fetuses don't share it, and the analogy is weak.

Tip: Identify what properties are important to the claim you're making, and see whether the two things you're comparing both share those properties.

n. **False dichotomy**

Definition: In false dichotomy, the arguer sets up the situation so it looks like there are only two choices. The arguer then eliminates one of the choices, so it seems that we are left with only one option: the one the arguer wanted us to pick in the first place. But often there are really many different options, not just two, and if we thought about them all, we might not be so quick to pick the one the arguer recommends.

Example: "The Kenyatta University Harambee Hall is in bad shape. Either we tear it down and put up a new building, or we continue to risk students' safety.

Obviously, we shouldn't risk anyone's safety, so we must tear the building down." The argument neglects to mention the possibility that we might repair the building or find some way to protect students from the risks in question, for example, if only a few rooms are in bad shape, perhaps we shouldn't hold classes in those rooms.

Tip: Examine your own arguments: if you're saying that we have to choose between just two options, is that really so? Or are there other alternatives you haven't mentioned? If there are other alternatives, don't just ignore them, and explain why they, too, should be ruled out. Although there's no formal name for it, assuming that there are only three options, four options, etc. when really there are more is similar to false dichotomy and should also be avoided.

o. **o) Begging the question**

Definition: A complicated fallacy; it comes in several forms and can be harder to detect than many of the other fallacies we've discussed. Basically, an argument that begs the question asks the reader to simply accept the conclusion without providing real evidence; the argument either relies on a premise that says the same thing as the conclusion (which you might hear referred to as "being circular" or "circular reasoning"), or simply ignores an important (but questionable) assumption that the argument rests on. Sometimes people use the phrase "beg the question" as a sort of general criticism of arguments, to mean that an arguer hasn't given very good reasons for a conclusion, but that's not the meaning we're going to discuss here.

Examples: "Active euthanasia is morally acceptable. It is a decent, ethical thing to help another human

being escape suffering through death.” Let’s lay this out in premise-conclusion form:

Premise: It is a decent, ethical thing to help another human being escape suffering through death.

Conclusion: Active euthanasia is morally acceptable.

If we “translate” the premise, we’ll see that the arguer has really just said the same thing twice: “decent, ethical” means pretty much the same thing as “morally acceptable” and “help another human being escape suffering through death” means something pretty similar to “active euthanasia.” So, the premise basically says, “active euthanasia is morally acceptable,” just like the conclusion does. The arguer hasn’t yet given us any real reasons why euthanasia is acceptable; instead, she has left us asking “well, really, why do you think active euthanasia is acceptable?” Her argument “begs” (that is, evades) the real question.

Here’s a second example of begging the question, in which a dubious premise which is needed to make the argument valid is completely ignored: “Murder is morally wrong so active euthanasia is morally wrong.” The premise that gets left out is “active euthanasia is murder.” And that is a debatable premise—again, the argument “begs” or evades the question of whether active euthanasia is murder by simply not stating the premise. The arguer is hoping we’ll just focus on the uncontroversial premise, “Murder is morally wrong,” and not notice what is being assumed.

Tip: One way to try to avoid begging the question is to write out your premises and conclusion in a short, outline-like form. See if you notice any gaps, any steps that are required to move from one premise to the next or from the premises to the conclusion. Write down

the statements that would fill those gaps. If the statements are controversial and you've just glossed over them, you might be begging the question. Next, check to see whether any of your premises basically says the same thing as the conclusion (but in different words). If so, you're probably begging the question. The moral of the story: you can't just assume or use as uncontroversial evidence the very thing you're trying to prove.

p. **Equivocation**

Definition: Equivocation is sliding between two or more different meanings of a single word or phrase that is important to the argument.

Example: "Giving money to charity is the right thing to do. So, charities have a right to our money." The equivocation here is on the word "right": "right" can mean both something that is correct or good (as in "I got the right answers on the test") and something to which someone has a claim (as in "everyone has a right to life"). Sometimes an arguer will deliberately, sneakily equivocate, often on words like "freedom," "justice," "rights," and so forth; other times, the equivocation is a mistake or misunderstanding. Either way, it's important that you use the main terms of your argument consistently.

Tip: Identify the most important words and phrases in your argument and ask yourself whether they could have more than one meaning. If they could, be sure you aren't slipping and sliding between those meanings.

q. **Genetic Fallacy**

This conclusion is based on an argument that the origins of a person, idea, institute, or theory determine its character, nature, or worth.

Example: The Volkswagen Beetle is an evil car because it was originally designed by Hitler's army.

In this example, the author is equating the character of a car with the character of the people who built the car. However, the two are not inherently related.

r. **Begging the Claim**

The conclusion that the writer should prove is validated within the claim. Example:

Filthy and polluting coal should be banned.

Arguing that coal pollutes the earth and thus should be banned would be logical. But the very conclusion that should be proved, that coal causes enough pollution to warrant banning its use, is already assumed in the claim by referring to it as "filthy and polluting."

s. **Circular Argument**

This restates the argument rather than actually proving it. Example:

Zenane is a good communicator because she speaks effectively.

In this example, the conclusion that Zenane is a "good communicator" and the evidence used to prove it "she speaks effectively" is basically the same idea. Specific evidence such as using everyday language, breaking down complex problems, or illustrating her points

with humorous stories would be needed to prove either half of the sentence.

t. **Either/or**

This is a conclusion that oversimplifies the argument by reducing it to only two sides or choices. Example:

“We can either stop using cars or destroy the earth”.

In this example, the two choices are presented as the only options, yet the author ignores a range of choices in between such as developing cleaner technology, car-sharing systems for necessities and emergencies, or better community planning to discourage daily driving.

How to detect fallacies in your own arguments/writing

Here are some general tips for finding fallacies in your own arguments:

- a) Pretend you disagree with the conclusion you’re defending. What parts of the argument would now seem fishy to you? What parts would seem easiest to attack? Give special attention to strengthening those parts.
- b) List your main points; under each one, list the evidence you have for it. Seeing your claims and evidence laid out this way may make you realize that you have no good evidence for a particular claim, or it may help you look more critically at the evidence you’re using.
- c) Learn which types of fallacies you’re especially prone to, and be careful to check for them in your work. Some writers make lots of appeals to authority; others are more likely to rely on weak analogies or set up

straw men. Read over some of your old papers to see if there's a particular kind of fallacy you need to watch out for.

- d) Be aware that broad claims need more proof than narrow ones. Claims that use sweeping words like “all,” “no,” “none,” “every,” “always,” “never,” “no one,” and “everyone” are sometimes appropriate, but they require a lot more proof than less-sweeping claims that use words like “some,” “many,” “few,” “sometimes,” “usually,” and so forth.
- e) Double-check your characterizations of others, especially your opponents; to be sure they are accurate and fair.

Common Fallacies in Everyday Life

There are many different types of fallacies, and their variations are almost endless. Here is a summary of some that are commonly committed.

a) Ad Hominem

Ad Hominem, also known as attacking the person, fallacies occur when acceptance or rejection of a concept is rejected based on its source, not its merit.

b) Appeal to Authority

When you commit an appeal to authority fallacy, you accept a truth on blind faith just because someone you admire said it.

c) Appeal to Ignorance

Appeal to ignorance fallacies occurs when someone asserts a claim that must be accepted because no one else can prove otherwise.

d) Appeal to Pity

These fallacies occur when someone seeks to gain acceptance by pointing out an unfortunate consequence that befalls them.

e) Bandwagon

You might have jumped on the bandwagon before. Well, bandwagon fallacies occur when a proposition is claimed to be true or good solely because many people believe it to be so.

- ✓ Everyone on campus is wearing Air Jordans. I need to buy those sneakers.
- ✓ All my friends are doing a low-carb diet. That must be the only way to lose weight.

f) Begging the Question

Begging the question, also called circular reasoning, is a type of fallacy that occurs when the conclusion of an argument is assumed in the phrasing of the question itself.

- ✓ If aliens didn't steal my newspaper, who did?
- ✓ I have a right to free speech so I can say what I want and you shouldn't try to stop me.

g) Cum Hoc, Ergo Propter Hoc

You'll see these fallacies happen when it is assumed that, because two things occur together, they must be related.

- ✓ People who eat brown ugali have healthy hearts.
- ✓ Roosters crow before sunrise. Therefore, roosters cause the sun to rise.

h) False Analogy Fallacy

In false analogy fallacies, you make an assumption about two things that are alike. Because they are alike in one respect, it is assumed they are alike in another.

- ✓ People and watches are both complex. Therefore, they both must be the product of complex design.
- ✓ Tigers and lions are ruthless killers. House cats must also be ruthless killers.

i) False Dilemma

False dilemma fallacies occur when someone is only given two choices for possible alternatives when more than two exist.

- ✓ In Africa, only two countries offer travel and tourism options: Kenya and South Africa.
- ✓ Khateera is one of the 16,400 students on her college campus.
- ✓ The only boys worth dating are Tom and Nate.

j) Hasty Generalization

If you've ever been accused of jumping to conclusions, then you've committed a hasty generalization. This type of informal generalization makes an assumption based on a small sample and can lead to stereotypes.

- ✓ My brother eats chips and pizza. He is thin. Chips and pizza aren't the cause of obesity.
- ✓ Four out of five doctors recommend "Heal" brand lotion for patients. It must be the best.

k) Post Hoc, Ergo Propter Hoc

These fallacies occur when it is assumed that, because one thing happened after another, it must have occurred as a result of it.

- ✓ Right when I sneezed, the power went off. I must've caused the outage.
- ✓ Agatha wore her favorite necklace today and aced her spelling test. That necklace must be lucky.

l) **Red Herring**

A red herring fallacy occurs when someone uses irrelevant information to distract from the argument.

- ✓ How is talking about vaccinations going to help us find a cure for cancer?
- ✓ There are starving children in Africa. Eat your Githeri.

m) **Slippery Slope**

You might see a slippery slope fallacy when someone assumes a very small action will lead to extreme outcomes.

- ✓ If we allow our 14-year-old to have her first date tonight, what's next? A wedding, kids?
- ✓ If we teach Xolani how to drive the car, he'll want to learn how to fly helicopters next!

n) **Straw Man Fallacy**

A straw man fallacy happens when someone appears to be refuting the original point made but is actually arguing a point that wasn't initially made.

- ✓ President Trump doesn't have middle-class Americans in mind. He's part of the upper echelon of America.
- ✓ "We should be doing more to make cars greener and more fuel-efficient." "Our cities are built for cars; do you want to affect the economy?"

o) Sweeping Generalizations

A sweeping generalization happens when a very broad application is applied to a single premise.

- ✓ Dogs are good pets. Coyotes are dogs. Therefore, coyotes are good pets.
- ✓ Divorce is rampant in Africa. We only stand a 50 percent chance of survival. Therefore, we can't get married.

How to Avoid Fallacious Reasoning

Fallacies are the silent pitfalls of human thought, traps into which any thinker may easily stumble. No absolute armor exists to completely shield our reasoning from error. However, we can guard our minds against these missteps by adopting two distinct habits of philosophical discipline.

First, conquering fallacies of relevance demands unwavering vigilance and a sharp awareness of the many ways unrelated static can intrude upon an argument. We must recognize that language is highly flexible and serves many purposes beyond pure logic. Understanding this flexibility prevents us from mistaking an emotional plea designed merely to make us accept or approve a conclusion, for a genuine, rational argument meant to prove that conclusion true.

Second, fallacies of ambiguity require us to master the slippery nature of words, which naturally carry a shifting variety of meanings. When these different definitions become tangled within an argument, our reasoning breaks down. To avoid these subtle traps, we must hold the exact meanings of our terms firmly and clearly in mind. The most effective way to achieve this clarity is by strictly defining the key concepts we choose to use.

Self-Assessment Test

1. "Fallacious reasoning is offensive to correct thinking" illustrate this statement using four examples two from each of the two general categories of informal fallacies.
2. Discuss any three fallacies showing how they are committed at your workplace or among your fellow students and then explain how they can be avoided.
3. Give three examples of fallacies of relevance and in each case, show how one is misled by the argument.
4. Identify the type of fallacy committed in each of the following statements:
 - a) "I'd like to respond to that, but taking into account your background, education, and intelligence, I am quite sure that you would not be able to understand."
 - b) "I have observed that those who disagree with me on the next point tend to be unsophisticated, and those who quickly recognize the validity of the point to be more educated. The point is...."
 - c) "As you mature emotionally (or mentally, or spiritually), you will grow out of your present way of thinking, and you will eventually come around to my point of view."
 - d) "You said 'feel' instead of 'think'. If you are feeling instead of thinking, I won't be able to convince you with reason."
 - e) "Have I ever brought up the 2000 franc you owe me? Never! Have I ever embarrassed you or made you feel bad over it? Have I ever told you how much I need that money? No, I never have."
 - f) "I agree with everything you said except the conclusion. It doesn't make any sense to me, and I

cannot accept it. I am trying, but your brain must work much differently than mine."

- g) "Your problem is that you are thinking in a linear versus configurational framework."
5. Using different types of fallacies, explain how fallacies may compromise your work as a student.
 6. Explain how you would avoid making fallacies in decision making

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CHAPTER SEVEN

LOGIC

Brainteaser

A farmer wants to cross a river and take with him a wolf, a goat, and a cabbage. He has a boat, but it can only fit himself plus either the wolf, the goat, or the cabbage. If the wolf and the goat are alone on one shore, the wolf will eat the goat. If the goat and the cabbage are alone on the shore, the goat will eat the cabbage. How can the farmer bring the wolf, the goat, and the cabbage across the river without anything being eaten?

Introduction

This chapter invites you to explore logic, the living architecture of human thought and the core science of reason. Logic does more than test statements; it reveals how the mind seeks truth, builds clear arguments, and holds together every branch of philosophy. By exploring how the human mind moves from thought to conclusion, you will learn to master the foundational concepts of logical reasoning.

This journey begins with defining, and mapping deductive and inductive logic, which represent the distinct paths of logical certainty and probability. We then unpack propositions, premises, and conclusions as the basic building blocks of any argument, while examining truth and validity as the vital standards that separate good reasoning from bad. Ultimately, this chapter equips you to sharpen your thinking, helping you spot hidden assumptions, build unshakeable arguments, and understand how clarity of thought guides all human knowledge.

Chapter Objectives

By the end of this chapter, the learner should be able to:

- a) Apply the tools of logic to arguments in the execution of military duties
- b) Explain what logic is.
- c) Distinguish between premises and conclusions in arguments.
- d) Differentiate between deductive and Inductive logic.
- e) Distinguish between Truth and validity.

Definitions

Logic (from the Greek "logos", has a variety of meanings, ranging from word, thought, idea, argument, account, reason or principle) is the study of reasoning or the study of the principles and criteria of valid inference and demonstration; or, the study of the methods and principles used to distinguish good (correct) from bad (incorrect) reasoning. In its broadest sense, it is the study of evidential link between premises and conclusions.

Aristotle defined logic as "new and necessary reasoning", "new" because it allows us to learn what we do not know, and "necessary" because its conclusions are inescapable. Logic asks questions such "What is correct reasoning?", "What distinguishes a good argument from a bad one?", "How can we detect an error in reasoning?"

Logic investigates and classifies the structure of statements and arguments, both through the study of formal systems of inference and through the study of arguments in natural language (informal). It deals only with propositions (declarative sentences, used to make an assertion, as opposed to questions, commands or sentences expressing wishes) that are capable of being true and false. It is not concerned with the

psychological processes connected with thought, or with emotions, images and the like. It covers core topics such as the study of fallacies and paradoxes, as well as the analysis of reasoning using probability and arguments involving causality and argumentation theory.

Logical systems have three determinants: consistency (which means that none of the theorems of the system contradict one another); soundness (which means that the system's rules of proof will never allow a false inference from a true premise); and completeness (which means that there are no true sentences in the system that cannot, at least in principle, be proved in the system).

The distinction between correct and incorrect reasoning is the central problem that logic deals with. The logician's methods and techniques have been developed primarily for the purpose of making this distinction, based on the evidence that subsist between premises and conclusions clear. The logician is interested in all reasoning regardless of its subject matter, but only from this special point of view.

Inference

An inference is a rule-governed step from one or more propositions, called premises, to a new proposition, usually called the conclusion. A rule of inference is said to be truth-preserving if the conclusion derived from the application of the rule is true whenever the premises are true. Simply put, *an Inference* is a process by which one proposition is reached and affirmed on the basis of one or more propositions accepted as the starting point of the process of argument. The logician is not concerned with the process of inference, but with the propositions that are the initial and end points of that process, and the relationships between them.

To this end, it can be said that inferences based on truth-preserving rules are called deductive, and the study of such inferences is known as deductive logic. An inference rule is said to be valid, or deductively valid, if it is necessarily truth-preserving. That is, in any conceivable case in which the premises are true, the conclusion yielded by the inference rule will also be true. Inferences based on valid inference rules are also said to be valid.

a. Propositions

Propositions are either true or false, and in this they differ from questions, commands and exclamations. Only propositions can either be asserted or denied: questions may be asked and commands given and exclamations uttered, but none of them can be affirmed or denied, or judged to be either true or false.

It is necessary to distinguish sentences and the propositions they may be used to assert. Two sentences which are clear because they consist of different words differently arranged may in the same context have the same meaning and express the same proposition. For example:

Nanyingi loves Cheko
Cheko is loved by Nanyingi

Are two different sentences, for the first contains three words, whereas the second contains five, the first begins with the word “*Nanyingi*” whereas the second begins with “*Cheko*”. Yet the two sentences have exactly the same meaning. It is customary to use the term “proposition” to refer to what such sentences as these may be used to assert.

The difference between sentences and propositions is brought out by the remarking that a sentence is always a part of language, the language in which it is enunciated, whereas propositions are not peculiar to any of the languages in which they may be expressed.

No proposition by itself, in isolation, is either a premises or a conclusion. It is a premise only when it occurs as an assumption in an argument. It is a conclusion only when it occurs in an argument in which it is claimed to follow from proposition assumed in that argument.

b. Premises and Conclusions

Premise is a proposition upon which an argument is based or from which a conclusion is drawn. A premise is a starting point of reasoning, while *Conclusion* is a judgement, decision, or belief formed after investigation or reasoning.

ii) Premises and Conclusions in Arguments

To carry out the logician's task of distinguishing correct from incorrect arguments, one must first be able to recognize arguments when they occur and to identify their premises and conclusions.

Premises are the reasons we infer in support of a statement asserted whereas conclusions are the statements asserted to which we give evidence to prove.

There are certain words or phrases that typically serve to introduce the conclusion of an argument. Among the most common of these conclusion-indicators are "therefore", "hence", "thus", "so", "consequently", "it follows that", "we may infer" and "we may conclude." Premises-indicators are "since", "because", "for", "as", "inasmuch as", and "for the reason that".

Once an argument has been recognized, these words and phrases help us to identify premises and conclusion.

Example

All men are wise (*Premise 1*)

Xolani is a man (*Premise 2*)

Therefore, Xolani is wise (*Conclusion*)

Deductive and Inductive Logic

Arguments are traditionally divided into two types, deductive and inductive.

a. Deductive argument

Although every argument involves the claim that its premises provide some grounds for the truth of its conclusion, only a deductive argument involves the claim that its premises provide conclusive grounds. In case of deductive arguments, the technical terms “valid” and “invalid” are used in place of “correct” and “incorrect.” A deductive argument is valid when its premises, if true, do provide conclusive grounds for its conclusion, that is, when premises and conclusion are so related that it is absolutely impossible for the premises to be true unless the conclusion is true also. Every deductive argument is either valid or invalid. The task of deductive logic is therefore to clarify the nature of the relation between premises and conclusion in valid arguments, and thus to allow us to discriminate valid from invalid arguments.

b. Inductive Argument

An inductive argument involves the claim not that its premises give conclusive grounds for the truth of its conclusion, but only that it provides some grounds for it. Inductive arguments are neither valid nor invalid in the sense in which those terms are applied to deductive arguments. Inductive arguments may be evaluated as better or worse, according to the degree of likelihood or probability which their premises confer upon their conclusions.

Accordingly, Deductive and inductive arguments are characterized and distinguished from one another in

terms of the relative generality of their premises and conclusion. As such, the misconception common in most logic books that deductive arguments proceed from general to particular while inductive arguments from particular to general is erroneous. Either of the arguments can proceed from general to general, particular to particular, general to particular and particular to general. The only distinguishing characteristic between deductive and inductive arguments is the evidential link between the premises and the conclusion.

Truth and Validity

In logic it is not uncommon to find where there are valid arguments with false conclusions, as well as invalid arguments with true conclusions. The truth or falsehood of an argument's conclusion does not determine the validity or invalidity of the argument. Nor does the validity of an argument guarantee the truth of its conclusion. There are perfectly valid arguments with false conclusions-but any such argument must have at least one false premise. The term "sound" is used to characterize a valid argument of whose all premises are true in case of inductive logic. A deductive argument fails to establish the truth of its conclusion if it is unsound, which means either that it is not valid or that not all of its premises are true. However, the logician is not so much interested in the truth or falsehood of propositions as in the logical relations between them. By "logical" relations between propositions we mean those which determine the correctness or incorrectness of arguments in which they may occur. Thus, the need to determine the correctness or incorrectness of arguments is a preserve of logic. The logician is interested in the correctness of arguments whose premises might be false.

Simply stated, *truth* is a property of individual statements, such as a single premise or conclusion. A statement is true if it matches real facts and corresponds to the actual world. It does not depend on argument structure or reasoning. For example, the sentence "Nairobi is the capital of Kenya" is true because it reflects reality. Truth simply asks whether a single claim is factually correct on its own.

Validity, on the other hand, is a property of an entire argument's structure rather than any single statement. An argument is valid if its conclusion follows logically from its premises. This means that if the premises were true, the conclusion would have to be true by necessity. Validity is purely about form, meaning an argument can be valid even if its individual premises are factually false. When a valid argument also happens to contain true premises, logicians call it a *sound* argument

Role of Logic to Critical thinking and Problem-Solving

Logic is the structured "rulebook" of reasoning that provides the essential tools to test whether an argument works or fails. It serves the following roles:

a. Foundation of clear thinking

Logic acts as the structural framework for critical thinking by providing the rules needed to evaluate, analyze, and construct arguments. Without logic, critical thinking risks becoming a collection of unverified opinions and subjective biases. By encouraging us to distinguish between sound reasoning and emotional persuasion, logic allows us to objectively assess evidence, identify hidden assumptions, and determine whether a conclusion genuinely follows from its supporting facts. It

transforms raw information into actionable knowledge, giving thinkers the tools to systematically dismantle complex ideas and judge their validity.

b. Enhancing Problem-Solving Efficiency

In problem solving, logic dramatically enhances efficiency by serving as a mental filter that eliminates trial-and-error guesswork. Instead of wasting time on irrelevant data or pursuing dead-end solutions, a logical approach allows you to break a large, intimidating problem down into smaller, manageable parts. By mapping out clear cause-and-effect relationships, you can swiftly pinpoint the root cause of an issue rather than just treating its symptoms. This structured diagnostic process ensures that your cognitive energy and resources are directed exclusively toward solutions that are structurally sound and practically viable.

c. Optimizing Decision-Making

When it comes to decision-making, logic serves as an objective anchor that strips away cognitive biases and emotional noise and bottlenecks. It enables you to layout various courses of action, accurately forecast their likely outcomes, and weigh the pros and cons based on hard evidence rather than wishful thinking. By utilizing logical frameworks, such as conditional reasoning ("if X, then Y"), you can anticipate potential risks and bottleneck scenarios before they occur. This rigorous vetting process accelerates the speed of decision-making, minimizes costly errors, and provides you with a defensible, rational justification for the path you choose to take

Summary

Logic is important because it allows people to enhance the quality of arguments and of evaluating arguments constructed by others. It is also an essential skill in determining what is necessary to believe and what is not. Logic is instrumental to good argumentation, constructive decision making and problem solving.

Self-Assessment Questions

1. Explain the importance of logical reasoning in your life/profession
2.
 - a) Define logic
 - b) Distinguish between deductive and inductive reasoning.
3. What is the meaning of?
 - a) inference
 - b) proposition
 - c) deductive argument
 - d) inductive argument
4. Using your own examples demonstrate that the distinction between Inductive and Deductive reasoning is based on the degree of the evidential strength between premises and conclusions of arguments.
5. Distinguish between Truth and Validity
6. Show the relevance of deductive and inductive reasoning.

Study Questions

1. Define logic and then show its relevance in the work of a military officer.

2. Distinguish between deductive and inductive reasoning.
3. What is the meaning of:
 - a) an inference
 - b) a deductive argument
 - c) an inductive argument
4. Using your own examples demonstrate that the distinction between Inductive and Deductive reasoning is based on the degree of the evidential strength between premises and conclusions of arguments.
5. Distinguish between Truth and Validity
6. Show the relevance of deductive and inductive reasoning to the security officer's job.
7. Discuss the role of logic to critical thinking, problem solving, and decision making.

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CHAPTER EIGHT

BARRIERS TO CRITICAL THINKING

Puzzle: The Functional Fixedness Trap (The Candle Problem)

- ✓ *The Setup:* You are given a candle, a box of matches, and a box of thumbtacks.
- ✓ *The Goal:* Fix the candle to a cork bulletin board on the wall and light it so the candle wax does not drip onto the table below.

The Barrier: Functional Fixedness. This is the tendency to see an object only working in its customary, intended way. Most people try to tack the candle directly to the wall or melt the side of it to stick it to the board.

The Critical Thinking Solution: Look at the objects differently. Empty the box of thumbtacks. Tack the *empty box* to the wall. Put the candle inside the box. The box acts as a platform and a wax catcher.

Introduction

You are anxious, and feeling uneasy, but you cannot quite put your hand on the issue troubling and infuriating you. And even if you do, your mind is a *tabula rasa*, completely incapacitated to think clearly and distinctly; then you hate yourself, at times transferring your rage of abhorrence to others.

These are common occurrences most of us go through; losing sight of our problems' best solutions because something; something remote and invisible is clouding our vision and

holding us back from realizing the best solutions that we can attain. These, known to exist or remotely impacting on our problem-solving and decision-making processes are the hindrances to critical thinking abilities.

Barriers to critical thinking are chronic shortfalls within us and our environs that continually demean and destruct clear thinking. The most common ones can be categorized into three broad fields: those commonly classified, philosophically as fallacies; cognitive biases that exploit the blind spots of our mental composition; and, common and deceptive conversational cheap-shots and gimmicks which, from face-value looks true, convincing and yet flaws reason.

Most of these barriers result from individuals' mental laxity, lack of exposure, paternalism, indoctrination, religious dogmas and influence, peer-group and social influence, schooling environment and authoritative systems, arrogance and intolerance, biased experiences, egocentric thinking, social conditioning, and drone mentality, among other. Francis Bacon, a British philosopher captures most of these barriers in his masterpiece - *The Interpretation of Nature: Noum Organum* where he refers to them as *Idols*.

This chapter is intended to introduce you to some of the barriers that hinder effective critical thinking.

Chapter Objectives

By the end of this chapter, you should be able to:

- a) Understand the sources of obstacles to critical thinking
- b) Discuss the barriers to critical thinking and problem-solving.

- c) Distinguish between different types of barriers to critical thinking, and how they impact on problem-solving and decision-making processes
- d) Apply the knowledge acquired to daily life.

Nature of Human Mind

Though human beings are born with innate curiosity and a sense of wonder, the quest to discover and unearth the essence definitive of knowledge is soon destroyed by the time a child gets to school-going age.

Human beings are rational entities. Rational in the sense that their actions are informed by reason - a fundamental distinguishing feature between humans and other creations of the universe. But despite this rational element, human beings are also creatures whose actions have consternated many, and aroused skepticism about the level of objectivity of their mind and its actual states.

This trepidation is occasioned by the contradictory dichotomy of human nature.

According to Barnes (1992), human beings are the only, and uniquely animals that use meanings- ideas, concepts, analogies, metaphors, models, theories, and explanations- to make sense of things, to understand, predict, and control things. But again, to the contrary the human being is also the only creature that uses meanings to negate, contradict, and deceive themselves, to misconceive, distort, and stereotype, and to be dogmatic, prejudiced, and narrow-minded. Further, humans are the only, and uniquely animals whose thinking can be characterized as clear, precise, accurate, relevant, consistent, profound, and fair; but at the same time, they are also the only animals whose thinking is often imprecise, vague, inaccurate, irrelevant, superficial, trivial, and biased. Humans are thinking being

whose thinking at times constitutes unthinking. (Barnes, 1992),

Accordingly, our quest to comprehend the need to think critically makes sense in retrospect to these paradoxical dichotomies.

Human beings need not simply to trust their instincts and sense-derived 'knowledge'. They should not unquestioningly believe what spontaneously occurs to them. They should not accept as true everything that is taught or passed to them by those in authority as true. They should not assume that their experience is unbiased. They need to formulate, conceptualize and reflect, since they are not born with, intellectually sound standards for belief, truth, and validity. They need to cultivate habits and traits that integrate critical thinking standards into their lives and help eliminate any obstacles that stand between them and good thinking.

Barriers to Critical Thinking and Problem Solving

To understand why human beings and especially learners in institutions of learning often exhibit less than encouraging levels of interest and understanding, we need to look no further than two general predispositions that many people bring with them from previous socialization:

- i. attitude of intellectual passivity or disengagement; and,
- ii. negative preconceptions about disciplines and cultural integration.

Carl Sagan (1997) observes:

"I think everybody is born with wonder but society beats it out of you. Youngsters who are slowly examining the world around them and wondering about it ask perfectly good questions, like, why is the grass

green? ' Because they can envision it purple, or Orange... The adult who is answering the question is annoyed ...and says, 'Don't ask dumb questions. What colour do you expect it to be" (Sweeney, 1982).

Major among the barriers to critical thinking and effective problem solving are discussed here below. They include:

- a) Cultural Conditioning and traditions
- b) Individuals' mental laxity,
- c) Lack of exposure,
- d) Negative preconceptions
- e) Propaganda
- f) Paternalism,
- g) Egocentric Thinking
- h) Indoctrination,
- i) Mass man or Groupthink
- j) Anxiety
- k) Arrogance and Intolerance
- l) Religious dogmas and influence,
- m) Peer-group and social influence,
- n) Drone Mentality
- o) Schooling environment, and
- p) Biased Experiences
- q) Ideological Conditioning and dictatorial tendencies
- r) Social Conditioning
- s) Schedule Pressures

Cultural Conditioning: While not all adults are as insensitive as Sagan's caricature, our culture does exert pressure on children to remain silent and follow instructions rather than ask questions. And even before they get to school-going age, the natural inquisitiveness in children is soon replaced by passivity and a tendency to take cues from others. Children learn to

forgo their own questions and answers and, instead, ask the kinds of questions and provide the kinds of answers they think teachers and other adults want to hear. Similarly, juniors in the workplace learn to forego their innovative and creative potency beneficial to their profession and organization and instead become conformists and subservient conveyor belts. By the time most of them occupy higher leadership roles, the inner-directed leader has become the indecisive other-directed leader. Passivity and caution have replaced inquisitiveness and questioning, and taking notes on the cue and thoughts of others have replaced thinking for one-self. We need to start motivating children from their inception, teaching them the value of asking questions, and answering their questions honestly; we need to infuse knowledge in the children, not fear and distortion.

Egocentric Thinking: This kind of thinking focuses too much on oneself. People who are egocentric thinkers are so consumed by their self-narratives and self-interests. They fail to consider other people's ideas and thoughts. Sometimes they may not even be aware that they're doing it.

Egocentric thinking usually stems from extreme closed-mindedness. If we wish to overcome this barrier, we should start being mindful of other's needs. Our minds will gradually open up once we realize that their perspectives are as valid as ours.

Drone Mentality: This kind of mentality usually happens when we become too comfortable with the status quo. We begin to act without thinking, without paying attention to the world around us, like we are the "ultimate voice". We forget how to act in the face of new challenges and would rather stay within our comfort zones.

To awaken from the "ultimate voice" mode, it is important to constantly expose ourselves to things that excite and challenge

us. This can be hard to do on our own, so it definitely helps to surround ourselves with people who will inspire us to go after personal growth.

Biased Experiences: The biased view of our experiences stems from egocentric thinking. While the saying “experience is the best teacher” rings true, our views of our experiences are usually distorted because of how it made us feel. When we’re too stuck inside our heads, this can lead to a cycle of self-delusion, anger, hate and prejudices.

Bias can also manifest through the negative preconceptions individual often bring to the study of particular professions or to certain occupations. Some of these attitudes may result from previous encounters with poor orientation or bad influence, while others may arise from individuals own idiosyncratic likes or dislikes.

To get out of our biased experiences, it is important to question ourselves multiple times if we are thinking of our situation rationally. A good way of confirming this is to ask our trusted friends what they think. We must choose someone who can tell us things as it is - someone who isn’t afraid to speak the truth even if that’s not what we want to hear.

Social Conditioning: One of humanity’s biggest problems is the inability to accept each other. More often than not, our refusal to accept others is a result of social conditioning from the moment we are born. We are taught to believe that certain stereotypes are the absolute truth.

This is why it’s important to recognize that our way of life is not the only right way to live. Once we choose to see beyond the stereotypes, we will learn to get rid of beliefs that only cause more harm than good.

Arrogance and Intolerance: Another offshoot of egocentric thinking is arrogance and intolerance. These two

characteristics can set anyone back because it is often a result of a bloated sense of self. When someone believes in themselves too much, they refuse to see that others may have better ideas.

Arrogance and intolerance mainly stem from the fear of failing - resulting in wanting to be right all the time. To combat this, we must learn to let go of the stubborn need to be right. Life is not simply about getting ahead of everyone else, it's about coexisting.

Schedule Pressures: Most human beings have been transformed into machines for production, often competing with time to meet targets. Working against time can often cause people to think poorly and make the wrong decisions. While it is true that time is of the essence, unrealistic expectations will just result in a vicious cycle of shortcuts, procrastination, and unnecessary stress.

Oftentimes we underestimate the time and effort it takes to get things done, leading to the pressures of having to work within tight and unreasonable schedules. To break out of such a vicious cycle, we must learn how to properly plan things out before we even start. This will save us from wasting time and resources that we will never get back.

Mass-man or Groupthink: When everyone talks about the same thing or every form of media you come across expresses the same kind of thought, people are bound to think that what they're saying is the norm. This is another facet of social conditioning, and it becomes very dangerous when no one bothers to question the information that they're being fed.

Depending on what is being established as the norm, it can be uncomfortable to go against the group's tide. But to be a critical thinker means you have to continually ask if something makes logical sense. It's about upholding your principles when you know that something clearly isn't right.

Ideological Conditioning: A number of political establishments, especially the authoritative and despotic in nature have a tendency of interfering with human liberties and right to individual privacy. When the system is so rigid as not to respect the freedom and liberties of its citizens, it does not only allow people to freely express themselves, hold opinions, associate or make choices, but also makes efforts to influence their thinking and behavior. When people are incessantly harassed, detained and imprisoned over flimsy allegations, their thinking is curtailed and tilted towards conformity. Such individuals become submissive, naive and lose self-identity. Authoritarianism is one of the worst impediments to the cultivation of individuality; it reduces one to a mere android or robot of utility.

Communities ought to embrace some degree of liberalism; allowing their members to exercise their right to holding opinion, expressing themselves and questioning what is not clear as a way of knowing and acting on the basis of knowledge.

Propaganda: a form of communication that is aimed at influencing the attitude of a community toward some cause or position so as to benefit the propagator or his group. Opposed to impartially providing information, propaganda presents information primarily to influence an audience. Propaganda is often biased, with facts selectively presented (thus possibly lying by omission) to encourage a particular synthesis, or uses loaded messages to produce an emotional rather than rational response to the information presented. The desired result is a change of attitude toward the subject in the target audience to further a political, or other type of agenda.

Propaganda is the deliberate, systematic attempt to shape perceptions, manipulate cognition, and direct behavior to achieve a response that furthers the desired intent of the propagandist in total disregard for reasons contrary to what he/she purports.

Richard Alan Nelson(1998) looks at propaganda as a systematic form of purposeful persuasion that attempts to influence the emotions, attitudes, opinions, and actions of specified target audiences for ideological, political or commercial purposes through the controlled transmission of one-sided messages (which may or may not be factual) via mass and direct media channels.

Propaganda can be tamed through the use of media, which has the responsibility of generating well-informed and fact-established information. People must also be allowed the freedom to question freely any information passed to them, seeking to establish the source, authenticity, and its truth basis.

Peer Influence: Peer influence is a crucible to regressive thinking. The impact of our contemporaries, and especially when they harbour personal interests can act devastation to our own thinking. Cultism, political grouping, sectarian organizations, paternalism, etc. all tend to limit independence of thought to the advantage of the group. Group mentality, especially when it entails group justices is a major obstacle to critical thinking. This is so because the opinion of the group or that of the group leader is often the law, often draped with blackmail, coercion, and intimidation.

Bad influence should be resisted and outlawed; often be cautious in choosing friends and people to associate with

Paternalism: The way we are brought up and the kinds of families we come from has a bearing to the kind of personalities we eventually become. The norms embraced and encoded in the life of a family, and the kind of rigidity exercised within the family set-up greatly determines whether an individual will become an independent thinker or a naïve and passive introvert. Many timid persons- those lacking self-confidence or self-trust are products of hostile upbringing. Paternalism is a major obstacle to critical thinking and effective problem-

solving. Personality is a product of the environment in which one is brought up; a dead environment produces dead minds. We need to motivate and liberalize the environments in which our children are brought up and in which we work

Religious Doctrines and Dogmas: Most religions and religious sects have strict rules, regulations, dogmas, and principles that govern their operations. Some religious sects do not allow their flock to ask or question the authority of the shepherd, usually, the word of the shepherd is the law and any attempt to interrogate the shepherd's character can easily lead to banishment. Nowadays, it is not uncommon to find in some churches, verdict cards similar to those used by football referees being dangled by pastors or shepherds. These cards are used to upraise and at the same time to expel memberships. The pastor is the arresting officer, prosecutor, and judge at the same time. If you tithe and contribute generously in the church and you are full of praise for the pastor, you will qualify to join the inner cycle of administration (white card), those attempting to whisper about lack of accountability by the pastor are queued for the warning - (yellow card), and, woe to those found talking about expenditure and the moral etiquette of the pastor beyond the walls of the church, its red card with no option for appeal; ex-communication. In such an environment, the flock is not supposed to talk but to listen, consume and implement what he/she hears; it's a total mental lockdown.

Summary

Critical thinking focuses on the use of reason to arrive at acceptable conclusion. Quiet often critical thinkers try as much as possible to avoid emotional reasoning. They insist on the need to question, interrogate, understand, and be convinced before accepting anything as true, the purpose of critical thinking is to use reason as a beacon to knowledge.

Recognition and guarding against any form of barriers to the attainment of knowledge is a necessary condition to the comprehension of the world and the reality that characterizes it.

Remember:

*Obstacles can't stop you.
Problems can't stop you.
Most of all,
Other people can't stop you.
The only one who stops you
Is yourself. (Famous Quotes)*

Study Activities

1. Outline some barriers to critical thinking.
2. Explain an instance where your mind has acted as a block to logical thinking when you most needed to solve a problem.

Self-Assessment test

1. Examine the view that a rigid working environment is an impediment to thinking and to effective problem-solving.
2. To what extent do authoritarian regimes affect the use of reason in deliberations?
3. In your view what are the major barriers to critical thinking at your workplace?
4. To what extent is paternalism, traditions, religion, peer influence, and academic training institutions impediments to critical thinking?
5. Discuss any four barriers to critical thinking in your life.

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CHAPTER NINE

PROBLEM-SOLVING AND DECISION MAKING

Brainteaser

1. The Set-Up

You are a senior government officer and a victim of a set-up by some malicious officer in your section through your office cleaner who has planted unlawful drugs in your office and alerted security agencies that you are using your office and position to peddle and traffic drugs. You have been suspended and summoned by the Management to show because why you should not be terminated and face prosecution, and possible jail term.

Q. How would you proceed in solving this problem such that the decision arrived at by management does not cost your job, nor subject you to prosecution, but be a judicious lesson to the mastermind, the cleaner, and all other potential malicious staff in your section?

2. The Condemned Prisoner (Lateral Thinking)

A prisoner is condemned to death. The executioner decides to offer a final choice of three rooms for the execution.

-  *Room 1:* Filled with a firing squad holding loaded rifles.
-  *Room 2:* Raging with an inescapable, blazing wildfire.
-  *Room 3:* Packaged with twenty fierce tigers that have not eaten a single thing in over six months.

Which room should the prisoner choose to guarantee survival?

Introduction

Human beings can be delusional. We often believe we live in a world of absolute facts, when we actually live in a world of perpetual choices. Every monumental breakthrough in human history - and every catastrophic failure, was not merely the result of happenstance, but the direct consequence of how a human mind process a challenge, deliver and action a response. Too often, we treat "problem solving" and "decision making" as interchangeable synonyms, grouping them together as generic corporate buzzwords. They are not the same.

Problem solving is an analytical, diagnostic journey; it is the intellectual labor of bridging the gap between a broken current reality and a desired goal. Decision making, by contrast, is an evaluative, selective act; it is the definitive choice of which bridge to cross when multiple paths appear before us.

Flawed choices rarely stem from a simple lack of intelligence. Instead, they occur because we construct warped problem architectures or fall victim to insidious cognitive biases that cloud our judgment. We are forced to operate under the rules of bounded rationality - the unavoidable truth that our time, energy, and information are strictly finite.

This chapter is designed to dismantle your passive habits of mind. By exploring rigorous cognitive best practice frameworks to problem-solving and decision-making, you will learn to transition from emotional guessing to structured, systematic navigation. You will discover how to map problems accurately before you ever attempt to solve them, ensuring that when you finally make a high-stakes choice, you are steering with absolute clarity.

Our ability to think critically, to effectively address and solve ever-emerging and relevant problems; and to understand key methods and skills for problem-solving and decision-making

will enable us to effectively address the right problems, identify risks and make better decisions.

In this chapter, we look at the process of problem-solving and decision-making; by defining a problem, problem-solving, and decision and process of problem-solving, problem-solving skills, barriers to solving problems, and characteristics of good problem solvers.

Chapter Objective

By the end of this chapter, you will be able to:

-  Explain the meaning of the *problem*, *problem-solving* and of *decision*
-  Discuss the process of problem-solving
-  Explain the essential aspects of problem-solving mistakes
-  Apply problem-solving and decision-making skills
-  Discuss the challenges and barriers to problem-solving
-  Explain the characteristics of good problem solvers.

Definitions

Problem refers to an issue that is out of alignment and requires attending to, fixing, or correcting to enable desired outcomes to be achieved. We say one has a problem when he/she is faced with a pressing or demand issue but has no immediate solution to it. Problem-solving is therefore the process of finding solutions to difficult or complex issues that need solutions for the ease of our needs. (Namwambah, 2020)

Closely linked to problem-solving is decision making which refers to the mental (cognitive) processes of analyzing, evaluating, and synthesizing data as received and which culminates in the selection of a course of action among several

alternative scenarios. Every decision-making process produces a definite solution that characterizes our actions, opinions, and choice. (ibid)

The process of problem-solving and decision-making

Problem-solving is a process informed by various steps. These steps must be followed if we need to solve problems that often confront us. Any attempt to mangle up the process will lead to making a decision by indecision; meaning that we will always be in a vicious circle with problems and we will never attain a solution whatsoever.

Central to problem-solving process is the ability to recognize and define the problem. Problem solvers habitually realize when something has gone wrong or when attention is required; they often anticipate complications before they even exist and take precautionary measures to guard against the imminent destructive and inconvenient result. Noticing that something is amiss requires a keen sense of what is going on around you. For example, only when you don't know the consequences of poor leadership, can you be surprised when rebellions suddenly arise; and, without being aware of typical conduits used by corrupt officers, you won't be able to confront and stamp out corruption from your organization. The sooner you realize there is a problem, the faster you can respond to it.

The following steps are necessary for effective problem-solving process:

1. Recognition and Definition of the Problem

Why is a problem? A problem is a problem because there is a pressing issue, a need or a question but there is no obvious answer to it.

The first phase of problem-solving therefore involves *recognition and definition of the issue at stake*. Generally speaking, a typical process of problem-solving and decision-making begins with the recognition of a problem. It is commonly true, that many problems are never solved because they are not recognized soon enough or not recognized at all. For example, some freshmen fail in college life because they do not recognize soon enough that their study habits are inadequate or that they are in an unsuitable curriculum.

Once a problem has been recognized, it should be carefully defined. Failure to attain a clear definition of a problem will always result in obtaining unsuccessful solutions or you may end up solving “some” problem but not the one that you were trying to solve.

In many situations, defining the problem will be the most difficult phase in decision-making. But once you have correctly defined the problem, the rest will be relatively easy.

There are three rules that must be followed in defining the problem: First, *the definition should not be too general* - This is so because if the definition is too broad, the guidelines for a solution will be too broad, and the investigation may flounder. Large problems can be very real, but their solution usually require breaking them down into smaller, clearly defined segments in order to solve them one at a time; second, *the definition should not be too specific* - a definition of a problem is said to be too specific when it unnecessarily restricts alternative solutions. When the definition of the problem is too specific, it will always lead to temporary solutions because it will have ignored other significant aspects that led to its emergence and which might be critical to its solution; third, *the definition should not in itself constitute a “solution” to the problem* - Suppose that in each year, there is a problem of mass drop-out of Masters Students in the School of Law, Humanities and Social Sciences at Kenyatta university in Kenya, and the Dean

of School defines the problem as due to lack of scholarships and/or financial limitations on the part of students. The Dean's definition would in itself have committed an error of inclusion – engraining a “possible solution” *that more scholarships and financial grants be extended to masters' program students*. This would rule out other solutions for consideration and possibly skew the thinking and barricade the solution to the problem.

These rules are necessary to observe because quite often, there is temptation to quickly jump into figuring out solutions without understanding the nature and magnitude of the problem. If a problem is not well understood, the solution might not be effective, and valuable time and effort would have been unnecessarily wasted.

2. Establish Causal Factors

The second phase to problem solving entails *finding out what caused the problem/gathering information or conducting research*. The leading question here is: *what caused the problem?* Once you have identified and clearly defined the current problem, the next step is to dig a little deeper to find out the root cause or background of the problem. Some questions to ask at this stage include the following: When and where did the difficulty, obstacle or complication occur? Why did the problem happen? How did it happen? What led to the problem? How real or practical is the problem? Was it caused by one thing or many things? Was it accidental or intentionally caused? What information is missing? Where can you find more information? What could have prevented the problem? What is known about similar problems? What solutions have been tried before?

3. Problem Impact Analysis

Phase three of problem-solving and decision-making entails *analyzing the impact of the problem*. The principal question at this stage is: Who or what is affected by the problem? It is important that at this stage one makes efforts to determine how widespread the problem is and its devastating effects. Major guiding questions at this stage include: Is it affecting one person or many; and how is it affecting them? How long has the problem been going on? Are there any trends? Is this a re-occurring problem or a completely new one? What would happen if the problem is not resolved?

If the problem cuts across social divide or is affecting a multitude or an institution, talk to different people to get first-hand accounts of the impact of the problem, its possible source, and their views on how best to mitigate it. Establish if it is severe, mild or manageable.

4. Formation of Tentative Solutions

The fourth phase to problem-solving is *brainstorming and the formation of possible solutions*. The guide question to this phase is: *What are the potential solutions?* This phase calls for a reasonable and bias-free multifaceted critical approach. Identify as many possible solutions to the problem through brainstorming.

In a case where the problem affects many people who are also involved in your search for a solution, state the problem in agreeable terms then request everyone involved to independently write down their own individual possible solution which will, together with others be used to inform and form a solution. Thereafter, list down all the answers proposed and invite others to further build upon and refine the suggested solutions or you go further to propose and share other additional solutions that might not have been captured

by your respondents and share them out before reaching a definite solution.

For a brainstorming session to be successful, the problem needs to be clearly defined, enough time needs to be scheduled, participants should take time to think through the problem and generate solutions, and solutions should not be judged during the brainstorming session. If the problem is collective and impacting on many people or an institution, it is advisable to use a good facilitator to listen attentively to participants, encourage input by all and drive the discussion before you subject their opinions to the scrutiny of analytical reason.

5. Evaluation of Tentative Solutions

Phase five entails the *evaluation of alternatives/solutions*. The key question to this phase is: How do you select the best alternative/solution? Once a good number of options have been gathered, the next step is to go through the alternatives and narrow down the ones that are most viable. It is possible that at this stage, the top choice would be a merger between one or more other alternative choices. In the process of synchronizing alternatives, it's important to identify the advantages and disadvantages of each of the top choices. In addition, also take a step back and write down the desired results, when they should be achieved as well as how the results will be measured i.e., what is expected after the problem has been eliminated or handled- imagine how it would be like when the problem is solved; then finally, analyze how best the top choices would lead to the desired results for the entire affected population.

6. Decision Making

The sixth and last step in brainstorming is deciding the best solution among the top alternatives available, let's call it *choosing the best option or making the decision*. The critical leading

question here is: *Will this solution solve the problem?* In problem-solving and decision-making, this is one of the most difficult and overwhelming steps and could easily trigger hesitation because of fear of making the wrong decision. As a result of such fear, there is always a tendency for people to want to continue digging further in order to come up with more information or more alternatives. As a consequence, this leads to continued suffering as the problem will continue to hurt its victims.

Additionally, choosing an alternative could also entail making compromises, forcing some parties to make concessions for the benefit of all; there is a possibility that not everyone would be happy with the final solution. This is so because in one way or the other, the decision-making process has to come to an end at some point. Following your rational gut instinct and seeking advice from others can help in making decision agreeable across board. And if the heat generated by the problem is overwhelming, expectations are high, anxiety and tempers at their pick, it's advisable to take a break away from the scene of the problem, clear your head, relax and then make the decision with a clear mind and be able to easily explain as to why it's the best of all the alternatives. And where consensus is unforeseeable, then taking a poll would similarly be a simple way to determine the solution that should be implemented for bigger institutional problems.



Aspects of Problem-Solving Mistakes

Problems are real. To a good problem solver, there is no small or big problem. Problem is just problem and it need all the seriousness and mental input to handle. Being casual in handling problem has unbearable consequences. The following are some of examples of problem solving mistakes: i) refusing to admit or acknowledge that a problem exists; ii) looking for quick fixes; iii) thinking that there won't be any problems; iv) fixing symptoms instead of the root cause or real problem; .v) focusing on putting out small fires instead of addressing the big picture problem; vi) rushing to solve a problem before understanding it; vii) fearing to share out of the box ideas during brainstorming; viii) risk of group think during brainstorming or conforming to what everyone else is suggesting; ix) not having an open mind during brainstorming; poor facilitation and conditioning in brainstorming sessions; x) solving the wrong problem; xi)

looking for someone to blame or pointing fingers; xii) not listening or not seeking feedback or solutions from others.

Other problem solving mistakes include: a) thinking that you should have all the answers; b) solutions that are not clearly defined; c) lack of clear communication; d) assuming that people already know what to do; failing to give credit to staff who have fixed problems; e) fear of making the wrong decision; assuming contributions of others; f) wrong assumptions; g) getting scared or panicking when a problem arises; h) getting emotionally excited with tentative solutions; i) procrastinating to make a decision or choose among alternatives; j) refusing to acknowledge when a solution is not working; k) doing nothing when a problem arises; l) taking a long time before attending to a problem; m) believing that time will naturally fix the problem; and, n) not being flexible or adaptable when assumptions and conditions change.

Problem Solving Skills

There are various skills that can increase our likelihood to solving problems. These skills are enhanced by our ability to think critically and they include: i) *Decision making skills* – this skill is useful especially in choosing between alternatives, identifying the best solution and being able to explain why the chosen solution is the best one under the circumstances. ii) *Communication skills* -helps in letting others know that there is a problem and in outlining how the problem will be corrected. Effective communication skills is also instrumental in assigning responsibilities and explaining to others what they should be doing and, in letting others know that the problem solving process is on course or it has been resolved; iii) *Risk taking* -the ability to identify the pros and cons of an alternative and then arming oneself with enough knowledge to carry out the plan effectively and efficiently; iv) *Prioritization* - when faced with many problems in your study or at work, being able

to identify the most urgent and important problem to be addressed and fixed is a skill definitive of success and effective organization; v) *Flexibility* - conditions and situations change all the time therefore, willingness to re-analyze plans and assumptions and re-calibrate them as needed is essential.

Other helpful traits for effective problem solving consist of willingness to receive feedback, determination and perseverance to see things through, patience, connecting the dots or figuring out the relationship between things, tolerance for uncertainty and faith in reason that in the long run the best for the self and humanity is tenable in time.

Challenges and Barriers to effective Problem Solving

Our ability to solve problems varies from individual to individual. The reason why many individuals and/or institutions fail to attain their targets in growth depends on the ability of the institution's management and/or an individual's ingenuity to handle and address emerging problems. At the individual level, inability to handle and solve problems has led to many unconventional actions – suicide, stress, depression and mental breakdown, family breakdown, and other uncivil behaviors.

Reasons why most of us are unable to solve problems, include: passive behavior of ignoring or avoiding the problem; thinking that problem solving process takes too much time or effort; casual believe that the problem will fizzle out or solve itself; not having the authority to decide which solution should be implemented; procrastinating or inertia to resolve a problem because it could take a long time to figure out solutions especially for complex problems; thinking that the problem is more difficult than it really is; thinking that you have to figure it all out on your own; lack of self-confidence in dealing with

and solving problems; naivety as not to ask for help; unwilling to take other people's opinions; fear that implementation could be difficult and frustrating; and fear of failure.

Other challenges and barriers include: resource constraints; insufficient resources such as manpower and finances to properly address large scale problems; too many problems at the same time or difficulty in prioritizing problems; resistance to change or new ways of doing things; not following through on solutions after the brainstorming stage; mental fatigue and giving up too soon when it takes long to solve a problem; inability to measuring progress; abrupt change in external factors causing the need to rethink or revise solutions; inexperience in handling and solving problems; and, not wanting to deal with uncertainty.

Problem Solving Assessment Criteria

1. What is the real problem? (Do not confuse the problem with its symptoms).
2. What is our goal? (What does a successful fix look like?)
3. Who is affected? (List all the stakeholders who have a say or interest in the outcome).
4. What is the root cause? (Keep asking "Why?" until you find the source of the issue).
5. What are all our options? (Brainstorm to list every possible solution, even the wild ones).
6. What are the pros and cons? (List the costs, risks, and benefits of each choice).
7. Which criteria matter most? (Rank options by what is fastest, cheapest, or most ethical).
8. What is the best choice? (Pick the balanced option that helps the most and hurts the least).

9. How do we do it? (Make a clear plan with steps and deadlines).
10. Did the fix work? (Check the results and make changes if needed).

Self-Assessment Questions

1. Imagine you own a small shop and your sales are dropping.
 - *Problem:* Customers think your items are too expensive.
 - i. *Decision:* Do you lower prices, add better features, or offer discounts? “Effective problem solvers and decision makers are critical thinkers.” Discuss.
2. Tell us of a memorable problem that confronted you, you managed to solve it, but until now you are not able to understand how you did it.
3. If you were to exit this world in the next 24 hours, what FIVE things would you do today?
4. List five factors you consider as barriers to effective problem solving and decision-making at your workplace.
5. Explain one popular, yet irrational belief that you have ever defended, but it still makes you to feeling guilty to-date. Give reasons as to why you defended it.

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CHAPTER TEN

APPEARANCE AND REALITY

1. Examine the picture below, list, and discuss your observations.
2. Which direction is the image in the picture facing? Is it human or animal?
3. What age is the image in the picture?



Puzzle

The Three Bowls of Water (Locke's Puzzle)

- *The Setup:* Line up three bowls of water. Left bowl: ice-cold. Middle bowl: room temperature. Right bowl: hot.
- *The Action:* Place your left hand in the cold water and your right hand in the hot water for one minute. Then, put both hands into the middle room-temperature bowl at the same time.
 - *The Appearance:* The middle bowl feels hot to your left hand, but cold to your right hand.
 - *The Reality:* The water in the middle bowl is exactly one constant temperature.
 - ✓ *The Puzzle:* An object cannot be hot and cold at the same exact time. Since the heat changes based entirely on your perception, is "warmth" a real property of the water, or does it only exist in your mind?

Introduction

Our senses often trick us. What we see or feel is not always the truth. This chapter explores how to tell the difference between mere *appearance* (what our brain senses) and hard *reality* (what is actually true). Mastering this skill is the foundation of smart, rational decision making.

Think of your brain like a virtual reality headset. When you look at an object, your eyes capture light and send signals to your brain. This creates a mental picture. Sometimes, that picture is wrong.

Consider a simple table. From across the room, it may look dark brown. If you step closer and turn on a bright light, it might look reddish-brown. If you look at it under a microscope,

you will see empty space and moving atoms. The table itself did not change. Only your viewpoint and tools of observation changed.

This happens in daily life all the time. If you rely on *appearances* (what you see on the surface), you make poor choices. If you use *critical thinking* (investigating the facts), you uncover the *reality*.

In relation to application, distinguishing appearance and reality cut across all domains of life. Critical thinker looks past the "*appearance*" to audit events and situations for "*reality*". Failing to do so leads to investing in mental futility and unproductiveness.

Examples of the relevance of appearance and reality abounds across spectrums of life. E.g.

a) In Technology: The Halo of AI-Driven Objectivity

- i. *The Appearance:* A company implements a state-of-the-art machine learning algorithm to screen job applicants. Because a computer program handles the selection process, managers assume the hiring decisions are completely neutral, objective, and free from human prejudice.
- ii. *The Reality:* The algorithm was trained on historical data from the company's past ten years of hiring. Because human managers in those previous years harbored implicit biases, the data itself is biased. The technology simply automates and hides those existing human prejudices under a glossy layer of code.
- iii. *The Critical Choice:* Relying on the appearance of technological neutrality prevents organizations from auditing their tools. Decision-makers must realize

that algorithms are only as objective as the data fed into them.

b) In Everyday Life: The "Expert" Recommendation

- i. *The Appearance:* You are shopping for a new mattress or a reliable mechanic. You find a local option online with a flawless 4-9 - star rating based on over a thousand reviews. It appears to be an absolute guarantee of a great experience.
- ii. *The Reality:* The business uses an automated software system that texts customers a discount coupon only if they select a 5-star rating on an initial, private feedback form. Negative experiences are routed to a private customer service inbox and never make it to public review platforms.
- iii. *The Critical Choice:* The uncritical thinker buys immediately based on the stellar rating. The critical thinker recognizes how easily digital validation can be manufactured, prompting them to look for independent forums, verified complaints, or unfiltered feedback before spending their money.

This chapter teaches you how to pause. It shows you how to test your assumptions. You will learn to ask three key questions when making a decisions.

- i. what do I see?
- ii. what are the hidden facts?
- iii. does the evidence match my belief?

By answering these questions, you stop trusting every thought that pops into your head. You start making clear, evidence-based choices. You learn to distinguish appearance and reality.

Bertrand Russell's article on appearance and reality explains the problem of, and the need to distinguish appearance and

reality. His refutation of reliability on senses as a source of knowledge, and the need to comprehend knowledge via the combination of sense datum and sensation underscores the need for this distinction.

Chapter Objectives

By the end of this chapter, you will be able to:

- a) Explain what appearance and reality is
- b) Discuss the problem of appearance
- c) Explicate the importance of distinguishing appearance and reality in life
- d) Distinguish appearance and reality
- e) Apply the knowledge gained to daily life

Definitions

- i. *Appearance*: - that which we perceive, our sensation of the empirical objects, that which is experienced by our senses.
- ii. *Reality*: - actuality of being, the thing in itself, the essence of reality, or that which is comprehended by the mind (Namwambah, 2020).

The Problem of Appearance

In life, the mind presents us with only two possibilities for knowing: either we mistake appearances for reality, or our mind is capacitated to comprehend reality or things in themselves. Often, appearance distorts our capacity to know things in themselves, or, at least, a thing in itself. This is caused by the fact that appearance is based on senses which are most of the time deceptive. Given the deceptiveness of the senses, it's prudent not to trust where one has been once deceived. And this, coupled with the fact that human mind has the tendency

of replicating the objects of nature makes the possibility of generating mistaken identities a common mental phenomenon, especially when triggered in a mind which its conscience is not fully nurtured to maturity. Knowledge is dynamic and it changes with new occurrences, causing a myriad of challenges, confusion and to some level impeding the actualization of what reality consists of; propagandists, advertisers, conmen, crooked lawyers, demagogues, and politicians' prey on this deficiency by making appearance reality.

Importance of Distinguishing Appearance and Reality

Distinguishing Appearance and Reality helps us to understand ourselves, and the world much better, and to be more knowledgeable about the essence and the nature of things around us. It is instrumental to a well-defined form of life; helps in the avoidance of errors characteristic of mistaken identities, and gives meaning and relevance to the rational nature of the human being and the worth of life (Namwambah, 2012).

Summary of Bertrand Russell's Appearance and Reality

Russell begins by asking his reader to consider what knowledge if any, exists that cannot be doubted: "*is there any knowledge that is so certain that no reasonable man could doubt it?*" His purpose is to produce the realization that radical doubt soon brings even the most self-evident assumptions in our everyday lives under reconsideration. In this beginning chapter of his masterpiece - *The problem of Philosophy*, Russell describes a scene: "I am now sitting in a chair, at a table of a certain shape, on which I see sheets of paper with writing or print." All of these "facts" are easily called into question.

Russell engages in his discussion to find out how knowledge of such things is possible at all.

In order to lay bare, the ordinary assumptions at issue, Russell concentrates on one example, and the table before him. Walking around the table, he discerns different colors from different points of view: in places seeming to reflect more light, a brighter shade of brown appears. In reality we assume that there is only one color of the table, yet the appearance of many colors contradicts our assumption. The color seems to be a relation depending on the observer, his point of view, and conditions like "the way the light falls on the table."

Since it seems clear that no two people could share one identical point of view, Russell registers a doubt as to whether one real color of the table even exists. Russell continues his investigation of color by reasoning that in ordinary language usage, when we refer to the color of an object; we actually refer to something perceived from the usual perspective of observer. However, he continues, there is no reason to assume that the usual perspective should be considered real and other perspectives, under other conditions, be considered less real. Russell does not think that the most usual brown should be considered the brown of the table, to the exclusion of other apparent browns.

As with color, the existence of just one texture of the table is ambiguous, because "*to the naked eye, the table appears to be smooth and hard. Aided by a microscope, the grain of the wood enlarges to appear as a mountainous range of different roughnesses and textures.*" Russell argues that one cannot consider one texture more real than another. The shape of the table, a rectangle, also changes immediately shape as one walks around it. The sensation of pressure depends on the force we exert on the table, as does the production of sound when we rap on the wood. Thus, the sensations of touch and sound, like sight, are not fixed by a reality; they are apparent possibilities and each

depends on the conditions of observation. These observations lead to Russell's first distinction between appearance and reality, *"between what things seem to be and what they are."* Russell proposes that we are not struck with these discontinuities in our daily life because in practical experience, one learns "to construct the 'real' shape from the apparent shape." The real shape exists in so much as we infer it from our senses.

He writes, *"the real table, if there is one, is not immediately known to us at all, but must be an inference from what is immediately known."* The reality of the table, in the sense that there is a table, depends on a process of inference based on a knowable part of reality; the part Russell calls *"sense-data"*. Sense-data are not the same as our sensations. Sense-data are "the things that are immediately known to us in sensation." Variations in our sensations indicate that sensation does not directly reveal the reality of an object like the table. Instead, it is probable that our sensations are "signs of some property which perhaps causes all the sensations." To fully grasp Russell's distinction, consider sensation as an act belonging to the realm of experience and consider the object of that direct experience to be sense-data. The object, a patch of red, produces the sensation or experience of redness. Since we have seen that certain knowledge of the table's reality is not available through the senses, Russell asks how we can know that a real table exists at all and what kind of certainty we can have. It remains clear that we do have an experience of awareness where we recognize colors and other properties as part of the table. While we may doubt the existence of a real table, it is harder to doubt our awareness of our own sensations. Therefore, we can regard our confidence in the sense-data of our everyday experiences as safe.

The next problem that arises is one of understanding how the real table, if there is one, relates to our sense-data. Russell states that it is impossible to understand, in this stage of the

discussion, if or how the relation would work. The questions we must first approach are: "is there a real table at all" and "if so, what sort of object can it be?" This relation, between sense-data and the real table, is a substantial concern for Russell's inquiry. Returning to his table, he admits that when we have been saying the "real table," we have meant the "physical object." Physical objects may be understood as "matter." The questions at issue become: "is there any such thing as matter" and "if so, what is its nature?"

In line with the thoughts of British philosopher Bishop Berkeley (1685–1753) who brought out the position that the immediate objects, which we call physical objects, do not exist independently of us, Russell considers one possible answer to the first question. He asserts that they depend on our minds. In his view, matter does not exist. What we call physical objects are really just ideas, mental products that we project onto the world. The existence of objects that appear to correspond to our sensations is dubious on this view. Russell's contemplation of the table shares Berkeley's spirit of enquiry inasmuch as he agrees with Berkeley that "*if there are any things that exist independently of us they cannot be the immediate objects of our sensations.*" However, Berkeley's arguments offer a more extreme philosophical view, belief in the impossibility of a reality independent of man.

At this point, Russell integrates an important distinction between meanings packed in the word "matter." A common conception of matter is something opposed to mind, something that takes up space in the physical world and is absolutely incapable of consciousness. Berkeley denies this sense of matter. He does not deny matter in the sense of things like sense-data, which signify an existence of something independent of ourselves. According to Berkeley, this independence is possible; he believes that there is something that persists when we close our eyes or walk out of a room.

However, he believes that this something depends for its existence on a mind that it may be independent but must be mental. It must not be "independent of seeing altogether, though it must be independent of our seeing." Thus, Berkeley regards the reality of the table and other such physical objects as ideas in the mind of God. Things can exist independently as long as they are not things essentially unknowable.

Berkeley's view is just one example of idealism, the view that there is "nothing acceptable as real except minds and their ideas." Argument supporting this view maintains that "whatever can be thought of is an idea in the mind of the person thinking it; therefore, nothing can be thought of except ideas in minds; therefore, anything else is inconceivable, and what is inconceivable cannot exist." Other philosophers held that the physical objects of the world merely depend on being observed by some entity, not necessarily God. Leibniz (1646–1716) thought that physical objects existed because they were observed by some conceptually collective mind, like the universe itself. These philosophers denied matter "as opposed to mind."

Russell also accepts the version of matter that they do not deny. By reiterating his initial question - "Is there a real table at all?" Russell points out his agreement with Berkeley and Leibniz in believing that there is a real table. However, Russell disagrees with the idealists over the question of the nature of the real table, the latter question "what sort of object can it be?" Russell continues that "almost all philosophers agree that there is a real table" and that our sense-data are signs of something that exists independent of us, something that may be said to cause the "sense-data whenever we are in a suitable relation to the real table." Before going on to an analysis of matter, Russell recognizes the positive agreement to his first question as conspicuously important and plans, in the next chapter, to investigate the reasons why anyone should believe

thus. Russell concludes by reemphasizing that what we gather from our senses directly in terms of "appearance" are but signs from which we infer "reality."

Russell's Appearance and Reality

Is there any knowledge in the world which is so certain that no reasonable man could doubt it? This question, which at first sight might not seem difficult, is really one of the most difficult that can be asked. When we have realized the obstacles in the way of a straightforward and confident answer, we shall be well launched on the study of philosophy - for philosophy is merely the attempt to answer such ultimate questions, not carelessly and dogmatically, as we do in ordinary life and even in the sciences, but critically after exploring all that makes such questions puzzling, and after realizing all the vagueness and confusion that underlie our ordinary ideas.

In daily life, we assume as certain many things which, on a closer scrutiny, are found to be so full of apparent contradictions that only a great amount of thought enables us to know what it is that we really may believe. In the search for certainty, it is natural to begin with our present experiences, and in some sense; no doubt, knowledge is to be derived from them. But any statement as to what it is that our immediate experiences make us know is very likely to be wrong. It seems to me that I am now sitting in a chair, at a table of a certain shape, on which I see sheets of paper with writing or print. By turning my head, I see out of the window buildings and clouds and the sun. I believe that the sun is about ninety-three million miles from the earth; that it is a hot globe many times bigger than the earth; that, owing to the earth's rotation, it rises every morning, and will continue to do so for an indefinite time in the future. I believe that, if any other normal person comes into my room, he will see the same chairs and tables and books and papers as I see, and that the table which I see is the same as the

table which I feel pressing against my arm. All this seems to be so evident as to be hardly worth stating, except in answer to a man who doubts whether I know anything. Yet all this may be reasonably doubted, and all of it requires much careful discussion before we can be sure that we have stated it in a form that is wholly true.

To make our difficulties plain, let us concentrate attention on the table. To the eye it is oblong, brown and shiny, to the touch it is smooth and cool and hard; when I tap it, it gives out a wooden sound. Anyone else who sees and feels and hears the table will agree with this description, so that it might seem as if no difficulty would arise; but as soon as we try to be more precise our troubles begin. Although I believe that the table is 'really' of the same color all over, the parts that reflect the light look much brighter than the other parts, and some parts look white because of reflected light. I know that, if I move, the parts that reflect the light will be different, so that the apparent distribution of colors on the table will change. It follows that if several people are looking at the table at the same moment, no two of them will see exactly the same distribution of colors, because no two can see it from exactly the same point of view, and any change in the point of view makes some change in the way the light is reflected.

For most practical purposes these differences are unimportant, but to the painter they are all-important: the painter has to unlearn the habit of thinking that things seem to have the color which common sense says they 'really' have, and to learn the habit of seeing things as they appear. Here we have already the beginning of one of the distinctions that cause most trouble in philosophy — the distinction between 'appearance' and 'reality', between what things seem to be and what they are. The painter wants to know what things seem to be, the practical man and the philosopher want to know what they are; but the philosopher's wish to know this is stronger than the practical

man's, and is more troubled by knowledge as to the difficulties of answering the question.

To return to the table, it is evident from what we have found, that there is no color which preeminently appears to be *the* colour of the table, or even of any one particular part of the table—it appears to be of different colors from different points of view, and there is no reason for regarding some of these as more really its color than others. And we know that even from a given point of view the colour will seem different by artificial light, or to a color-blind man, or to a man wearing blue spectacles, while in the dark there will be no color at all, though to touch and hearing the table will be unchanged. This colour is not something which is inherent in the table, but something depending upon the table and the spectator and the way the light falls on the table. When, in ordinary life, we speak of *the* color of the table, we only mean the sort of color which it will seem to have to a normal spectator from an ordinary point of view under usual conditions of light. But the other colors which appear under other conditions have just as good a right to be considered real; and therefore, to avoid favoritism, we are compelled to deny that, in itself, the table has any one particular color.

Self-Assessment Questions

1. Discuss how our understanding of the universe is enhanced by distinguishing Appearance from Reality.
2. Using relevant examples demonstrate the extent to which conmen, politicians, lawyers, advertisers, street/rogue preachers, and propagandists take advantage of appearance as reality. “
3. To have a better understanding of the world, we must distinguish between Appearance and Reality” Discuss.
4. “Senses are deceptive and it is only by use of reason that we can claim knowledge” Discuss this statement

in relation to Bertrand Russell's Appearance and Reality.

5. By ways of examples demonstrate the problem of Appearance and Reality
6. Show why a critical thinker ought to distinguish appearance and reality.
7. Discuss the importance of a university student distinguishing appearance and reality.
8. How can one apply Russell's thought on "*Appearance and Reality*" to everyday life in Kenya today?
9. Discuss how our understanding of the universe is enhanced by distinguishing appearance and reality.

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CHAPTER ELEVEN

EDUCATION AND HUMAN DEVELOPMENT

Puzzle

The Kenya government faces a severe public health crisis due to an overpopulation of venomous cobras in a major city. To solve the issue, the governor implements a financial incentive: the government will pay a cash bounty to any citizen who brings in a dead cobra.

- *The Result:* Initially, cobra sightings drop. However, after a few months, the number of dead cobras being turned in for cash increases exponentially, yet the actual wild cobra population in the city's streets remains completely unchanged.
- *The Critical Thinking Challenge*

Analyze how individuals dynamically gaming a rigid, metric-driven system will inevitably break the policy's intended outcome (Goodhart's Law)

Introduction

The role of education in enhancing criticality, self-reflection, and personal development is uncontestable. Many seasoned writers have underscored the importance of education not only for human understanding but also in the entire paradigm of skill development. Bertrand Russell for example developed a rich conception of education, involving a complex set of skills, dispositions and attitudes, which together delineate a virtue that has both intellectual and moral aspects. His views on

Critical thinking, education for thinking and self-reflection are of enormous importance in our understanding of the nature of educational aims for human development.

This chapter introduces the learner to the role of education in inculcating skills, dispositions, and attitudes requisite for critical thinking, self-reflection, rational judgments and human mental maturation. It covers such domains as the definition of education, importance of education, skills, attitudes and dispositions of education in the critical faculty.

Chapter Objectives

By the end of this chapter, you should be able to:

- a) Discuss the main aspects of education.
- b) Explain the relevance of skills, dispositions, and attitudes of education in the critical faculty to the development of reflective and critical thinking.
- c) Apply the skills, dispositions, and attitudes of education to the practical world.
- d) Appreciate the role of education in the critical faculty in the development of rational judgments in life.

Definition of Education

Education begins as a collaborative transmission of shared knowledge, skills, and lived experiences, serving to deepen the understanding of oneself, the environment, and the broader worldview. This initial phase goes beyond mere instruction; it is a vital process of personal growth that actively nurtures human intellect and refines the capacity for rational judgment. Through this continuous engagement with the world, the individual translates raw information into an existential wisdom that clarifies their position within the human experience.

Ultimately, this developmental journey culminates in an optimized and resilient state of mind, capable of maintaining absolute clarity regardless of external circumstances. By sharpening intellectual abilities, education empowers the individual to perceive reality accurately, think without confusion, and act with deliberate efficacy. It is the ultimate vehicle for human autonomy, transforming the inner landscape so that one can purposefully realize self-selected goals and higher aspirations.

Role of Education

Education is the profound alchemy through which the human mind awakens from the slumber of ignorance and rigid dogma into the lucid light of rationality and deep self-understanding. It serves as a vital lever for emancipation, stripping away the blinding layers of self-deception, and misconception to reveal the authentic core of the person. By shifting the soul away from the dull echo chamber of mass-thinking and narrow isolation, genuine learning forges true autonomy and distinct individuality. In this inner crucible, education becomes the ultimate instrument of self-actualization and continuous reinvention, allowing the individual to author their own destiny with clarity and purpose.

Beyond the inner landscape, education acts as the great harmonizing bridge that seamlessly integrates the individual with their deepest self, the natural world, and the broader tapestry of human society. It is the dynamic catalyst that reengineers our collective existence, driving continuous progress and positive change for both the solitary seeker and the global community. As a foundational force for societal development and human growth, it reshapes the boundaries of what is possible, turning the abstract potential of mankind into a shared, enduring reality. Education is thus the very heartbeat of civilization's continuous rebirth.

Additionally, education gives the ability to think with reason, pursue dreams and aspirations in life and live a respectable life. Education gives us a definite path to follow, to lead our lives by principles, and gives us freedom of expression. It frees our minds from prejudices and motivates it to think logically. It is essential for the overall development of the human mind and brain.

The benefits of education are numerous, below are a few.

- a. **Overcome social prejudices:** This is probably the most important benefit of education. Social evils and beliefs can really hold back the growth and development of society, and a country. So, to overcome this and understand and explain things with logic and reasoning, educated minds are very essential. One enlightened mind can lit up a thousand more. Education, used in the proper way also helps to reduce crime and restore law and order.
- b. **Nurture talent and pursue dreams:** Every human has dreams and aspirations. So, education is a medium to pursue and fulfill them. It increases the knowledge of a person in different fields of study. It helps to determine a path to follow and express your talent to the world.
- c. **Enhance creativity and imagination:** Education opens up new ways and ideas to ponder. It cultivates a young mind to think out of the box and explore different things in life. Education also helps to know about things and stay healthy, fit and follow a productive lifestyle.
- d. **Contribute to a bigger growth:** Education is a way of academic excellence and paves the path for the economic growth of the country. Research and development in sectors like technology, medicine, and others, breakthrough innovation, and progressive

mindset – all of these are fruits of education, which takes a nation and its people forward. Educated people contribute towards advancement in every sector.

- e. **Knowledge, wisdom, and exposure:** Education opens up every channel of knowledge and wisdom. It exposes us to a whole new world of information, invent new things, and know how we can make our surroundings a better place to live and put our lives to greater, and better use.

As Nelson Mandela said, “*Education is the most powerful weapon, which you can use to change the world.*” When the world is busy getting equipped with deadly weapons and machinery, it is very important to understand that education is the real asset that can develop an individual as well as a nation. People and leaders across the world should join hands to make education, not only a fundamental right for all but also the guiding light, which can take mankind ahead through any phase of darkness.

Essential Skills of Education in the Critical Faculty

There is a wide range of skills, dispositions, and attitudes which together characterize a virtue that has both intellectual and moral aspects, and which serves to prevent the emergence of numerous vices, including dogmatism and prejudice. One central purpose of education is to prepare students to be able to form "a reasonable judgement on controversial questions in regard to which they are likely to have to act". In addition to having access to impartial supplies of knowledge, education needs to offer "training in judicial habits of thought. Beyond access to such knowledge, students need to develop certain *skills* if the knowledge acquired is not to produce individuals who passively accept the teacher's wisdom or the creed which

is dominant in their own society; let's talk of intelligence, contrasting it with information alone; to indicate the whole set of critical abilities such education is supposed to impact.

Such critical skills grounded in knowledge include:

- i. *the ability to form an opinion for oneself*, which involves being able to recognize what is intended to mislead, being capable of listening to eloquence without being carried away, and becoming adept at asking and determining if there is any reason to think that our beliefs are true;
- ii. *the ability to find an impartial solution*, which involves learning to recognize and control our own biases, coming to view our own beliefs with the same detachment with which we view the beliefs of others, judging issues on their merits, trying to ascertain the relevant facts, and the power of weighing arguments;
- iii. *the ability to identify and question assumptions*, which involves learning not to be credulous, applying constructive doubt in order to test unexamined beliefs, and resisting the notion that some authority, a great philosopher perhaps, has captured the whole truth.

In nurturing these skills, we need to remember that our most unquestioned convictions *may* be as mistaken as those of we criticise or our opponents. Our account of critical skills should to great deal covers grounds set out in our discussion on critical thinking tools of analysis.

There are numerous insights in this effort which have a familiar ring to those acquainted with the recent Critical thinking literature:

- a. First is our emphasis on *judgement*, suggesting the point that critical skills cannot be reduced to a mere formula to be routinely applied. Critical judgement means that one has to *weigh* evidence and arguments,

approximate truth must be *estimated*, with the result that skill demands wisdom.

- b. Second is that critical thinking requires being critical *about our own attempts at criticism*. For example, we need to recognise that refutations are rarely final; they are usually a prelude to further refinements. We must also be cautious to reject the notion that critical thinking texts restrict criticism to "approved" topics and that punishment awaits those who wander into unconventional fields of criticism. Critical thinking must include critical reflection on what passes for critical thinking.
- c. Third, Critical thinking is not essentially a negative enterprise; our emphasis on *constructive* doubt, and warning against practices that lead to children becoming *destructively* critical is positive scepticism. It is important that the kind of criticism aimed at is not just that which seeks to reject, but that which considers apparent knowledge on its merits, retaining whatever survives critical scrutiny.

Dispositions of Education in the Critical Faculty

The mere possession of critical skills is not sufficient to make one a critical thinker or fully developed individual. We must draw our attention to certain *dispositions* which will guarantee that the relevant skills are actually exercised. Many names can be used to refer to these dispositions- *habits* or the notion of *practice* to suggest the translation of skills into actual behaviour. In this respect, education can be understood as the formation, by means of instruction, of certain mental habits [and a certain outlook on life and the world]. Of great importance among these dispositions are:

- i. *the habit of impartial inquiry*, which is necessary if one-sided opinions are not to be taken at face value, and if people are to arrive at conclusions that do not depend solely on the time and place of their education;
- ii. *the habit of weighing evidence*, coupled with the practice of not giving full assent to propositions which there is no reason to believe true;
- iii. *the habit of attempting to see things truly*, which contrasts with the practice of merely collecting whatever reinforces existing prejudice; and
- iv. *the habit of living from one's own centre*, a kind of self-direction, certain independence in the will. Such habits, of course, have to be exercised intelligently. This can however be problematic and it's the duty of Critical thinking to address it. One becomes a victim of habit if the habitual beliefs of one's own age constitute a prison of prejudice. Hence the need for a *critical* habit of mind.

Because they are not simply automatic responses in which one has been drilled, such intellectual habits in effect reflect a person's willingness; call it one's *readiness*, to act and respond in various ways. And examples here could include:

- i. *a readiness to admit new evidence against previous beliefs*, which involves an open-minded acceptance (avoiding credulity) of whatever a critical examination has revealed;
- ii. *a readiness to discard hypotheses that have proved inadequate*, where the test is whether or not one is prepared in fact to abandon beliefs that once seemed promising; and
- iii. *a readiness to adapt oneself to the facts of the world*, as opposed to merely going along with whatever happens to be in the ascendant, which might be evil;

to be ready to act, or react in this way suggests both awareness that the habits in question are appropriate and a principled commitment to their execution is justifiable.

These dispositions have in common the virtue of *truthfulness*, which entails the wish to find out and try to be right in matters of belief.

Traits of Education in the Critical Faculty

Beyond the skills and dispositions outlined above, a certain set of *attitudes* characterize the outlook of a critical person. By critical attitude, we mean a temper of mind central to a certain stance with respect to knowledge and opinion; it involves:

- i. *a realization of human fallibility*, a sense of the uncertainty of many things commonly regarded as indubitable, bringing with it humility;
- ii. *an open-minded outlook* with respect to our beliefs, an "inward readiness" to give weight to the other side, where every question is regarded as open and where it is recognized that what passes for knowledge is sure to require correction;
- iii. *a refusal to think that our own desires and wishes provide a key to understanding the world*, recognizing that what we should like has no bearing whatever on what is;
- iv. *being tentative, without falling into a lazy scepticism* (or dogmatic doubt), but holding one's beliefs with the degree of conviction warranted by the evidence. This entails having a strong desire to know combined with great caution in believing that one knows must meet the test of certainty and proof. It entails assurance that open-mindedness does not become regenerate into being mindless.

A number of phrases capture the ideal of critical thinking as a component of an educated individual, including the philosophic spirit and a philosophical habit of mind, the liberal outlook (or even the liberal creed), and the rational temper. All of these ideas are closely intertwined. The critical outlook, therefore, reflects an epistemological and ethical perspective that emphasizes:

- i. *how* beliefs are held i.e., not dogmatically,
- ii. *the doubtfulness* of all beliefs,
- iii. *the belief* that knowledge is difficult but not impossible,
- iv. *freedom* of opinion,
- v. *truthfulness*, and
- vi. *tolerance*.

Self-Assessment Questions

1. Education that transforms is the only education of which it can be truly said that it makes good citizens. Discuss
2. With reference to education in the critical faculty, explain the relevance of any two of the following in the duties of a military officer:
 - a) Essential Skills for thinking
 - b) Dispositions for Critical Thought
 - c) Traits of a Critical Mind
 - d) Self-examination
3. “I am not what I think, but what I think I am” to what extent does this statement enhance the autonomy and professional etiquette of a military officer?
4. “Of the three persons in me, namely, that whom people think I am, that whom I think I am and the unknown me, there lies the really me.” Espouse on this statement.

5. Who am I? Discuss
6. "I am who I am" to what extent does this statement define the self of a military officer?

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CHAPTER TWELVE

THINKING FOR ONESELF – RENE DESCARTES' MODEL

The puzzle: The Matrix Puzzle (The Demon Scenario)

- *The Setup:* Imagine a deceptively powerful, malicious entity has dedicated all its energy to tricking you. Everything you see, touch, hear, and remember is a simulated illusion fed directly into your mind.
- *The Puzzle:* Look around your room. Strip away your sight, touch, and memories. What is the ***one single truth*** this demon could never trick you into believing, because the very act of being tricked proves it?
- ✓ *The Cartesian Lesson:* This is Descartes' famous *Cogito, ergo sum* (I think, therefore I am). Even if everything else is a fake simulation, you cannot doubt your own existence. To doubt, you must think, and to think, you must exist.

Introduction

This chapter is intended to introduce you to Rene Descartes' contribution to the subject of critical thinking and problem solving. René Descartes fundamentally transformed the foundation of critical thinking by introducing systematic doubt as the ultimate tool for uncovering truth. Rather than accepting traditional wisdom, assumptions, or sensory information at face value, Descartes argued that a disciplined thinker must actively question everything until reaching an undeniable, logical foundation.

Through this practice of radical scepticism, he sought to clear away intellectual clutter; in the modern era, this mirrors a researcher completely disregarding unverified internet rumours to focus solely on raw data. By famously concluding "Cogito, ergo sum" ("I think, therefore I am"), he established that rigorous self-awareness and rational thought - rather than external authority - are the true bedrock of all knowledge. To operationalize this mind-set, Descartes developed a structured, four-step framework for problem-solving. First, a thinker must accept only clear truths, much like an investigator refusing to make assumptions before evidence is verified. Second, they must break complex problems into smaller parts, similar to a programmer isolating individual lines of buggy code. Third, they should order thoughts from simplest to most complex, akin to a mechanic fixing a car's basic electrical wiring before tackling its advanced computer systems. Finally, the thinker must thoroughly review final conclusions, just as an accountant audits a financial spreadsheet to ensure no errors were missed. Ultimately, his greatest contribution was shifting the goal of critical thinking from simply accumulating information to systematically auditing how we verify what we know.

Chapter objectives

By the end of this chapter, you should be able to:

- a) Discuss the life of René Descartes
- b) Explain the Cartesian Methodic Doubt
- c) Distinguish between pure scepticism and the systemic Methodic Doubt of René Descartes
- d) Discuss the significance of Descartes dreams
- e) Explain the relevance of *cogito ergo sum* to critical and creative thinking

René Descartes

Rene Descartes was born in 1596 in the village of Touraine which is today called La Haye-Descartes, France. His mother died when he was only a year old, leaving him with “a dry cough and a pale complexion”. (Kenny 1987). He was a sickly child, expected to die young. When he went to school, he was dispensed from early morning exercises and awarded a private room, where he acquired a lifelong habit of meditating in bed. From his eleventh to his nineteenth year, Descartes studied classics and philosophy at the newly founded Jesuit college of La Flèche. (Gaukroger, 1995). He always recalled with respect the talents and devotion of his teachers, but he regarded their scholastic doctrine at first with suspicion and later with contempt. Among all his lessons, only mathematics really delighted him “on account of the certainty and clarity of its reasoning.” (Dicker, 1993).

In 1616, having taken a degree in law at Poitiers, Descartes abandoned his studies in favour of “the great book of the world.”- Philosophy (Kenny 1987). At the age of twenty-two, he enrolled as an unpaid volunteer in the army of the Dutch Prince Maurice of Orange. While in Holland he discussed mathematics, physics, and logic with the savant Isaac Beckman, for whom he wrote a brief treatise on music. In 1619, Descartes transferred to the army of the Duke of Bavaria, who was warring against the Elector Frederick, son-in-law of King James I. (Ibid).

During this winter Descartes acquired a conviction of his task as a philosopher. He spent November 10, 1619, beside a stove, engrossed in the meditations that he records in the second part of the *Discourse on Method*. He conceived the idea of undertaking, single-handedly; a reform of human learning that would display all disciplines as branches of a single wonderful science. When he went to sleep, full of ardour for his project,

he had three dreams that he regarded as prophetic signs of divine vocation and an insight in philosophical inquiry (Ibid).

René Descartes conviction to abandon all other studies in preference for philosophy was informed by his observation that all he had acquired in terms of knowledge was subject to doubt since those who impacted it on him had certain vested interest in the nature and kind of person they intended to produce. He, therefore, opts to unpack and re-examine all the things he had taken for granted as constituting knowledge before he can accept them as certain and beyond doubt. The process of his approach is what is today known as the Cartesian Method.

The Three Dreams

The modern world, dominated by the currents of rationality, began on November 10, 1619, with a revelation and a nightmare. On that day, at Neubourg, in Saxe-Wurtemberg, on the banks of the Danube, it is a bitterly cold evening. Freezing rain, driven by a violent wind, smashes against the window panes. Trees are torn up, draughts rush down chimneys, and swinging metal signs creak loudly.

Inside an over-heated bedroom, curled up in an armchair at a table, next to a big, earthenware stove, is a young man of twenty-three. Oblivious to the weather outside, he is reading by the bright light of a candelabrum.

The young man does not come from Neubourg. He is a soldier of the Duke of Bavaria, whose armies have just taken up their winter quarters. Like his army colleagues, he is lodged with a town inhabitant and is living a gentle, comfortable life while waiting to leave, in spring, to fight the Protestant troops of the Palatine Elector Frederic V.

The young soldier rarely leaves the house where he is billeted. Tonight, he is reading a treatise on music. But, perhaps due to the excessive heat of the stove, he keeps

nodding off. So, he puts away the book, undresses, blows out the candles, and goes to bed. And, in spite of the tempest which continues to rattle the house, blowing away weather vanes and whistling through the roof, the young soldier quickly goes to sleep.

He immediately has a strange dream: he is walking in an unknown street when suddenly ghosts appear in front of him. Terrified, he wants to flee, but he feels a great weakness on his right side, and he is obliged to lean on his left to be able to advance. Ashamed of walking in this grotesque position, he makes an immense effort to stand upright, but an impetuous wind suddenly makes him spin three or four times on his left foot, like a top.

Then, he stops spinning and forces himself to continue to advance. But his body's position makes walking difficult, and he thinks that he is going to fall with each step that he takes. A college, whose door is open, then appears in his path. He enters it, thinking to find refuge there, and perhaps a remedy for what is ailing him. Then he sees the college church and wants to go there to pray, but he notices that he has passed a man whom he knows, without greeting him. So, he wants to turn back to say something agreeable to him. But he is violently pushed back by the wind which is blowing against the church and stopping him from advancing. At the same time, he sees, in the middle of the college courtyard, another person who calls him by his name and says to him:

"Would you be kind enough to carry something to one of our friends?"

The young man asks what he is to carry. He receives no answer, but imagines, we don't know why, that it is a melon brought from some foreign country.

He continues walking, dragging himself along and tottering, while the people whom he meets are walking firmly on their

feet, and the wind has dropped. He is so unhappy that he wakes up.

The dream, from which he emerges with difficulty, has anguished him so much that he thinks that a bad genie has come to torment him. So, he makes a long prayer to secure himself against the bad effects of his vision.

After two hours of unhappy thoughts, he goes back to sleep. He is immediately transported into another dream where he hears a sharp, explosive noise, which he takes for thunder. Fear wakes him. Opening his eyes, he sees sparks from the fire scattered in his bedroom. But this doesn't worry him, for it has happened several times before. On some nights, the sparks are so bright that they allow him to see the objects around him.

After a short time, he goes back to sleep once more, and finds himself in a third dream. In front of him, on a table, is a book. Having opened it, he sees that it is a dictionary. Then he notices a second book. This one is a poetry anthology. He flicks through it and immediately comes upon the latin verse: "*Quod vitae sectabor iter?*": "Which path in life will I choose?"

At the same time, an unknown man appears and presents him with a poem that starts with *Est et non* (what is and is not). He adds that it is an excellent work. The young soldier says:

"I know. It is in this book of poems. Look!"

But he flicks through the anthology in vain. He can't find the poem. So, he takes up the dictionary and notices that some of the pages are missing. He is exchanging a few more words with the stranger when, suddenly, the books and the man disappear.

When he wakes up, the young soldier, very troubled by these three dreams, thinks that they have been sent to him by Heaven and starts to try to find out what they mean.

Descartes was so bewildered by all this that he began to pray. He assumed his dreams had a supernatural origin. He vowed he would put his life under the protection of the Blessed Virgin and go on a pilgrimage from Venice to Notre Dame de Lorette, traveling by foot and wearing the humblest-looking clothes he could find.

What was the idea that Descartes saw in a burning flash? He tells us that his third dream pointed to no less than the unification and the illumination of the whole of science, even the whole of knowledge, by one and the same method: the method of *reason*.

Significance of Descartes' Method

Eighteen years would pass before the world would have the details of the grandiose vision and of the "*mirabilis scientiae fundamenta*" - the foundations of a marvellous science. Such as he was able to give them, they are contained in the celebrated "Discourse on the Method of Properly Guiding the Reason in the Search of Truth in the Sciences." According to Descartes, his "method" should be applied when knowledge is sought in any scientific field. It consists of (a) accepting only what is so clear in one's own mind as to exclude any doubt, (b) splitting large difficulties into smaller one, (c) arguing from the simple to the complex, and (d) checking, when one is done.

Often regarded as the first "modern" thinker for providing a philosophical framework for the natural sciences as these began to develop, Descartes in his *Meditations on First Philosophy* attempts to arrive at a fundamental set of principles that one can know as true without any doubt. To achieve this, he employs a method called Methodological Scepticism: he doubts any idea that can be doubted.

He gives the example of dreaming: in a dream, one's senses perceive things that seem real, but do not actually exist. Thus,

one cannot rely on the data of the senses as necessarily true. Or, perhaps an "evil genius" exists: a supremely powerful and cunning being who sets out to try to deceive Descartes from knowing the true nature of reality. Given these possibilities, what can one know for certain?

Initially, Descartes arrives at only a single principle: *if I am being deceived, then surely "I" must exist*. Most famously, this is known as *cogito ergo sum*, ("I think, therefore I am"). (These words do not appear in the Meditations, although he later wrote them in Discourse on the Method.

He concludes that he can be certain that he exists, but in what form? You perceive your body through the use of the senses; however, these have previously proven unreliable. So, Descartes concludes that at this point, he can only say that he is a thinking being. Thinking is his essence as it is the only thing about him that cannot be doubted.

To further demonstrate the limitations of the senses, Descartes proceeds with what is known as the Wax Argument. He considers a piece of wax: his senses inform him that it has certain characteristics, such as shape, texture, size, colour, smell, and so forth. However, when he brings the wax towards a flame, these characteristics change completely. However, it seems that it is still the same thing: it is still a piece of wax, even though the data of the senses inform him that all of its characteristics are different. Therefore, in order properly to grasp the nature of the wax, he cannot use the senses: he must use his mind. Descartes concludes:

"Thus, what I thought I had seen with my eyes, I actually grasped solely with the faculty of judgment, which is in my mind."

In this manner Descartes proceeds to construct a system of knowledge, discarding perception as unreliable and instead admitting only deduction as a method. Halfway through the Meditations he also claims to prove the existence of a

benevolent God, who, being benevolent, has provided him with a working mind and sensory system, and who cannot desire to deceive him, and thus, finally, he establishes the possibility of acquiring knowledge about the world based on deduction and perception.

Mathematicians consider Descartes of the utmost importance for his discovery of analytic geometry. Up to Descartes's times, geometry, dealing with lines and shapes, and algebra, dealing with numbers, appeared as completely different subsets of mathematics. Descartes showed how to translate (almost) all problems in geometry into problems in algebra, by regarding them as questions asking for the length of a line segment and using a Coordinate system to describe the problem.

Descartes's theory provided the basis for the calculus of Newton and Leibniz, and thus for much of modern mathematics. This appears even more astounding when one keeps in mind that the work was just meant as an example to his *Discours de la méthode pour bien conduire sa raison, et chercher la verité dans les sciences* (Discourse on the Method to Rightly Conduct the Reason and Search for the Truth in Sciences, known better under the shortened title *Discours de la méthode* – Discourse on Methods).

Foundations to Cartesian Method

If we were to describe in a word what Descartes does in his *First Meditation*, the word would be “Doubts”. In *Meditation I*, Descartes doubts, or calls into question his previous beliefs with a view of attaining certainty. His dramatic decision to doubt all his previous beliefs is not necessarily his immediate point of departure. Rather, his logical point of departure is a statement of the purpose for which he doubts his previous beliefs. In the very first sentence of *Meditation I*, Descartes declares that he must question his beliefs “*if he wanted to establish anything at all in the sciences that was stable and likely to*

last”; and near the end he repeats that he “*must withhold assent from his previous beliefs if he wants to discover any certainty*” [1, 10]. These two intentions are crucial because they reveal Descartes purpose, namely: *to discover what, if anything, is really certain*. His doubt is therefore purposive, aimed at attaining certain fundamental answers to all those beliefs that had been taken for granted for the time he had lived- it is a methodic doubt - a kind of directed thinking blended with a degree of scepticism aimed at elucidating knowledge. An analogy of Descartes own nicely illustrates his basic strategy.

“Suppose that you had a basket full of apples that you feared some of them might be rotten, and that you wanted to find the good ones. How might you proceed? Well, the easiest way would be to turn all the apples out of the basket, inspect them, and put back into the basket only the unspoiled ones” (John Cottingham et al. 1984, p.324).

The relevance of Rene Descartes method to the study of critical thinking and problem solving is manifest in the goal or purpose of his doubt. The need to attain certainty if our thinking and be able to address and solve problems effectively and arrive at decisive decisions is a principal concern to the subject of critical thinking. To date, Descartes attempt to attain certainty remains of interest and the process contributes enormously, not only to our comprehension of critical thinking, but also to our ability in developing requisite skills for problem solving and decision making.

One reason is evident, the question “*What, if anything, is really certain?*” is an intrinsically interesting question. We live in a world embroiled in unsurpassed challenges, diverse opinions, views, and theories about almost every issue. Often, these opinions and views are held with great confidence; yet, in the midst of advances in technology, new discoveries in science, changes in human society occasioned by various emerging occurrences, what passes for knowledge is also continually

changing, compelling the human person to incessantly ask “*What, if anything, is really certain?*”

Experts disagree on many important matters today. Have you ever stopped to ask yourself whether anything is really certain? Or are human beings bound to live amidst uncertainty, taking cue from the prevailing “expert” opinion of the day- an opinion that may change by tomorrow?

For one, Descartes was profoundly dissatisfied with such a prospect. He was convinced that by a careful application of thought and rational scrutiny of issues and concepts, genuine certainty could be possible, even about matters of the greatest concern.

Does the thought that perhaps nothing is certain leave you dissatisfied? Can you sympathise with Descartes hope that careful thinking can lead to genuine certainty about important matters? If so, then you can appreciate the most basic reason for asking *what, if anything is really certain*: the intrinsic interest of the question.

Another reason for the search of certainty pertains to the nature of knowledge. There seems to be a close connection between knowing something and being certain of it. Suppose I was to tell you, “*I know Nairobi is the capital of Kenya, but I am not completely certain that it is.*” I admit that it’s a little doubtful in my mind whether Nairobi really is the capital of Kenya. You may well feel that there is something very wrong with those statements. If I really know that Nairobi is the capital of Kenya, you may want to insist that I am also (completely) certain that it is. Here again, Descartes and many other philosophers before him maintain that knowledge and certainty go hand in hand. This provides a further reason for asking the question about certainty.

Cartesian Methodic Doubt

Descartes strongly believed that a person who seeks truth must call in doubt whatever can be doubted. He observed that many of our beliefs were acquired in childhood before we attained the use of reason and self-judgement. Such beliefs derive from uncritical sense perception, unreasoning instinct, and the testimony of unreliable educators. He argued that our minds are like a canvas botched by apprentice painters and our beliefs constitute a shaky edifice on rotten foundations.

In line with Descartes' argument, recent scholars in philosophy have expressed concern about many of the factors that distort and impede knowledge, necessitating constructive scepticism.

Descartes Methodic doubt makes sense in the light of human paradoxical dichotomies discussed under barriers to critical thinking. Human beings need not simply to trust their instincts and sense-derived 'knowledge'. They should not unquestioningly believe what spontaneously occurs to them. They should not accept as true everything that is taught as true. They should not assume that their experience is unbiased. They need to formulate since they are not born with, intellectually sound standards for belief, truth and validity. They need to cultivate habits and traits that integrate these standards into their lives; they need to call in doubt that which can be doubted

The dichotomy of the human nature has implications for human learning, knowledge acquisition and the progression of science. Descartes' case is awake to the damage done by multiple forms of prejudice and narrow-mindedness - academic, social, personal, professional, religious, racial, national, and ideological. It addresses the need for cultivating positive scepticism in almost any academic setting. By focusing on the rational capacities of the learner's mind, by designing

instructions so that the learner explicitly grasps the sense of the “logic” of what they learn, we can make all additional learning easier for them and ease their scepticism to knowledge. This kind of higher order learning multiplies comprehension and insight; it stimulates and empowers the mind from infancy.

In order to acquire clear, distinct and certainty, therefore, the canvas of indoctrination must be wiped clean and allow reason to paint upon it. We must pull down the house of beliefs and rebuild one founded on reason and justification. We must doubt everything about which there can be the slightest uncertainty. Although we may not test each belief, in turn, to see whether it admits to doubt; we can still examine the foundations on which our beliefs generally depend. This is Descartes’s mission in the *First Meditation*.

Relevance of Descartes’ Method to Critical Thinking and Problem Solving

Descartes notes that the most apparently solid of our beliefs derive from the senses; even the testimony of others comes to us through hearing. In fact, the existence of perceptible objects seems more trusted than knowledge pursued through the rigour of reason. And since senses sometimes deceive us, it is prudent not to trust where one has once been deceived.

So, by not accepting what is derived from the senses, Descartes reaches the conclusion that everything that he had accepted as most obvious and certain should be subjected to the scrutiny of reason. He says:

“Sometimes towers which have looked round from a distance appeared square from a close up; and enormous statues standing on their pediments did not seem large when observed from the ground. In these and countless other such cases, I find that judgements of the external senses were mistaken.” (Meditation IV).

The occasional deceptiveness of the senses provides a reason not to trust them uncritically. In fact, Descartes carries the argument further to prove that even perceptions occurring in ideal conditions of observation may not be distinguishable from vivid dreams (refer to the example of the madmen viz dreams). Here Descartes reaches a sceptical position with regard to senses (Curley, 1978).

In Meditation XI, Descartes reminds himself of what is in “*doubt*”: - perhaps everything that he seems to see or remember is unreal. Perhaps ‘body, shape, extension, movement and place’ (i.e., the entire material world) are only but illusions. Or perhaps the sole certainty is that God, or any other being, has put these very doubts or thought into his mind or perhaps he produces them himself.

Sceptic about the reality of everything Rene Descartes struggles to find rationale of being and nature of knowledge. He questions the possibility of his own existence and the ‘voidness’ of the physical world. Doubting his own existence Descartes asks if his state of doubt can be achieved in the absence of his existence. At the edge of lapse into subjectivity, Descartes establishes and asserts the first principle of reality- his own existence, and he says;

“I have convinced myself that perhaps the entire physical world including my own body, does not exist. Does it follow that I do not exist?” (Meditation XI).

Descartes negates this question and affirms his existence as the first principle to indubitable knowledge;

“If I convince myself of something, then I certainly exist.”

“I think, therefore I am (or I exist)” – “Cogito Ergo Sum”

This becomes the first certainty that Descartes has been seeking, namely, his own existence. The discovery seems

obvious and sensible in the sense that for one to *doubt* (think), one must exist

Accordingly, Descartes mission includes the task of showing how criticality can generate indubitable knowledge – knowledge beyond any doubt. It also encourages us to release our minds for it to actualize its potential.

His approach consists in setting on one side, anything that does not possess the mark of genuine knowledge, this mark being that we should have clear and distinct ideas of the things in question. To Descartes, things or ideas are clear when they are open to the mind; when the mind can comprehend them and when we are clearly aware of them. An idea or a thing is also distinct and clear when we have a full knowledge of the nature of its object and of the means through which that object can be distinguished from other things. But how do we come to acquire clear and distinct ideas?

In the second chapter of the *Discourse on Methods*, Descartes describes the ideal method for this through a prescription to addressing problematic issues:

- a) Accept nothing as true if it is not clear and distinctly recognised to be so.
- b) Divide up and analyse difficulties into as many simpler parts as are requisite.
- c) Advance from simple and easy knowledge to more complex and related objects.
- d) Review the field so thoroughly; revisit the exercise so that no omission is committed.

His hyperbolic doubt is therefore two dimensional, namely:

- a) it is of conceptual discursive thinking- it is analytic-heuristic method, a method of conceptual discursive inquiry and,

- b) the method enables us to discover the simple or ultimate elements of rational thought as a solid foundation for further discursive thinking thus enlarging the area of our intuitive knowledge.

Drawing from his Method, critical thinking is not only an epistemological discourse, but it also traces its roots from *the Philosophy of Caution* to which René Descartes is the foundation.

Study Activities

1. “Cartesian Methodic Doubt exemplifies critical thinking and Problem solving.” Discuss
2. Can dreams be indicators of what things are in reality? Explicate.
3. “I think therefore I am” what is the relevance of this statement to self-actualization and self-realization?

Self-Assessment Questions

1. To what extent did René Descartes’ life influence his thoughts?
2. A Critical thinker is one who is appropriately moved by reason. Discuss this in reference to Descartes Meditation I and II
3. What is the rationale behind *cogito ergo sum*?
4. “An effective problem solver is also an astute critical thinker” Discuss
5. A seeker of truth must call into doubt whatever can be doubted. Discuss
6. Examine the view that Cartesian Methodic Doubt is a precursor to critical thinking.
7. What are the philosophical foundations to Cartesian methodic Doubt?

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CHAPTER THIRTEEN

ON LIBERTY OF THOUGHT AND INDIVIDUALITY - JOHN STUART MILL

Introduction

John Stuart Mill's *"Of Individuality, as One of the Elements of Well-Being"* is a pivotal third chapter of his 1859 treatise *On Liberty*. It serves as a foundational text for critical thinking by challenging the psychological and social forces that breed intellectual conformity. In this chapter, Mill shifts his focus from state censorship to the more insidious "tyranny of the majority," arguing that democratic societies can subtly stifle independent thought through social pressure and public opinion. He asserts that true individuality is not merely a personal preference but an essential component of human progress and happiness. He warns that when individuals allow custom or society to choose their life path for them, they surrender their distinctively human faculties of judgment and choice. For a critical thinking student, Mill's text acts as an intellectual crucible: it implores us to interrogate why we believe what we believe, analyze the invisible social scripts guiding our daily choices, and evaluate the modern tension between tribal, ethnic, racial conformity and individual dissent. By framing non-conformity as a necessary "experiment in living," Mill provides a compelling defense of the very essence of critical inquiry - the courage to question established norms, tolerate divergent viewpoints, and rigorously test ideas in the marketplace of thought.

This chapter is intended to introduce the learner to the concept of individuality and autonomy as a guide to unprecedented interference by governments and social systems in the liberties and freedoms of individual in modern society. It covers a brief history of John Stuart Mill, definitions of freedom, individualism, individuality, and autonomy, and Mills' purpose.

Chapter Objectives

By the end of this chapter, the learner should be able to:

- a) Distinguish between Autonomy and Conformity.
- b) Explain what freedom, individualism, individuality and autonomy is.
- c) Discuss some aspects of freedom as human entitlement,
- d) Discuss the extent to which society can interfere with the freedom of its individuals
- e) Distinguish between individualism and individuality
- f) Apply the knowledge acquired.

Introduction: J. S. Mill's opening Statement in On Liberty of Thought and Individuality

“The time, it is to be hoped, is gone by when any defence would be necessary of the “liberty of the press” as one of the securities against a corrupt or tyrannical government. No argument, we may suppose, can now be needed against permitting a legislature or executive, not identified in interest with people, to prescribe opinions to them and determine what doctrines or what arguments they shall be allowed to hear. This aspect of the question, besides, has been so often and so triumphantly enforced by preceding writers that it need not be specially insisted on this place. Speaking generally, it is not, in constitutional countries, to be apprehended that the government, whether completely responsible to the people or not, will often attempt to control the

expression of opinion, except when in doing so it makes itself the organ of the general intolerance of the public. Let us suppose, therefore, that the government is entirely at one with the people, and never thinks of exerting any power of coercion unless in agreement with what it conceives to be their voice.” (J.S. Mill’s on Liberty of Thought)

Keywords:

- i. **Freedom:** The liberties enjoyed by a person, it entails the liberties to hold opinion, express oneself, association, choice, etc.
- ii. **Definitions of Individuality and autonomy** - thinking for oneself, ability to stand out, creativity, productiveness, independence of thought, distinctive innovativeness etc. It also entails being considerate of others and contributing to the well-being of others independent of external influence or forces.

J. S. Mills’ Purpose

- a) To discuss the degree to which the government and society may interfere in the lives of the citizens. The argument is that as human beings we are endowed with the ability to think and determine the destiny of our own lives: - that any interference by the government in the freedom and liberties of individual persons is only necessary if it aims at preventing one person from harming the other but such interference cannot be warranted where the government has as its aim the appropriation of the freedom and liberties of individual persons and gag their creative potentials.
- b) That our freedom and liberties are our entitlement only insofar as they do not infringe on the liberties and freedoms of other persons.

- c) That as much as we may enjoy the liberties and freedom to do as we wish and act the way we act, our actions are enshrined in our liberties if they do not affect, in a negative way the interests and liberties of others.
- d) Any action we undertake in the name of our freedoms and liberties is therefore naturally restricted by way of the impact it exerts on the freedoms and liberties of others.
- e) Freedom is only freedom insofar as it favours the exercise of freedom and liberties by others, without causing inconveniences in the process of enjoying and executing it.

Mill asserts that suppressing an opinion implicitly assumes the infallibility of the censor. Why does he claim this assumption is deeply flawed?

- a) Because censors are always corrupt and have ulterior motives for silencing opposition.
- b) Because public opinion is always inherently correct and needs no censorship.
- c) Because human judgment is fallible, and allowing free discussion is the only way to test and correct errors.
- d) Because true moral and scientific knowledge cannot be grasped by the human intellect.

Contextualising Mills Article

- i. If all mankind minus one were of one opinion, mankind would be no more justified in silencing that one person than he, if he had the power, would be justified in silencing mankind.
- ii. Were an opinion a personal possession of no value except to the owner, if to be obstructed in the enjoyment of it were simply a private injury, it would

make some difference whether the injury was inflicted only on a few persons or on many.

- iii. But the peculiar evil of silencing the expression of an opinion is that it is robbing the human race, posterity as well as the existing generation—those who dissent from the opinion, still more than those who hold it.
- iv. If the opinion is right, they are deprived of the opportunity of exchanging error for truth; if wrong, they lose, what is almost as great a benefit, the clearer perception and livelier impression of truth produced by its collision with error.
- v. We can never be sure that the opinion we are endeavouring to stifle is a false opinion; and if we were sure, stifling it would be an evil still.
- vi. Possibly, the opinion which it is attempted to suppress by authority may possibly be true,
- vii. Those who desire to suppress it, of course, deny its truth; but they are not infallible.
- viii. They have no authority to decide the question for all mankind and exclude every other person from the means of judging.
- ix. To refuse a hearing to an opinion because they are sure that it is false is to assume that their certainty is the same thing as absolute certainty.
- x. All silencing of discussion is an assumption of infallibility. Its condemnation may be allowed to rest on this common argument, not the worse of being common.
- xi. Thus: So long as the freedom one enjoys does not infringe on the freedom and Rights of others in the wider society, then the government authority has no otherwise but to allow individual persons to exercise and enjoy their liberties of holding an opinion,

association, and expression. Natural laws bestow restrictions on the acts of man.

The maxim: Do to others what you would want others to do unto you.

The Person of John Stuart Mill

John Stuart Mill (1806-1873), a British philosopher in the Empiricist (Empiricism is the view that all knowledge is grounded in, and derived from, experience.) tradition, economist, moral and political theorist, and administrator, was the most influential English-speaking philosopher and thinker of the nineteenth century. Born in Bentonsville, then a suburb of London, he was the eldest son of James Mill, a Scotsman who had come to London and become a leading figure in the group of philosophical radicals which aimed to further the utilitarian philosophy of Jeremy Bentham. John Stuart Mill's mother was Harriet Barrow, who seems to have had very little influence upon him. (*Capaldi, Nicholas, 2004*)

J. S. Mill's views are of continuing significance, and are generally recognized to be among the deepest and certainly the most effective defences not only of empiricism but also of a liberal political view of society and culture. The overall aim of his philosophy it seems was to develop a positive view of the universe and the place of human beings in it, a view which contributes to the progress of human knowledge, individual freedom and human well-being. Although his views are not entirely original (they trace their roots in the British empiricism of John Locke, George Berkeley and David Hume, and in the utilitarian theory of Jeremy Bentham), he gave them a new dimensional depth through formulations that were sufficiently articulate to gain for them a continuing influence among a broad public and sphere.

In his book *The Life of John Stuart Mill* (1954) Packe reports that James Mill spent considerable time on the education of his eldest son J. S. Mill. The latter began to learn Greek at three and Latin at eight. By the age of fourteen he had read most of the Greek and Latin classics, had made a wide survey of history, had done extensive work in logic and mathematics and had mastered the basics of economic theory. This education it is claimed was undertaken according to the principle of Bentham's associationist psychology, and aimed at making the younger Mill a leader in views of philosophical radicalism.

At fifteen John Stuart Mill undertook the study of Bentham's various fragments on the theory of legal evidence. These had an inspiring influence on him, fixing in him his life-long goal of reforming the world in the interest of human well-being. At eighteen he spent considerable time and effort at editing these manuscripts into the long coherent treatise that they became in his hands. Guided by his father he threw himself into the work of the philosophical radicals, and began an active literary career.

In 1830 Mill was introduced to Harriet Taylor. Her husband was a druggist whose grandfather had once been a neighbour of James Mill. The younger Mill rapidly became intimate with Mrs. Taylor, who profoundly influenced the rest of his life. She was an invalid who lived apart from her husband. Mill's father highly disapproved of the association between the two. When Mill married Mrs. Taylor in 1851 two years after her husband's death there was a complete estrangement from his mother and sisters. Mill reports in his *Autobiography* that Harriet was of crucial significance to his intellectual and moral development. Although the reading of Wordsworth works gave the younger Mill a sense of greater human possibilities, it was Harriet Taylor who kept this sense alive, and continually strengthened Mill's conception of the real end of human being as the progressive development of individuality

in all, women as well as men, and workers as well as aristocrats. It was she who imbued Mill with the sense that if these ends could be developed then it would become clear that at present human beings were enjoying only a small fraction of the happiness that was possible. It was she who gave Mill the expansive idea of the good that was to form the new utilitarian end that replaced the rather rigid and narrow ends described by Bentham and his father. As Mill insisted, she was indispensable to his later thought. He was nearly inconsolable when she died. It was during a trip to Europe in 1858 that she fell fatally ill and died at Avignon, where she is buried. For the rest of his life, Mill spent half a year at a house in Avignon so that he could be near to her grave.

In 1865 Mill was elected to the House of Commons. Given his reputation and his previous seclusion, his work was subject to immense attention. His performance was generally acclaimed, but he found himself at odds with the aims of his electors. He was unwilling to compromise his own principles, and as a consequence, he failed in his attempt at re-election in 1868. He continued to work, as he had earlier in his life, for many radical causes. He was particularly concerned among other things, for the status of women. His later work was made easier by the cooperation of Mrs Taylor's daughter, Helen, who in many respects took the latter's place in Mill's life. A number of his important works were published posthumously by Helen Taylor. Mill surrendered to death in 1873 at Avignon, where he is buried next to his wife.

J.S Mill Writings

Mill made his philosophical reputation with his *System of Logic*, which he published in 1843; this work re-vitalized the study of logic, and provided for the remainder of the century the definitive account of the philosophy of science and social science. This was followed by *The Principles of Political*

Economy in 1848; this defined the orthodox form of liberal principles for the next quarter century. In 1861 he published his only systematic treatise in first philosophy. This was his *Examination of Sir William Hamilton's Philosophy*; a comprehensive critique of the latter's rationalism and intuitionism. So effective was Mill's critique that this work effectively dated itself and is now unfortunately neglected. His two best-known works in moral philosophy were *On Liberty* and *Utilitarianism*, which appeared in 1859 and 1861 respectively. These are of continuing significance. His *Considerations on Representative Government*, published in 1851, is perhaps now less important than his essay on *The Subjection of Women* (1869). Mill's partially finished *Autobiography* was published, with additions by Helen Taylor, in 1873. She also saw for the posthumous publication in 1874 of his *Three Essays on Religion*.

Summary on Liberty

In *On Liberty* Mill discusses the degree to which the government and society may interfere in the lives of citizens. He argues that such interference is warranted only to prevent one person from harming another. Compelling someone to act for his own good, or to prevent him from harming himself, is never justified (*Berger, 1984*). According to Mill people should be allowed to think and speak, as they like, to choose their own way of living, and to choose their associates. And because Mill's principle draws the line at harm to others- a pure utilitarian principle (utilitarianism is the theory that we should strive to produce as much happiness as possible), it is often called the "harm principle."

According to J. S. Mill government is not a matter of natural rights or social contract, as in many forms of liberalism. Forms of government are, rather, to be judged according to "utility in the largest sense, grounded on the permanent interest of man

as a progressive being” (*On Liberty*, p. 224). By this he means that forms of government are to be evaluated in terms of their capacity to enable each person to exercise and develop in his or her own way their capacities for higher forms of human happiness. Such development will be an end for each individual, but also a means for society as whole to develop and to make life better for all.

Given the centrality of self-development, Mill argues that liberty is a fundamental human right. “The sole end,” he proposes, “for which mankind are warranted, individually or collectively... in interfering with the liberty of action of any of their number, is self-protection” (*On Liberty* p. 223). This will enable each to seek his or her own best; it will liberate a diversity of interests to the benefit of the individual and of all; and it will nurture moral freedom and rationality. With rationality comes creativity and the means of social and intellectual progress. Mill's *On Liberty* remains the strongest and most eloquent defence of liberalism that is so far known. He argues in particular for freedom of thought and discussion. “We can never be sure,” he wrote, “that the opinion we are endeavouring to stifle is a false opinion, and if we were sure, stifling it would be an evil still” (*On Liberty*, p. 229). Our beliefs and actions are reasonable or not depending upon our capacity to critically assess them. Only through free debate can such critical skills be developed and maintained: our self-development as reasonable persons, capable of critical assessments for belief and action. And if our beliefs and actions emerge from the critical assessment such debate involves, if they survive the struggle as it were in the “marketplace of ideas”, then, and only then, will one be entitled to accept them as justified. Even so, even though that is the best guarantee that there is sufficient reason to justify accepting the belief as true or the action as right, nonetheless, as always, we are fallible: while it may be the best guarantee of truth or belief or rightness of action that we have, one must also allow that it is

best only so far as our fallible judgement allows. And that fallibility means, of course, that the debate must be on-going.

In this respect the best sort of person is one who individually is responsible for his or her beliefs and actions. It is not someone whose beliefs or actions are simply those that conform to some custom, or are simply those that they have always had or held, or are simply those asserted to be correct by some authority. The best kind of beliefs and actions are those that emerge from the person's own critical assessments, and the best kind of person is the individual who can provide as required those critical assessments. As for why that sort of person is the best, it is because such a person will not only be happy in his or her own case but will be concerned with, and contribute to, the happiness of others. Individuality is, in other words, one of the main ingredients of human happiness, and it is for that reason that it ought to be cultivated. Here, as elsewhere in his other works, it is utility, the general welfare, that determines what is right and what is the best.

Since individuality is good, it is necessary to foster social institutions that contribute to that individuality. Free, uncensored debate is one such institution. So, more generally, is liberty, the right to do as one wants free from the interference of others, so long as what one wants or one's actions do not cause harm to others. (It is however imperative to note that merely offending the moral sensitivities and emotional/appetitive orientations of others does not count as harm, especially since others often confuse feelings of repugnance with feelings of moral disapprobation.) Individuality also ought to manifest in Democracy and representative government establishments as they too contribute to the development of the individual, just as much as the reason that free speech so contributes, since they too are social institutions that are justified on utilitarian grounds.

Bentham and Mill's father had argued that democracy was the form of government that could best secure the happiness of all. The younger Mill did not disagree. But for him the end is not just well-being, as earlier utilitarian argued. To him, the end that recommends democracy is the tendency to foster self-development and individuality. He defended Representative Government; in particular, as that form of government which best encourages individuality. According to Mill Representative Government leads people to take a more active and intelligent participation in society. It provides moral training and encourages the development of natural human sympathies. The result is the habit of looking at social questions from an impersonal perspective rather than that of self-interest. His defence of democracy was much qualified and self-evident. To be sure, he was, like the earlier utilitarian, sympathetic to the fall of the *ancient regime* and to the ends of the French Revolution would amount to naivety and inconsistency with utilitarian prescriptions and principles. He had little tolerance for the British aristocracy and criticizes it for its follies in its own country and in Ireland, and the vestiges, such as the Game Laws, of medieval privilege (*Robson (ed.) 1963*). He strove to liberalise the press still severely bound by an absurd libel law that excluded effective social criticism. But influenced by Coleridge he had come to see that there were virtues in social systems, even out-dated ones, else why would they have survived so long. He therefore came to appreciate the conservative arguments that unrestrained freedom is dangerous. The effort to achieve at year zero a new social order justified on *a priori* principles by means of Jacobin terror can be as great a threat to liberty and to human well-being as the most repressive tyranny (*Collini, 1991*).

Mill argued, reasonably on utilitarian grounds, that social institutions need to be adapted to the time and place where they operate. His work in the East India Company dealing with

the governance of states in India undoubtedly had a significance influence here. Referring to the rule of Akbar in India, he allowed that despotic rule could be necessary under certain conditions for stable government. He even suggests that, since people must be properly fit if democracy is to function well, a despotic form of government, if well-run with this aim in mind, might prepare its people for the exercise of responsibilities of a free electorate. His position here had some influence on British colonial administration and expansionism.

Individuality and even eccentricity is better than massive social uniformity. The latter is the consequence of both terror and tyranny. But it can also be the consequence of democracy. Influenced by de Tocqueville's analysis of American culture, Mill came to think that the chief danger of democracy is that of suppressing individual differences, and of allowing no genuine development of minority opinion and of minority forms of culture. Democracy might impoverish the culture of the community by imposing a single and inflexible set of mass values. This form of government has the virtue of fostering intelligence, common moral standards, and happiness; but where the citizens are unfit and passive it can be an instrument for tyranny, perhaps of one, as with Louis Napoleon, or perhaps of the many as in Kenya to date. In general, the only reliable safeguard can be institutions, educational institutions in particular, that can ensure the development of individuals with personalities strong enough to resist such pressures. But other forms of social order are also called for. Thus, after the rebellion in 1837 in Canada Mill defended Lord Durham's recommendations for internal responsible self-government in the colonies, free on the whole from interference from the colonial power. But, where Lord Durham recommended a central government and the assimilation of the French population to the English, Mill defended the cultural interests of the French minority, and recommended a form of federal government as an institutional means to protect those

interests. A federal form of government was finally secured with the British North America Act of 1867, which created Canada as a confederation. This Act was passed while Mill was a Member of Parliament.

Another means suggested by Mill for the protection of minorities in a democratic system was a system of proportional representation. Finally, one might also mention his acceptance of the principle of multiple votes, in which educated and more responsible persons would be made more influential by giving them more votes than the uneducated.

In all, Mill is concerned with providing a form of government in which the members have as much education as is feasible, and which is selected through a process in which those who do the selecting, the electors, become themselves educated as better citizens. A properly educated electorate would be willing and able to select the best as their governors. Since those elected would be better informed and wiser on specific issues than those who elected them, it would be wrong to bind the representatives to anything but a very general agreement with the beliefs and the aims of the electors. He agrees with the rejection of populism enunciated by Burke in his speech to his electors in Bristol, accepting the principle that the representative should be expected to exercise his or her own judgement, not merely to accept blindly the views of those on whose votes his or her tenure depended. It was a principle to which Mill himself adhered in his own brief term in the House of Commons. It was much to the consternation of his own electors that he attacked colonialism in the West Indies and criticized Governor Eyre in particular for his brutality in suppressing a rebellion by blacks in Jamaica. It was what cost him his seat.

Mill's thought was of a whole. He aimed to show humans the way the world is, and how they could accommodate themselves

to it and to one another. His aim was the improvement of humankind. His guide was the principle of utility.

Mill believes that all of morality rests on the principle of utility: “strive to produce as much happiness as possible.” Thus, to be consistent, Mill must defend the harm principle by showing that following it will maximise happiness. At first glance, this defence seems unpromising; for when we allow someone to live self-destructively, or to spread false beliefs, we appear to allow more unhappiness than we need to. But according to Mill, this is not so. For one thing, all of society benefits from tolerance. By tolerating unpopular beliefs, we either learn new truths or reach a deeper understanding of received opinion; by tolerating unorthodox activities, we observe the results of many “experiments of living.” In addition, each of us reaps a personal benefit from the development and expression of his individuality.

Mill’s discussion is deservedly regarded as a classic of liberal thought. However, for all its greatness, it is not without its difficulties. It is unclear that there is any real utility in tolerating such “experiments of living” as the use of hard drugs. In addition, many actions that apparently affect only the agent, such as homosexuality and the private use of pornography do harm other people at least to the extent that just knowing about them gives offence to many. Whether these objections undermine Mill’s defence of the harm principle is left for further thought.

This however is often missed; the principle of utility has become the object of scholastic discussion. People debate whether Mill’s notion that there are some pleasures that are to be preferred to others makes good sense. The human aspect of this is ignored. Mill put it well, and makes it clear that his claims on this point are solidly based.

In the golden rule of Jesus of Nazareth, we read the complete spirit of the ethics of utility. To do as one would be done by, and to love one's neighbour as oneself, constitute the ideal perfection of utilitarian morality. As the means of making the nearest approach to this ideal, utility would enjoin, first, that laws and social arrangements should place the happiness, or (as speaking practically it may be called) the interest, of every individual as nearly as possible in harmony with the interest of the whole; and secondly, that education and opinion, which have so fast a power over human character, should so use that power as to establish in the mind of every individual an indissoluble association between his own happiness and the good of the whole (*Utilitarianism*, p. 218).

Mill aimed at the improvement of humankind. For this end, he was active in many causes. He denounced the takeover by the British government of the East India Company, correctly anticipating the evils consequent upon the scramble for spoils by second rate English officials. He supported reform of the Irish land tenure system in order to relieve the poverty of the peasants. During his period in Parliament, he denounced English methods in Ireland, a move which was unfortunately denounced as support for the Fenians. In 1866 and 1867, he was active along with Herbert Spencer and many other liberals in the committee for the prosecution of Governor Eyre for atrocities in suppressing a rebellion by blacks in Jamaica. He supported attempts to preserve natural beauty and was a founder and strong supporter of the Commons Preservation Society.

In his own day Mill was immensely influential. He was never one to compromise his principles, and his pursuit of those ideals was steady and often successful. His lasting influence has been in the areas of political and social philosophy. His defences of utilitarianism and of liberty shaped the views of his own generation, and they continue to this day to inspire and to

guide. There are many who might be critical of details of, say, the utilitarianism but who are moved by the same general idea of the good, for example, the philosopher and economist Amartya Sen is critical of various formulations of the utilitarian ethic in his *Collective Choice and Social Welfare* (1970), but equally clearly is moved by Millian ends in his *Inequality Re-examined* (1992) or *Development as Freedom* (1999). Sen is hardly alone in having views for which Mill is the clear inspiration. In thought especially but also in action Mill made of the world a better place.

Self-Assessment Questions

1. “Freedom is only relevant insofar as it does not infringe on the liberties of others”. Discuss this statement with reference to J.S. Mills’ essay on Individuality.
2. How is the concept of autonomy understood within the military profession?
3. Discuss some of the advantages and disadvantages of conformity in the military profession
4. “The attainment of autonomy is the ultimate goal in human development” Discuss this in light to J.S. Mills essay on Individuality and Liberty of Thought
5. Critically examine John Stuart Mill’s view that attainment of autonomy is the prima facie principle for human existence.
6. What are the basic elements of;
 - a) autonomy
 - b) Conformity?
7. How can individuality enhance the wellbeing of society?

8. Individuality is crucial to Critical thinking. Is this justifiable given man's sociality?
9. Show the connection between individuality and freedom in the context of Critical and Creative thinking.
10. In your view, what would you consider a fair relationship between social authority and individual autonomy within the military profession?
11. What do you consider to be the place of an individual in the state?
12. a) What are slogans?
b) Can slogans contribute positively to human Well-being?
13. Autonomy is the ultimate goal of human development. Discuss this in the light of J.S. Mill's essay on Individuality.

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APPENDICES

APPENDIX 1 – Glossary to Critical Thinking

Introduction

Below is a list of terms commonly used in Philosophy, Critical thinking, and Problem solving. You can make reference to them as you read through the book. This glossary was developed by Linda Elder and Richard Paul (1999 and later expanded in 2009) to help people raise their thinking levels and to better understand critical thinking. We acknowledge the two great critical thinkers in unlimited words.

Glossary A-B

Accurate: Free from errors, mistakes, or distortion. Correct connotes little more than the absence of error; accurate implies a positive exercise of one to obtain conformity with fact or truth; exact stresses perfect conformity to fact, truth, or some standard; precise suggests minute accuracy of detail. Accuracy is an important goal in Critical thinking, though it is almost always a matter of degree. It is also important to recognize that making mistakes is an essential part of learning and that it is far better that students make their own mistakes, than that they parrot the thinking of the text or teacher. It should also be recognized that some distortion usually results whenever we think within a point of view or frame of reference. Students should think with this awareness in mind, with some sense of the limitations of their own, the texts, the teacher's, the subject's perspective. See perfections of thought.

Ambiguous: A sentence having two or more possible meanings. Sensitivity to ambiguity and vagueness in writing

and speech is essential to good thinking. A continual effort to be clear and precise in language usage is fundamental to education. Ambiguity is a problem more of sentences than of individual words. Furthermore, not every sentence that can be construed in more than one way is problematic and deserving of analysis. Many sentences are clearly intended one way; any other construal is obviously absurd and not meant. For example, "Make me a sandwich." is never seriously intended to request metamorphic change. It is a poor example for teaching genuine insight into Critical thinking. For an example of a problematic ambiguity, consider the statement, "Welfare is corrupt." Among the possible meanings of this sentence are the following: Those who administer welfare programs take bribes to administer welfare policy unfairly; Welfare policies are written in such a way that much of the money goes to people who don't deserve it rather than to those who do; A government that gives money to people who haven't earned it corrupts both the giver and the recipient. If two people are arguing about whether or not welfare is corrupt, but interpret the claim differently, they can make little or no progress; they aren't arguing about the same point. Evidence and considerations relevant to one interpretation may be irrelevant to others.

Analyze: To break up a whole into its parts, to examine in detail so as to determine the nature of, to look more deeply into an issue or situation. All learning presupposes some analysis of what we are learning, if only by categorizing or labeling things in one way rather than another. Students should continually be asked to analyze their ideas, claims, experiences, interpretations, judgments, and theories and those they hear and read. See elements of thought.

Argue: There are two meanings of this word that need to be distinguished: 1) to argue in the sense of to fight or to emotionally disagree; and 2) to give reasons for or against a

proposal or proposition. In emphasizing Critical thinking, we continually try to get our students to move from the first sense of the word to the second; that is, we try to get them to see the importance of giving reasons to support their views without getting their egos involved in what they are saying. This is a fundamental problem in human life. To argue in the Critical thinking sense is to use logic and reason, and to bring forth facts to support or refute a point. It is done in a spirit of cooperation and goodwill.

Argument: A reason or reasons offered for or against something, the offering of such reasons. This term refers to a discussion in which there is disagreement and suggests the use of logic and bringing forth of facts to support or refute a point. See argue.

Argument: the systematic engagement in a discourse either with self or as a group over a contestable issue with a view of resolving the contradictions inherent in the said issue and resolving the engrained conflict or contradiction.

To assume: To take for granted or to presuppose. Critical thinkers can and do make their assumptions explicit, assess them, and correct them. Assumptions can vary from the mundane to the problematic: I heard a scratch at the door. I got up to let the cat in. I assumed that only the cat makes that noise, and that he makes it only when he wants to be let in. Someone speaks gruffly to me. I feel guilty and hurt. I assume he is angry at me, that he is only angry at me when I do something bad, and that if he's angry at me, he dislikes me. Notice that people often equate making assumptions with making false assumptions. When people say, "Don't assume", this is what they mean. In fact, we cannot avoid making assumptions and some are justifiable. (For instance, we have assumed that people who buy this book can read English.) Rather than saying "Never assume", we say, "Be aware of and careful about the assumptions you make, and be ready to

examine and critique them." See assumption, elements of thought.

Assumption: A statement accepted or supposed as true without proof or demonstration; an unstated premise or belief. All human thought and experience are based on assumptions. Our thought must begin with something we take to be true in a particular context. We are typically unaware of what we assume and therefore rarely question our assumptions. Much of what is wrong with human thought can be found in the uncritical or unexamined assumptions that underlie it. For example, we often experience the world in such a way as to assume that we are observing things just as they are, as though we were seeing the world without the filter of a point of view. People we disagree with, of course, we recognize as having a point of view. One of the key dispositions of Critical thinking is the on-going sense that as humans we always think within a perspective, that we virtually never experience things totally and absolutistically. There is a connection, therefore, between thinking so as to be aware of our assumptions and being intellectually humble.

Authority: 1) The power or supposed right to give commands, enforce obedience, take action, or make final decisions. 2) A person with much knowledge and expertise in a field, hence reliable. Critical thinkers recognize that ultimate authority rests with reason and evidence, since it is only on the assumption that purported experts have the backing of reason and evidence that they rightfully gain authority. Much instruction discourages Critical thinking by encouraging students to believe that whatever the text or teacher says is true. As a result, students do not learn how to assess authority. See knowledge.

Bias: A mental leaning or inclination. We must clearly distinguish two different senses of the word 'bias'. One is neutral, the other negative. In the neutral sense we are

referring simply to the fact that, because of one's point of view, one notices some things rather than others, emphasizes some points rather than others, and thinks in one direction rather than others. This is not in itself a criticism because thinking within a point of view is unavoidable. In the negative sense, we are implying blindness or irrational resistance to weaknesses within one's own point of view or to the strength or insight within a point of view one opposes. Fair-minded critical thinkers try to be aware of their bias (in sense one) and try hard to avoid bias (in sense two). Many people confuse these two senses. Many confuse bias with emotion or with evaluation, perceiving any expression of emotion or any use of evaluative words to be biased (sense two). Evaluative words that can be justified by reason and evidence are not biased in the negative sense. See criteria, evaluation, judgment, opinion.

Glossary C

Clarify: To make easier to understand, to free from confusion or ambiguity, to remove obscurities. Clarity is a fundamental perfection of thought and clarification a fundamental aim in Critical thinking. Students often do not see why it is important to write and speak clearly, why it is important to say what you mean and mean what you say. The key to clarification is concrete, specific examples. See accurate, ambiguous, logic of language, vague.

Concept: An idea or thought, especially a generalized idea of a thing or of a class of things. Humans think within concepts or ideas. We can never achieve command over our thoughts unless we learn how to achieve command over our concepts or ideas. Thus, we must learn how to identify the concepts or ideas we are using, contrast them with alternative concepts or ideas, and clarify what we include and exclude by means of them. For example, most people say they believe strongly in democracy, but few can clarify with examples what that word

does and does not imply. Most people confuse the meaning of words with cultural associations, with the result that 'democracy' means to people whatever we do in running our government-any country that is different is undemocratic. We must distinguish the concepts implicit in the English language from the psychological associations surrounding that concept in a given social group or culture. The failure to develop this ability is a major cause of uncritical thought and selfish critical thought. See logic of language.

Conclude/conclusion: To decide by reasoning, to infer, to deduce; the last step in a reasoning process; a judgment, decision, or belief formed after investigation or reasoning. All beliefs, decisions, or actions are based on human thought, but rarely as the result of conscious reasoning or deliberation. All that we believe is, one way or another, based on conclusions that we have come to during our lifetime. Yet, we rarely monitor our thought processes; we don't critically assess the conclusions we come to, to determine whether we have sufficient grounds or reasons for accepting them. People seldom recognize when they have come to a conclusion. They confuse their conclusions with evidence, and so cannot assess the reasoning that took them from evidence to conclusion. Recognizing that human life is inferential, that we continually come to conclusions about ourselves and the things and persons around us, is essential to thinking critically and reflectively.

Consistency: To think, act, or speak in agreement with what has already been thought, done, or expressed; to have intellectual or moral integrity. Human life and thought are filled with inconsistency, hypocrisy, and contradiction. We often say one thing and do another, judge ourselves and our friends by one standard and our antagonists by another, lean over backwards to justify what we want or negate what does not serve our interests. Similarly, we often confuse desires with

needs, treating our desires as equivalent to needs, putting what we want above the basic needs of others. Logical and moral consistency is fundamental values of fair-minded Critical thinking. Social conditioning and native egocentrism often obscure social contradictions, inconsistency, and hypocrisy. See personal contradiction, social contradiction, intellectual integrity, human nature.

Contradict/contradiction: To assert the opposite of; to be contrary to, go against; a statement in opposition to another; a condition in which things tend to be contrary to each other; inconsistency; discrepancy; a person or thing containing or composed of contradictory elements. See personal contradiction, social contradiction.

Creativity: the bringing into being of something which did not exist before, either as a product, a process or a thought, or working on the old with a view of producing a harmonized new.

Creativity is demonstrated if we:

- a) Invent something which has never existed before
- b) Invent something which exists elsewhere but you are not aware of
- c) Invent a new process for doing something
- d) Reapply an existing process or product into a new or different market
- e) Develop a new way of looking at something (bringing a new idea into existence)
- f) Change the way someone else looks at something

Creative thinking: the creation or generation of ideas, processes, experiences or objects.

Creative thinking: the formation of possible solutions to a problem or possible explanations of a phenomenon,

Criterion (criteria, pl): A standard, rule, or test by which something can be judged or measured. Human life, thought, and action are based on human values. The standards by which we determine whether those values are achieved in any situation represent criteria. Critical thinking depends upon making explicit the standards or criteria for rational or justifiable thinking and behaviour. See evaluation.

Critical evaluation: the process of arriving at a judgment about the value or impact of a text by examining its quality in terms of form, style, and rhetorical features, the readability of the author and the consistency between ideas it presents and the reader's experience, including . . . internal evaluation . . . and external evaluation . . .

Critical listening: A mode of monitoring how we are listening so as to maximize our accurate understanding of what another person is saying. By understanding the logic of human communication—that everything spoken expresses point of view, uses some ideas and not others, has implications, etc.—critical thinkers can listen so as to enter sympathetically and analytically into the perspective of others. See critical speaking, critical reading, critical writing, elements of thought, intellectual empathy.

Critical person: One who has mastered a range of intellectual skills and abilities. If that person generally uses those skills to advance his or her own selfish interests, that person is a critical thinker only in a weak or qualified sense. If that person generally uses those skills fair-mindedly, entering empathically into the points of view of others, he or she is a critical thinker in the strong or fullest sense. See Critical thinking.

Critical reading: Critical reading is an active, intellectually engaged process in which the reader participates in an inner dialogue with the writer. Most people read uncritically and so

miss some part of what is expressed while distorting other parts. A critical reader realizes the way in which reading, by its very nature, means entering into a point of view other than our own, and the point of view of the writer. A critical reader actively looks for assumptions, key concepts and ideas, reasons and justifications, supporting examples, parallel experiences, implications and consequences, and any other structural features of the written text, to interpret and assess it accurately and fairly. See elements of thought.

2. Critical Reading: "(1) the process of making judgements in reading: evaluating relevancy and adequacy of what is read . . . " (2) an act of reading in which a questioning attitude, logical analysis, and inference are used to judge the worth of what is read according to an established standard . . . Among the identified skills of critical reading involved in making judgements are those having to do with the author's intent or purpose; with the accuracy, logic, reliability and authenticity of writing; and with the literary forms, components, and devices identified through literary analysis."

Critical readers are:

- a) willing to spend time reflecting on the ideas presented in their reading assignments
- b) able to evaluate and solve problems while reading rather than merely compile a set of facts to be memorized
- c) logical thinkers
- d) diligent in seeking out the truth
- e) eager to express their thoughts on a topic
- f) seekers of alternative views on a topic
- g) open to new ideas that may not necessarily agree with their previous thought on a topic
- h) able to base their judgements on ideas and evidence

- i) able to recognize errors in thought and persuasion as well as to recognize good arguments
- j) willing to take a critical stance on issues
- k) able to ask penetrating and thought-provoking questions to evaluate ideas
- l) in touch with their personal thoughts and ideas about a topic
- m) willing to reassess their views when new or discordant evidence is introduced and evaluated
- n) able to identify arguments and issues
- o) able to see connections between topics and use knowledge from other disciplines to enhance their reading and learning experiences.

Critical society: A society which rewards adherence to the values of Critical thinking and hence does not use indoctrination as the basic mode of learning (rewards reflective questioning, intellectual independence, and reasoned dissent). Socrates is not the only thinker to imagine a society in which independent critical thought became embodied in the concrete day-to-day lives of individuals; William Graham Sumner, North America's distinguished anthropologist, explicitly formulated the ideal:

The critical habit of thought, if usual in a society, will pervade its entire mores, because it is a way of taking up the problems of life. Men educated in it cannot be stampeded by stump orators and are never deceived by dithyrambic oratory. They are slow to believe. They can hold things as possible or probable in all degrees, without certainty and without pain. They can wait for evidence and weigh evidence, uninfluenced by the emphasis or confidence with which assertions are made on one side or the other. They can resist appeals to their dearest prejudices and all kinds of cajolery. Education in the critical faculty is the only education of which it can be truly said that it makes good citizens. (Folkways, 1906)

Until critical habits of thought pervade our society, however, there will be a tendency for schools as social institutions to transmit the prevailing world view more or less uncritically, to transmit it as reality, not as a picture of reality. Education for Critical thinking, then, requires that the school or classroom become a microcosm of a critical society. See didactic instruction, dialogical instruction, intellectual virtues, and knowledge.

Critical thinking: the ability to use cognitive skills and strategies effectively in order to increase the probability of a desirable outcome. It is the kind of thinking that is purposeful, reasoned, and goal-directed; the thinking that is involved in effective problem solving, calculation of likelihoods, formulation of inferences, and decisive decision-making.

Critical thinking: the thinking mainly concerned with having faith in the supremacy of reason, honesty, integrity, fair-mindedness, courage, empathy, and open-mindedness

Critical thinking: 1) Disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. 2) Thinking that displays mastery of intellectual skills and abilities. 3) The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible. It can be distinguished into two forms: "selfish" or "sophistic", on the one hand, and "fair-minded", on the other. In thinking critically, we use our command of the elements of thinking to adjust our thinking successfully to the logical demands of a type or mode of thinking. See critical person, critical society, critical reading, critical listening, critical writing, perfections of thought, elements of thought, domains of thought, intellectual virtues.

2. Critical thinking: the thinking concerned with reason, intellectual honesty, and open-mindedness, as opposed to

emotionalism, intellectual laziness, and closed-mindedness. It involves: following evidence where it leads; considering all possibilities; relying on reason rather than emotion; being precise; considering a variety of possible viewpoints and explanations; weighing the effects of motives and biases; being concerned more with finding the truth than with being right; not rejecting unpopular views out of hand; being aware of one's own prejudices and biases, and not allowing them to sway one's judgment."

3. Critical thinking: is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned and goal-directed - the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task. Critical thinking also involves evaluating the thinking process - the reasoning that went into the conclusion we've arrived at, the kinds of factors considered in making a decision. Critical thinking is sometimes called directed thinking because it focuses on the desired outcome

4. Critical thinking: is the intellectually disciplined process of actively and skilfully conceptualising, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications and consequences, objections from alternative

viewpoints, and frame of reference. **Critical thinking skills:** understanding the meaning of a statement, judging ambiguity, judging whether an inductive conclusion is warranted, and judging whether statements made by authorities are acceptable.

Critical writing: To express ourselves in language requires that we arrange our ideas in some relationships to each other. When accuracy and truth are at issue, then we must understand what our thesis is, how we can support it, how we can elaborate it to make it intelligible to others, what objections can be raised to it from other points of view, what the limitations are to our point of view, and so forth. Disciplined writing requires disciplined thinking; disciplined thinking is achieved through disciplined writing. See critical listening, critical reading, and logic of language.

Critique: An objective judging, analysis, or evaluation of something. The purpose of critique is the same as the purpose of Critical thinking: to appreciate strengths as well as weaknesses, virtues as well as failings; Critical thinkers' critique in order to redesign, remodels, and make better.

Cultural association: Undisciplined thinking often reflects associations, personal and cultural, absorbed or uncritically formed. If a person who was cruel to me as a child had a particular tone of voice, I may find myself disliking a person who has the same tone of voice. Media advertising juxtaposes and joins logically unrelated things to influence our buying habits. Raised in a particular country or within a particular group within it, we form any number of mental links which, if they remain unexamined, unduly influence our thinking. See concept, critical society.

Cultural assumption: Un-assessed (often implicit) belief adopted by virtue of upbringing in a society. Raised in a society, we unconsciously take on its point of view, values,

beliefs, and practices. At the root of each of these are many kinds of assumptions. Not knowing that we perceive, conceive, think, and experience within assumptions we have taken in, we take ourselves to be perceiving "things as they are", not "things as they appear from a cultural vantage point". Becoming aware of our cultural assumptions so that we might critically examine them is a crucial dimension of Critical thinking. It is, however, a dimension almost totally absent from schooling. Lip service to this ideal is common enough; a realistic emphasis is virtually unheard of. See ethnocentricity, prejudice, and social contradiction.

Glossary D

Data: Facts, figures, or information from which conclusions can be inferred, or upon which interpretations or theories can be based. As critical thinkers we must make certain to distinguish hard data from the inferences or conclusions we draw from them.

Decision making: the mental processes (cognitive process) of analyzing, evaluating, and synthesizing data as received and which culminates in the selection of a course of action among several alternative scenarios.

Dialectical thinking: Dialogical thinking (thinking within more than one perspective) conducted to test the strengths and weaknesses of opposing points of view. (Court trials and debates are, in a sense, dialectical.) When thinking dialectically, reasoners pit two or more opposing points of view in competition with each other, developing each by providing support, raising objections, countering those objections, raising further objections, and so on. Dialectical thinking or discussion can be conducted so as to "win" by defeating the positions one disagrees with—using critical insight to support one's own view and point out flaws in other views (associated with Critical thinking in the restricted or weak sense), or fair-

mindedly, by conceding points that don't stand up to critique, trying to integrate or incorporate strong points found in other views, and using critical insight to develop a fuller and more accurate view (associated with Critical thinking in the fuller or strong sense). See monological problems.

Dialogical instruction: Instruction that fosters dialogical or dialectic thinking. Thus, when considering a question, the class brings all relevant subjects to bear and considers the perspectives of groups whose views are not canvassed in their texts—for example, "What did King George think of the Declaration of Independence, the Revolutionary War, the Continental Congress, Jefferson and Washington, etc.?" or, "How would an economist analyze this situation? A historian? A psychologist? A geographer?" See critical society, didactic instruction, higher order learning, lower order learning, Socratic questioning, and knowledge.

Dialogical thinking: Thinking that involves a dialogue or extended exchange between different points of view or frames of reference. Students learn best in dialogical situations, in circumstances in which they continually express their views to others and try to fit other's views into their own. See Socratic questioning, monological thinking, multilogical thinking, and dialectical thinking.

Didactic instruction: Teaching by telling. In didactic instruction, the teacher directly tells the student what to believe and think about a subject. The student's task is to remember what the teacher said and reproduce it on demand. In its most common form, this mode of teaching falsely assumes that one can directly give a person knowledge without that person having to think his or her way to it. It falsely assumes that knowledge can be separated from understanding and justification. It confuses the ability to state a principle with understanding it, the ability to supply a definition with knowing a new word, and the act of saying that something is

important with recognizing its importance. See critical society, knowledge.

Domains of thought: Thinking can be oriented or structured with different issues or purposes in view. Thinking varies in accordance with purpose and issue. Critical thinkers learn to discipline their thinking to take into account the nature of the issue or domain. We see this most clearly when we consider the difference between issues and thinking within different academic disciplines or subject areas. Hence, mathematical thinking is quite different from, say, historical thinking. Mathematics and history, we can say then, represent different domains of thought. See the logic of questions.

Glossary E

Egocentricity: A tendency to view everything in relationship to oneself; to confuse immediate perception (how things seem) with reality. One's desires, values, and beliefs (seeming to be self-evidently correct or superior to those of others) are often uncritically used as the norm of all judgement and experience. Egocentricity is one of the fundamental impediments to Critical thinking. As one learns to think critically in a strong sense, one learns to become more rational, and less egocentric. See human nature, strong sense critical thinker, ethnocentrism, socio-centrism, personal contradiction.

Elements of thought: All thought has a universal set of elements, each of which can be monitored for possible problems: Are we clear about our purpose or goal? About the problem or question at issue? About our point of view or frame of reference? About our assumptions? About the claims we are making? about the reasons or evidence upon which we are basing our claims? about our inferences and line of reasoning? about the implications and consequences that follow from our reasoning? Critical thinkers develop skills of identifying and

assessing these elements in their thinking and in the thinking of others.

Emotion: A feeling aroused to the point of awareness, often a strong feeling or state of excitement. When our egocentric emotions or feelings get involved, when we are excited by infantile anger, fear, jealousy, etc., our objectivity often decreases. Critical thinkers need to be able to monitor their egocentric feelings and use their rational passions to reason themselves into feelings appropriate to the situation as it really is, rather than to how it seems to their infantile ego. Emotions and feelings themselves are not irrational; however, it is common for people to feel strongly when their ego is stimulated. One way to understand the goal of strong sense Critical thinking is as the attempt to develop rational feelings and emotions at the expense of irrational, egocentric ones. See rational passions, intellectual virtues.

Empirical: Relying or based on experiment, observation, or experience rather than on theory or meaning. It is important to continually distinguish those considerations based on experiment, observation, or experience from those based on the meaning of a word or concept or the implications of a theory. One common form of uncritical or selfish Critical thinking involves distorting facts or experience in order to preserve a preconceived meaning or theory. For example, a conservative may distort the facts that support a liberal perspective to prevent empirical evidence from counting against a theory of the world that he or she holds rigidly. Indeed, within all perspectives and belief systems many will distort the facts before they will admit to a weakness in their favourite theory or belief. See data, fact, and evidence.

Empirical implication: That which follows from a situation or fact, not due to the logic of language, but from experience or scientific law. The redness of the coil on the stove empirically implies dangerous heat.

Ethnocentricity: A tendency to view one's own race or culture as central, based on the deep-seated belief that one's own group is superior to all others. Ethnocentrism is a form of egocentrism extended from the self to the group. Much uncritical or selfish Critical thinking is either egocentric or ethnocentric in nature. ('Ethnocentrism' and 'socio-centrism' are used synonymously, for the most part, though 'socio-centricity' is broader, relating to any group, including, for example, socio-centricity regarding one's profession.) The "cure" for ethnocentrism or socio-centrism is empathic thought within the perspective of opposing groups and cultures. Such empathic thought is rarely cultivated in the societies and schools of today. Instead, many people develop an empty rhetoric of tolerance, saying that others have different beliefs and ways, but without seriously considering those beliefs and ways, what they mean to those others and their reasons for maintaining them.

Evaluation: To judge or determine the worth or quality of. Evaluation has logic and should be carefully distinguished from mere subjective preference. The elements of its logic may be put in the form of questions which may be asked whenever an evaluation is to be carried out: 1) Are we clear about what precisely we are evaluating? 2) Are we clear about our purpose? Is our purpose legitimate? 3) Given our purpose, what are the relevant criteria or standards for evaluation? 4) Do we have sufficient information about that which we are evaluating? Is that information relevant to the purpose? And 5) Have we applied our criteria accurately and fairly to the facts as we know them? Uncritical thinkers often treat evaluation as mere preference or treat their evaluative judgments as direct observations not admitting of error.

Evidence: The data on which a judgment or conclusion might be based or by which proof or probability might be established. Critical thinkers distinguish the evidence or raw data upon

which they base their interpretations or conclusions from the inferences and assumptions that connect data to conclusions. Uncritical thinkers treat their conclusions as something given to them in experience, as something they directly observe in the world. As a result, they find it difficult to see why anyone might disagree with their conclusions. After all, the truth of their views is, they believe, right there for everyone to see! Such people find it difficult or even impossible to describe the evidence or experience without coloring that description with their interpretation.

Explicit: Clearly stated and leaving nothing implied; explicit is applied to that which is so clearly stated or distinctly set forth that there should be no doubt as to the meaning; exact and precise in this connection both suggest that which is strictly defined, accurately stated, or made unmistakably clear; definite implies precise limitations as to the nature, character, meaning, etc. of something; specific implies the pointing up of details or the particularizing of references. Critical thinking often requires the ability to be explicit, exact, definite, and specific. Most students cannot make what is implicit in their thinking explicit. This deficiency hampers their ability to monitor and assess their thinking.

Glossary F-H

Fact: What actually happened, what is true; verifiable by empirical means; distinguished from interpretation, inference, judgement, or conclusion; the raw data. There are distinct senses of the word 'factual': "True" (as opposed to "claimed to be true"); and "empirical" (as opposed to conceptual or evaluative). You may make many "factual claims" in one sense, that is, claims which can be verified or disproven by observation or empirical study, but I must evaluate those claims to determine if they are true. People often confuse these two senses, even to the point of accepting as true, statements

which merely "seem factual", for example, "29.23 % of Americans suffer from depression." Before I accept this as true, I should assess it. I should ask such questions as "How do you know? How could this be known? Did you merely ask people if they were depressed and extrapolate those results? How exactly did you arrive at this figure?" Purported facts should be assessed for their accuracy, completeness, and relevance to the issue. Sources of purported facts should be assessed for their qualifications, track records, and impartiality. Education which stresses retention and repetition of factual claims stunts students' desire and ability to assess alleged facts, leaving them open to manipulation. Activities in which students are asked to "distinguish fact from opinion" often confuse these two senses. They encourage students to accept as true statements which merely "look like" facts. See intellectual humility, knowledge.

Fair: Treating both or all sides alike without reference to one's own feelings or interests; just implies adherence to a standard of rightness or lawfulness without reference to one's own inclinations; impartial and unbiased both imply freedom from prejudice for or against any side; dispassionate implies the absence of passion or strong emotion, hence, connotes cool, disinterested judgment; objective implies a viewing of persons or things without reference to oneself, one's interests, etc.

Faith: 1) Unquestioning belief in anything. 2) Confidence, trust, or reliance. A critical thinker does not accept faith in the first sense, for every belief is reached on the basis of some thinking, which may or may not be justified. Even in religion one believes in one religion rather than another, and in doing so implies that there are good reasons for accepting one rather than another. A Christian, for example, believes that there are good reasons for not being an atheist, and Christians often attempt to persuade non-Christians to change their beliefs. In some sense, then, everyone has confidence in the capacity of his

or her own mind to judge rightly on the basis of good reasons, and does not believe simply on the basis of blind faith.

Fallacy/Fallacious: An error in reasoning; flaw or defect in argument; an argument which doesn't conform to rules of good reasoning (especially one that appears to be sound); Containing or based on a fallacy; deceptive in appearance or meaning; misleading; delusive.

Higher order learning: Learning through exploring the foundations, justification, implications, and value of a fact, principle, skill, or concept; learning so as to deeply understand. One can learn in keeping with the rational capacities of the human mind or in keeping with its irrational propensities, cultivating the capacity of the human mind to discipline and direct its thought through commitment to intellectual standards, or one can learn through mere association. Education for critical thought produces higher order learning by helping students actively think their way to conclusions; discuss their thinking with other students and the teacher; entertain a variety of points of view; analyze concepts, theories, and explanations in their own terms; actively question the meaning and implications of what they learn; compare what they learn to what they have experienced; take what they read and write seriously; solve non-routine problems; examine assumptions; and gather and assess evidence. Students should learn each subject by engaging in thought within that subject. They should learn history by thinking historically, mathematics by thinking mathematically, etc. See dialogical instruction, lower order learning, critical society, knowledge, principle, domains of thought.

Human nature: The common qualities of all human beings. People have both a primary and a secondary nature. Our primary nature is spontaneous, egocentric, and strongly prone to irrational belief formation. It is the basis for our instinctual thought. People need no training to believe what they want to

believe: what serves their immediate interests, what preserves their sense of personal comfort and righteousness, what minimizes their sense of inconsistency, and what presupposes their own correctness. People need no special training to believe what those around them believe: what their parents and friends believe, what is taught to them by religious and school authorities, what is repeated often by the media, and what is commonly believed in the nation in which they are raised. People need no training to think that those who disagree with them are wrong and probably prejudiced. People need no training to assume that their own most fundamental beliefs are self-evidently true or easily justified by evidence. People naturally and spontaneously identify with their own beliefs. They experience most disagreement as personal attack. The resulting defensiveness interferes with their capacity to empathize with or enter into other points of view.

On the other hand, people need extensive and systematic practice to develop their secondary nature, their implicit capacity to function as rational persons. They need extensive and systematic practice to recognize the tendencies they have to form irrational beliefs. They need extensive practice to develop a dislike of inconsistency, a love of clarity, a passion to seek reasons and evidence and to be fair to points of view other than their own. People need extensive practice to recognize that they indeed have a point of view, that they live inferentially, that they do not have a direct pipeline to reality, that it is perfectly possible to have an overwhelming inner sense of the correctness of one's views and still be wrong. See intellectual virtues.

Glossary I

Idea: Anything existing in the mind as an object of knowledge or thought; concept refers to generalized idea of a class of objects, based on knowledge of particular instances of the class;

conception, often equivalent to concept, specifically refers to something conceived in the mind or imagined; thought refers to any idea, whether or not expressed, that occurs to the mind in reasoning or contemplation; notion implies vagueness or incomplete intention; impression also implies vagueness of an idea provoked by some external stimulus. Critical thinkers are aware of what ideas they are using in their thinking, where those ideas came from, and how to assess them. See clarify, concept, logic, logic of language.

Imply/implication: A claim or truth which follows from other claims or truths. One of the most important skills of Critical thinking is the ability to distinguish between what is actually implied by a statement or situation from what may be carelessly inferred by people. Critical thinkers try to monitor their inferences to keep them in line with what is actually implied by what they know. When speaking, critical thinkers try to use words that imply only what they can legitimately justify. They recognize that there are established word usages which generate established implications. To say of an act that it is murder, for example, is to imply that it is intentional and unjustified. See clarify, precision, logic of language, critical listening, critical reading, elements of thought.

Infer/Inference: An inference is a step of the mind, an intellectual act by which one concludes that something is so in light of something else's being so, or seeming to be so. If you come at me with a knife in your hand, I would probably infer that you mean to do me harm. Inferences can be strong or weak, justified or unjustified. Inferences are based upon assumptions. See imply/implication.

Insight: The ability to see and clearly and deeply understand the inner nature of things. Instruction for Critical thinking fosters insight rather than mere performance; it cultivates the achievement of deeper knowledge and understanding through insight. Thinking one's way into and through a subject lead to

insights as one synthesizes what one is learning, relating one subject to other subjects and all subjects to personal experience. Rarely is insight formulated as a goal in present curricula and texts. See dialogical instruction, higher order learning, lower order learning, didactic instruction, and intellectual humility.

Intellectual autonomy: Having rational control of one's beliefs, values, and inferences. The ideal of Critical thinking is to learn to think for oneself, to gain command over one's thought processes. Intellectual autonomy does not entail willfulness, stubbornness, or rebellion. It entails a commitment to analyzing and evaluating beliefs on the basis of reason and evidence, to question when it is rational to question, to believe when it is rational to believe, and to conform when it is rational to conform. See know, knowledge.

(Intellectual) confidence or faith in reason: Confidence that in the long run one's own higher interests and those of humankind at large will best be served by giving the freest play to reason-by encouraging people to come to their own conclusions through a process of developing their own rational faculties; faith that (with proper encouragement and cultivation) people can learn to think for themselves, form rational viewpoints, draw reasonable conclusions, think coherently and logically, persuade each other by reason, and become reasonable, despite the deep-seated obstacles in the native character of the human mind and in society. Confidence in reason is developed through experiences in which one reason one's way to insight, solves problems through reason, uses reason to persuade, and is persuaded by reason. Confidence in reason is undermined when one is expected to perform tasks without understanding why, to repeat statements without having verified or justified them, to accept beliefs on the sole basis of authority or social pressure.

Intellectual courage: The willingness to face and fairly assess ideas, beliefs, or viewpoints to which we have not given a serious hearing, regardless of our strong negative reactions to them. This courage arises from the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part), and that conclusions or beliefs espoused by those around us or inculcated in us are sometimes false or misleading. To determine for ourselves which is which, we must not passively and uncritically "accept" what we have "learned". Intellectual courage comes into play here, because inevitably we will come to see some truth in some ideas considered dangerous and absurd and some distortion or falsity in some ideas strongly held in our social group. It takes courage to be true to our own thinking in such circumstances. Examining cherished beliefs is difficult, and the penalties for non-conformity are often severe.

Intellectual empathy: Understanding the need to imaginatively put oneself in the place of others to genuinely understand them. We must recognize our egocentric tendency to identify truth with our immediate perceptions or longstanding beliefs. Intellectual empathy correlates with the ability to accurately reconstruct the viewpoints and reasoning of others and to reason from premises, assumptions, and ideas other than our own. This trait also requires that we remember occasions when we were wrong, despite an intense conviction that we were right, and consider that we might be similarly deceived in a case at hand.

Intellectual humility: Awareness of the limits of one's knowledge, including sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias and prejudice in, and limitations of one's viewpoint. Intellectual humility is based on the recognition that no one should claim more than he or she actually knows. It does not imply spinelessness or submissiveness. It implies

the lack of intellectual pretentiousness, boastfulness, or conceit, combined with insight into the strengths or weaknesses of the logical foundations of one's beliefs.

Intellectual integrity: Recognition of the need to be true to one's own thinking, to be consistent in the intellectual standards one applies, to hold oneself to the same rigorous standards of evidence and proof to which one holds one's antagonists, to practice what one advocates for others, and to honestly admit discrepancies and inconsistencies in one's own thought and action. This trait develops best in a supportive atmosphere in which people feel secure and free enough to honestly acknowledge their inconsistencies, and can develop and share realistic ways of ameliorating them. It requires honest acknowledgment of the difficulties of achieving greater consistency.

Intellectual perseverance: Willingness and consciousness of the need to pursue intellectual insights and truths despite difficulties, obstacles, and frustrations; firm adherence to rational principles despite irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time in order to achieve deeper understanding or insight. This trait is undermined when teachers and others continually provide the answers, do students' thinking for them or substitute easy tricks, algorithms, and short cuts for careful, independent thought.

Intellectual sense of justice: Willingness and consciousness of the need to entertain all viewpoints sympathetically and to assess them with the same intellectual standards, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community, or nation; implies adherence to intellectual standards without reference to one's own advantage or the advantage of one's group.

Intellectual virtues: The traits of mind and character necessary for right action and thinking; the traits of mind and character essential for fair-minded rationality; the traits that distinguish the narrow-minded, self-serving critical thinker from the open-minded, truth-seeking critical thinker. These intellectual traits are interdependent. Each is best developed while developing the others as well. They cannot be imposed from without; they must be cultivated by encouragement and example. People can come to deeply understand and accept these principles by analyzing their experiences of them: learning from an unfamiliar perspective, discovering you don't know as much as you thought, and so on. They include: intellectual sense of justice, intellectual perseverance, intellectual integrity, intellectual humility, intellectual empathy, intellectual courage, (intellectual) confidence in reason, and intellectual autonomy.

Interpret/interpretation: To give one's own conception of, to place in the context of one's own experience, perspective, point of view, or philosophy. Interpretations should be distinguished from the facts, the evidence, the situation. (I may interpret someone's silence as an expression of hostility toward me. Such an interpretation may or may not be correct. I may have projected my patterns of motivation and behaviour onto that person, or I may have accurately noticed this pattern in the other.) The best interpretations take the most evidence into account. Critical thinkers recognize their interpretations, distinguish them from evidence, consider alternative interpretations, and reconsider their interpretations in the light of new evidence. All learning involves personal interpretation, since whatever we learn we must integrate into our own thinking and action. What we learn must be given a meaning by us, must be meaningful to us, and hence involves interpretive acts on our part. Didactic instruction, in attempting to directly implant knowledge in students' minds,

typically ignores the role of personal interpretation in learning.

Intuition: The direct knowing or learning of something without the conscious use of reasoning. We sometimes seem to know or learn things without recognizing how we came to that knowledge. When this occurs, we experience an inner sense that what we believe is true. The problem is that sometimes we are correct (and have genuinely experienced an intuition) and sometimes we are incorrect (having fallen victim to one of our prejudices). A critical thinker does not blindly accept that what he or she thinks or believes but cannot account for is necessarily true. A critical thinker realizes how easily we confuse intuitions and prejudices. Critical thinkers may follow their inner sense that something is so, but only with a healthy sense of intellectual humility.

There is a second sense of 'intuition' that is important for Critical thinking, and that is the meaning suggested in the following sentence: "To develop your Critical thinking abilities, it is important to develop your Critical thinking intuitions." This sense of the word is connected to the fact that we can learn concepts at various levels of depth. If we learn nothing more than an abstract definition for a word and do not learn how to apply it effectively in a wide variety of situations, one might say that we end up with no intuitive basis for applying it. We lack the insight into how, when, and why it applies. Helping students to develop Critical thinking intuitions is helping them gain the practical insights necessary for a ready and swift application of concepts to cases in a large array of circumstances. We want Critical thinking to be "intuitive" to our students, ready and available for immediate translation into their everyday thought and experience.

Irrational/Irrationality: 1) Lacking the power to reason. 2) Contrary to reason or logic. 3) Senseless, absurd. Uncritical thinkers have failed to develop the ability or power to reason

well. Their beliefs and practices, then, are often contrary to reason and logic, and are sometimes senseless or absurd. It is important to recognize, however, that in societies with irrational beliefs and practices, it is not clear whether challenging those beliefs and practices-and therefore possibly endangering oneself-is rational or irrational. Furthermore, suppose one's vested interests are best advanced by adopting beliefs and practices that are contrary to reason. Is it then rational to follow reason and negate one's vested interests or follow one's interests and ignore reason? These very real dilemmas of everyday life represent on-going problems for critical thinkers. Selfish critical thinkers, of course, face no dilemma here because of their consistent commitment to advance their narrow-vested interests. Fair-minded critical thinkers make these decisions self-consciously and honestly assess the results.

Irrational learning: All rational learning presupposes rational assent. And, though we sometimes forget it, not all learning is automatically or even commonly rational. Much that we learn in everyday life is quite distinctively irrational. It is quite possible – and indeed the bulk of human learning is unfortunately of this character-to come to believe any number of things without knowing how or why. It is quite possible, in other words, to believe for irrational reasons: because those around us believe, because we are rewarded for believing, because we are afraid to disbelieve, because our vested interest is served by belief, because we are more comfortable with belief, or because we have ego identified ourselves, our image, or our personal being with belief. In all of these cases, our beliefs are without rational grounding, without good reason and evidence, without the foundation a rational person demands. We become rational, on the other hand, to the extent that our beliefs and actions are grounded in good reasons and evidence; to the extent that we recognize and critique our own irrationality; to the extent that we are not moved by bad

reasons and a multiplicity of irrational motives, fears, and desires; to the extent that we have cultivated a passion for clarity, accuracy, and fair-mindedness. These global skills, passions, and dispositions, integrated into behaviour and thought, characterize the rational, the educated, and the critical person. See higher and lower order learning, knowledge, didactic instruction.

Glossary J-L

Judgement: 1) The act of judging or deciding. 2) Understanding and good sense. A person has good judgement when they typically judge and decide on the basis of understanding and good sense. Whenever we form a belief or opinion, make a decision, or act, we do so on the basis of implicit or explicit judgements. All thought presupposes making judgements concerning what is so and what is not so, what is true and what is not. To cultivate people's ability to think critically is to foster their judgement, to help them to develop the habit of judging on the basis of reason, evidence, logic, and good sense. Good judgement is developed, not by merely learning about principles of good judgement, but by frequent practice judging and assessing judgements.

Justify/Justification: The act of showing a belief, opinion, action, or policy to be in accord with reason and evidence, to be ethically acceptable, or both. Education should foster reasonability in students. This requires that both teachers and students develop the disposition to ask for and give justifications for beliefs, opinions, actions, and policies. Asking for a justification should not, then, be viewed as an insult or attack, but rather as a normal act of a rational person. Didactic modes of teaching that do not encourage students to question the justification for what is asserted fail to develop a thoughtful environment conducive to education.

Know: To have a clear perception or understanding of, to be sure of, to have a firm mental grasp of; information applies to data that are gathered in any way, as by reading, observation, hearsay, etc. and does not necessarily connote validity; knowledge applies to anybody of facts gathered by study, observation, etc. and to the ideas inferred from these facts, and connotes an understanding of what is known. Critical thinkers need to distinguish knowledge from opinion and belief. See knowledge.

Knowledge: The act of having a clear and justifiable grasp of what is so or of how to do something. Knowledge is based on understanding or skill, which in turn are based on thought, study, and experience. 'Thoughtless knowledge' is a contradiction. 'Blind knowledge' is a contradiction. 'Unjustifiable knowledge' is a contradiction. Knowledge implies justifiable belief or skilled action. Hence, when students blindly memorize and are tested for recall, they are not being tested for knowledge. Knowledge is continually confused with recall in present-day schooling.

This confusion is a deep-seated impediment to the integration of Critical thinking into schooling. Genuine knowledge is inseparable from thinking minds. We often wrongly talk of knowledge as though it could be divorced from thinking, as though it could be gathered up by one person and given to another in the form of a collection of sentences to remember. When we talk in this way, we forget that knowledge, by its very nature, depends on thought.

Knowledge is produced by thought, analyzed by thought, comprehended by thought, organized, evaluated, maintained, and transformed by thought. Knowledge can be acquired only through thought. Knowledge exists, properly speaking, only in minds that have comprehended and justified it through thought. Knowledge is not to be confused with belief nor with symbolic representation of belief. Humans easily and

frequently believe things that are false or believe things to be true without knowing them to be so. A book contains knowledge only in a derivative sense, only because minds can thoughtfully read it and through that process gain knowledge.

Logic:

1. Correct reasoning or the study of correct reasoning and its foundations.
2. The relationships between propositions (supports, assumes, implies, contradicts, counts against, is relevant to ...).
3. The system of principles, concepts, and assumptions that underlie any discipline, activity, or practice.
4. Validation and or invalidation of an argument on the basis of the evidential link between the premises and the conclusion(s).
5. The set of rational considerations that bear upon the truth or justification of any belief or set of beliefs.
6. The set of rational considerations that bear upon the settlement of any question or set of questions.

The word 'logic' covers a range of related concerns all bearing upon the question of rational justification and explanation. All human thought and behaviour are to some extent based on logic rather than instinct. Humans try to figure things out using ideas, meanings, and thought. Such intellectual behaviour inevitably involves "logic" or considerations of a logical sort: some sense of what is relevant and irrelevant, of what supports and what counts against a belief, of what we should and should not assume, of what we should and should not claim, of what we do and do not know, of what is and is not implied, of what does and does not contradict, of what we should or should not do or believe.

Concepts have logic in that we can investigate the conditions under which they do and do not apply, of what is relevant or

irrelevant to them, of what they do or don't imply, etc. Questions have logic in that we can investigate the conditions under which they can be settled. Disciplines have logic in that they have purposes and a set of logical structures that bear upon those purposes: assumptions, concepts, issues, data, theories, claims, implications, consequences, etc.

The concept of logic is a seminal notion in Critical thinking. Unfortunately, it takes a considerable length of time before most people become comfortable with its multiple uses. In part, this is due to people's failure to monitor their own thinking in keeping with the standards of reason and logic. This is not to deny, of course, that logic is involved in all human thinking. It is rather to say that the logic we use is often implicit, unexpressed, and sometimes contradictory. See knowledge, higher and lower order learning, the logic of a discipline, the logic of language, the logic of questions.

The Logic of a Discipline: The notion that every technical term has logical relationships with other technical terms, that some terms are logically more basic than others, and that every discipline relies on concepts, assumptions, and theories, makes claims, gives reasons and evidence, avoids contradictions and inconsistencies, has implications and consequences, etc.

Though all students study disciplines, most are ignorant of the logic of the disciplines they study. This severely limits their ability to grasp the discipline as a whole, to think independently within it, to compare and contrast it with other disciplines, and to apply it outside the context of academic assignments. Typically, now, students do not look for seminal terms as they study an area. They do not strive to translate technical terms into analogies and ordinary words they understand or distinguish technical from ordinary uses of terms. They do not look for the basic assumptions of the disciplines they study. Indeed, on the whole, they do not know what assumptions are nor why it is important to examine them.

What they have in their heads exists like so many BBs in a bag. Whether one thought supports or follows from another, whether one thought elaborates another, exemplifies, presupposes, or contradicts another, are matters students have not learned to think about. They have not learned to use thought to understand thought, which is another way of saying that they have not learned how to use thought to gain knowledge. Instruction for Critical thinking cultivates the students' ability to make explicit the logic of what they study. This emphasis gives depth and breadth to study and learning. It lies at the heart of the differences between lower order and higher order learning. See knowledge.

The logic of language: For a language to exist and be learnable by persons from a variety of cultures, it is necessary that words have definite uses and defined concepts that transcend particular cultures. The English language, for example, is learned by many peoples of the world unfamiliar with English or North American cultures. Critical thinkers must learn to use their native language with precision, in keeping with educated usage.

Unfortunately, many students do not understand the significant relationship between precision in language usage and precision in thought. Consider, for example, how most students relate to their native language. If one questions them about the meanings of words, their account is typically incoherent. They often say that people have their own meanings for all the words they use, not noticing that, were this true, we could not understand each other.

Students speak and write in vague sentences because they have no rational criteria for choosing words-they simply write whatever words pop into their heads. They do not realize that every language has a highly refined logic one must learn in order to express oneself precisely. They do not realize that even words similar in meaning typically have different

implications. Consider, for example, the words explain, expound, explicate, elucidate, interpret, and construe.

- Explain implies the process of making clear and intelligible something not understood or known.
- Expound implies a systematic and thorough explanation, often by an expert.
- Explicate implies a scholarly analysis developed in detail.
- Elucidate implies a shedding of light upon by clear and specific illustration or explanation.
- Interpret implies the bringing out of meanings not immediately apparent.
- Construe implies a particular interpretation of something whose meaning is ambiguous.

See clarify, concept.

The logic of questions: The range of rational considerations that bear upon the settlement of a given question or group of questions. A critical thinker is adept at analyzing questions to determine what, precisely, a question asks and how to go about rationally settling it. A critical thinker recognizes that different kinds of questions often call for different modes of thinking, different kinds of considerations, and different procedures and techniques. Uncritical thinkers often confuse distinct questions and use considerations irrelevant to an issue while ignoring relevant ones.

Lower order learning: Learning by rote memorization, association, and drill. There are a variety of forms of lower order learning in the schools which we can identify by understanding the relative lack of logic informing them. Paradigmatically, lower order learning is learning by sheer association or rote. Hence students come to think of history class, for example, as a place where you hear names, dates,

places, events, and outcomes; where you try to remember them and state them on tests. Math comes to be thought of as numbers, symbols, and formulas-mysterious things you mechanically manipulate as the teacher told you in order to get the right answer.

Literature is often thought of as uninteresting stories to remember along with what the teacher said is important about them. Consequently, students leave with a jumble of undigested fragments, scraps left over after they have forgotten most of what they stored in their short-term memories for tests. Virtually never do they grasp the logic of what they learn. Rarely do they relate what they learn to their own experience or critique each by means of the other. Rarely do they try to test what they learn in everyday life. Rarely do they ask "Why is this so? How does this relate to what I already know? How does this relate to what I am learning in other classes?"

To put the point in a nutshell, very few students think of what they are learning as worthy of being arranged logically in their minds or have the slightest idea of how to do so. See didactic instruction, monological and multilogical problems and thinking.

Glossary M-O

Monological (one-dimensional) problems: Problems that can be solved by reasoning exclusively within one point of view or frame of reference. For example, consider the following problems: 1) Ten full crates of walnuts weigh 410 pounds, whereas an empty crate weighs 10 pounds. How much do the walnuts alone weigh? and 2) In how many days of the week does the third letter of the day's name immediately follow the first letter of the day's name in the alphabet? I call these problems and the means by which they are solved "monological". They are settled within one frame of reference

with a definite set of logical moves. When the right set of moves is performed, the problem is settled. The answer or solution proposed can be shown by standards implicit in the frame of reference to be the "right" answer or solution.

Most important human problems are multilogical rather than monological, nonatomic problems inextricably joined to other problems, with some conceptual messiness to them and very often with important values lurking in the background. When the problems have an empirical dimension, that dimension tends to have a controversial scope. In multilogical problems, it is often arguable how some facts should be considered and interpreted, and how their significance should be determined. When they have a conceptual dimension, there tend to be arguably different ways to pin the concepts down.

Though life presents us with predominantly multilogical problems, schooling today over-emphasizes monological problems. Worse, and more frequently, present instructional practices treat multilogical problems as though they were monological. The posing of multilogical problems, and their consideration from multiple points of view, play an important role in the cultivation of Critical thinking and higher order learning.

Monological (one-dimensional) thinking: Thinking that is conducted exclusively within one point of view or frame of reference: figuring out how much this \$67.49 pair of shoes with a 25% discount will cost me; learning what signing this contract obliges me to do; finding out when Kennedy was elected President. A person can think monologically whether or not the question is genuinely monological. (For example, if one considers the question, "Who caused the Civil War?" only from a Northerner's perspective, one is thinking monologically about a multilogical question.)

The strong sense critical thinker avoids monological thinking when the question is multi-logical. Moreover, higher order learning requires multi-logical thought, even when the problem is monological (for example, learning a concept in chemistry), since students must explore and assess their original beliefs to develop insight into new ideas.

Multilogical (multi-dimensional) problems: Problems that can be analyzed and approached from more than one, often from conflicting, points of view or frames of reference. For example, many ecological problems have a variety of dimensions to them: historical, social, economic, biological, chemical, moral, political, etc. A person comfortable thinking about multilogical problems is comfortable thinking within multiple perspectives, in engaging in dialogical and dialectical thinking, in practicing intellectual empathy, in thinking across disciplines and domains. See monological problems, the logic of questions, the logic of disciplines, intellectual empathy, and dialogical instruction.

Multilogical thinking: Thinking that sympathetically enters, considers, and reasons within multiple points of view. See multilogical problems, dialectical thinking, and dialogical instruction.

National bias: Prejudice in favour of one's country, its beliefs, traditions, practices, image, and world view; a form of sociocentrism or ethnocentrism. It is natural, if not inevitable, for people to be favourably disposed toward the beliefs, traditions, practices, and world view within which they were raised. Unfortunately, this favourable inclination commonly becomes a form of prejudice: a more or less rigid, irrational ego-identification which significantly distorts one's view of one's own nation and the world at large. It is manifested in a tendency to mindlessly take the side of one's own government, to uncritically accept governmental accounts of the nature of disputes with other nations, to uncritically exaggerate the

virtues of one's own nation while playing down the virtues of "enemy" nations.

National bias is reflected in the press and media coverage of every nation of the world. Events are included or excluded according to what appears significant within the dominant world view of the nation, and are shaped into stories to validate that view. Though constructed to fit into a particular view of the world, the stories in the news are presented as neutral, objective accounts, and uncritically accepted as such because people tend to uncritically assume that their own view of things is the way things really are.

To become responsible critically thinking citizens and fair-minded people, students must practice identifying national bias in the news and in their texts, and to broaden their perspective beyond that of uncritical nationalism. See ethnocentrism, socio-centrism, bias, prejudice, world view, intellectual empathy, critical society, dialogical instruction, and knowledge.

Opinion: A belief, typically one open to dispute. Sheer unreasoned opinion should be distinguished from reasoned judgment-beliefs formed on the basis of careful reasoning. See evaluation, judgment, justify, and know, knowledge, reasoned judgment.

Glossary P-Q

The perfections of thought: Thinking, as an attempt to understand the world as it is, has a natural excellence or fitness to it. This excellence is manifest in its clarity, precision, specificity, accuracy, relevance, consistency, logicalness, depth, completeness, significance, fairness, and adequacy. These perfections are general canons for thought; they represent legitimate concerns irrespective of the discipline or domain of thought.

To develop one's mind and discipline one's thinking with respect to these standards requires extensive practice and long-term cultivation. Of course, achieving these standards is a relative matter and varies somewhat among domains of thought— Being precise while doing mathematics is not the same as being precise while writing a poem, describing an experience, or explaining a historical event.

Furthermore, one's perfection of thought may be periodically incompatible with the others: adequacy to purpose. Time and resources sufficient to thoroughly analyze a question or problem is all too often an unaffordable luxury. Also, since the social world is often irrational and unjust, because people are often manipulated to act against their interests, and because skilled thought often serves vested interest, thought adequate to these manipulative purposes may require skilled violation of the common standards for good thinking. Skilled propaganda, skilled political debate, skilled defense of a group's interests, skilled deception of one's enemy may require the violation or selective application of any of the above standards.

Perfecting one's thought as an instrument for success in a world based on power and advantage differs from perfecting one's thought for the apprehension and defense of fair-minded truth. To develop one's Critical thinking skills merely to the level of adequacy for social success is to develop those skills in a lower or weaker sense.

Personal contradiction: An inconsistency in one's personal life, wherein one says one thing and does another, or uses a double standard, judging oneself and one's friends by an easier standard than that used for people one doesn't like; typically, a form of hypocrisy accompanied by self-deception. Most personal contradictions remain unconscious. People too often ignore the difficulty of becoming intellectually and morally consistent, preferring instead to merely admonish others. Personal contradictions are more likely to be discovered,

analyzed, and reduced in an atmosphere in which they can be openly admitted and realistically considered without excessive penalty. See egocentricity, intellectual integrity.

Perspective (point of view): Human thought is relational and selective. It is impossible to understand any person, event, or phenomenon from every vantage point simultaneously. Our purposes often control how we see things. Critical thinking requires that this fact be taken into account when analyzing and assessing thinking. This is not to say that human thought is incapable of truth and objectivity, but only that human truth, objectivity, and insight is virtually always limited and partial, virtually never total and absolute. The hard sciences are themselves a good example of this point, since qualitative realities are systematically ignored in favour of quantifiable realities.

Precision: The quality of being accurate, definite, and exact. The standards and modes of precision vary according to subject and context. See the logic of language, elements of thought.

Prejudice: A judgment, belief, opinion, point of view—favourable or unfavourable—formed before the facts are known, resistant to evidence and reason, or in disregard of facts which contradict it. Self-announced prejudice is rare. Prejudice almost always exists in obscured, rationalized, socially validated, functional forms. It enables people to sleep peacefully at night even while flagrantly abusing the rights of others. It enables people to get more of what they want, or to get it more easily. It is often sanctioned with a superabundance of pomp and self-righteousness.

Unless we recognize these powerful tendencies toward selfish thought in our social institutions, even in what appear to be lofty actions and moralistic rhetoric, we will not face squarely

the problem of prejudice in human thought and action. Uncritical and selfishly critical thought are often prejudiced.

Most instruction in schools today, because students do not think their way to what they accept as true, tends to give students prejudices rather than knowledge. For example, partly as a result of schooling, people often accept as authorities those who liberally sprinkle their statements with numbers and intellectual-sounding language, however irrational or unjust their positions. This prejudice toward pseudo-authority impedes rational assessment. See insight, knowledge.

Premise: A proposition upon which an argument is based or from which a conclusion is drawn— a starting point of reasoning. For example, one might say, in commenting on someone's reasoning, "You seem to be reasoning from the premise that everyone is selfish in everything they do. Do you hold this belief?"

Principle: A fundamental truth, law, doctrine, value, or commitment, upon which others are based. Rules, which are more specific, and often superficial and arbitrary, are based on principles. Rules are more algorithmic; they needn't be understood to be followed. Principles must be understood to be appropriately applied or followed. Principles go to the heart of the matter. Critical thinking is dependent on principles, not rules and procedures. Critical thinking is principled, not procedural, thinking. Principles cannot be truly grasped through didactic instruction; they must be practiced and applied to be internalized. See higher order learning, lower order learning, judgment.

Problem: A question, matter, situation, or person that is perplexing or difficult to figure out, handle, or resolve. Problems, like questions, can be divided into many types. Each

has a (particular) logic. See logic of questions, monological problems, multilogical problems.

Problem: an issue that is out of alignment and requires be attending to, fixing, or correcting to enable desired outcomes to be achieved.

Problem-solving: the process of finding solutions to difficult or complex issues that need solutions for the ease of our needs.

Problem-solving: Whenever a problem cannot be solved formulaically or robotically, Critical thinking is required: first, to determine the nature and dimensions of the problem, and then, in the light of the first, to determine the considerations, points of view, concepts, theories, data, and reasoning relevant to its solution. Extensive practice in independent problem-solving is essential to developing critical thought. Problem-solving is rarely best approached procedurally or as a series of rigidly followed steps. For example, problem-solving schemas typically begin, "State the problem." Rarely can problems be precisely and fairly stated prior to analysis, gathering of evidence, and dialogical or dialectical thought wherein several provisional descriptions of the problem are proposed, assessed, and revised.

Problem-solving process: i) recognition and defining the problem, ii) establishing causal factors, iii) problem impact analysis, iv) formation of tentative solutions, v) evaluation of tentative solutions, vi) decision making

Problem solving skills: There are various skills that can increase our likelihood to solving problems. they include: i) Decision-making skills – this skill is useful, especially in choosing between alternatives, identifying the best solution, and being able to explain why the chosen solution is the best one under the circumstances. ii) Communication skills -helps in letting others know that there is a problem and in outlining how the problem will be corrected. Effective communication

skills is also instrumental in assigning responsibilities and explaining to others what they should be doing and, in letting others know that the problem-solving process is on course or it has been resolved; iii) Risk taking -the ability to identify the pros and cons of an alternative and then arming oneself with enough knowledge to carry out the plan effectively and efficiently; iv) Prioritization - when faced with many problems in your study or at work, being able to identify the most urgent and important problem to be addressed and fixed is a skill definitive of success and effective organization; v) Flexibility conditions and situations change all the time, therefore, willingness to re-analyze plans and assumptions and recalibrate them as needed is essential.

Proof (Prove): Evidence or reasoning so strong or certain as to demonstrate the truth or acceptability of a conclusion beyond a reasonable doubt. How strong evidence or reasoning have to be to demonstrate what they purport to prove varies from context to context, depending on the significance of the conclusion or the seriousness of the implications following from it. See domain of thought.

Glossary R

Rational/Rationality: That which conforms to principles of good reasoning, is sensible, shows good judgement, is consistent, logical, complete, and relevant. Rationality is a summary term like 'virtue' or 'goodness'. It is manifested in an unlimited number of ways and depends on a host of principles. There is some ambiguity in it, depending on whether one considers only the logicalness and effectiveness by which one pursues one's ends, or whether it includes the assessment of ends themselves. There is also ambiguity in whether one considers selfish ends to be rational, even when they conflict with what is just. Does a rational person have to be just or only skilled in pursuing his or her interests? Is it rational to be

rational in an irrational world? See perfections of thought, irrational/irrationality, logic, intellectual virtues, weak sense Critical thinking, strong sense Critical thinking.

Rational emotions/Passions: R. S. Peters has explained the significance of the affective side of reason and critical thought in his defense of the necessity of "rational passions":

There is, for instance, the hatred of contradictions and inconsistencies, together with the love of clarity and hatred of confusion without which words could not be held to relatively constant meanings and testable rules and generalizations stated. A reasonable man cannot, without some special explanation, slap his sides with delight or express indifference if he is told that what he says is confused, incoherent, and perhaps riddled with contradictions.

Reason is the antithesis of arbitrariness. In its operation, it is supported by the appropriate passions which are mainly negative in character-the hatred of irrelevance, special pleading, and arbitrary fiat. The more developed emotion of indignation is aroused when some excess of arbitrariness is perpetuated in a situation where people's interests and claims are at stake. The positive side of this is the passion for fairness and impartial consideration of claims....

A man who is prepared to reason must feel strongly that he must follow the arguments and decide things in terms of where they lead. He must have a sense of the givenness of the impersonality of such considerations. In so far as thoughts about persons enter his head, they should be tinged with the respect which is due to another, who like himself, may have a point of view which is worth considering, who may have a glimmering of the truth which has so far eluded him. A person who proceeds in this way, who is influenced by such passions, is what we call a reasonable man.

Rational self: Our character and nature to the extent that we seek to base our beliefs and actions on good reasoning and evidence. Who we are, what our true character is, or our predominant qualities are, is always somewhat or even greatly different from who we think we are. Human egocentrism and accompanying self-deception often stand in the way of our gaining more insight into ourselves. We can develop a rational self, become a person who gains significant insight into what our true character is, only by reducing our egocentrism and self-deception. Critical thinking is essential to this process.

Rational society: See critical society.

Reasoned judgment: Any belief or conclusion reached on the basis of careful thought and reflection, distinguished from mere or unreasoned opinion on the one hand, and from sheer fact on the other. Few people have a clear sense of which of their beliefs are based on reasoned judgment and which on mere opinion. Moral or ethical questions, for example, are questions requiring reasoned judgment. One way of conceiving of subject-matter education is as developing students' ability to engage in reasoned judgment in accordance with the standards of each subject.

Reasoning: The mental processes of those who reason; especially the drawing of conclusions or inferences from observations, facts, or hypotheses; the evidence or arguments used in this procedure. A critical thinker tries to develop the capacity to transform thought into reasoning at will, or rather, the ability to make his or her inferences explicit, along with the assumptions or premises upon which those inferences are based. Reasoning is a form of explicit inferring, usually involving multiple steps. When students write a persuasive paper, for example, we want them to be clear about their reasoning.

Reciprocity: The act of entering empathically into the point of view or line of reasoning of others; learning to think as others do and by that means sympathetically assessing that thinking. (Reciprocity requires creative imagination as well as intellectual skill and a commitment to fair-mindedness.)

Relevant: Bearing upon or relating to the matter at hand; relevant implies close logical relationship with, and importance to, the matter under consideration; germane implies such close natural connection as to be highly appropriate or fit; pertinent implies an immediate and direct bearing on the matter at hand (a pertinent suggestion); apposite applies to that which is both relevant and happily suitable or appropriate; applicable refers to that which can be brought to bear upon a particular matter or problem. Students often have problems sticking to an issue and distinguishing information that bears upon a problem from information that does not. Merely reminding students to limit themselves to relevant considerations fails to solve this problem. The usual way of teaching students the term 'relevant' is to mention only clear-cut cases of relevance and irrelevance. Consequently, students do not learn that not everything that seems relevant is, or that some things which do not seem relevant are. Sensitivity to (ability to judge) relevance can only be developed with continual practice-practice distinguishing relevant from irrelevant data, evaluating or judging relevance, arguing for and against the relevance of facts and considerations.

Glossary S

Self-deception: Deceiving one's self about one's true motivations, character, identity, etc. One possible definition of the human species is "The Self-Deceiving Animal". Self-deception is a fundamental problem in human life and the cause of much human suffering. Overcoming self-deception through self-Critical thinking is a fundamental goal of strong sense

Critical thinking. See egocentric, rational self, personal contradiction, social contradiction, and intellectual virtues.

Social contradiction: An inconsistency between what a society preaches and what it practices. In every society there is some degree of inconsistency between its image of itself and its actual character. Social contradiction typically correlates with human self-deception on the social or cultural level. Critical thinking is essential for the recognition of inconsistencies, and recognition is essential for reform and eventual integrity.

Socio-centricity: The assumption that one's own social group is inherently and self-evidently superior to all others. When a group or society sees itself as superior, and so considers its views as correct or as the only reasonable or justifiable views, and all its actions as justified, there is a tendency to presuppose this superiority in all of its thinking and thus, to think closed-mindedly. All dissent and doubt are considered disloyal and rejected without consideration. Few people recognize the socio-centric nature of much of their thought.

Socratic questioning: A mode of questioning that deeply probes the meaning, justification, or logical strength of a claim, position, or line of reasoning. Socratic questioning can be carried out in a variety of ways and adapted to many levels of ability and understanding. See elements of thought, dialogical instruction, and knowledge.

Specify/specific: To mention, describe, or define in detail; limiting or limited; specifying or specified; precise; definite. Student thinking, speech, and writing tend to be vague, abstract, and ambiguous rather than specific, concrete, and clear. Learning how to state one's views specifically is essential to learning how to think clearly, precisely, and accurately. See perfections of thought.

Strong sense critical thinker: One who is predominantly characterized by the following traits:

1. an ability to question deeply one's own framework of thought
2. an ability to reconstruct sympathetically and imaginatively the strongest versions of points of view and frameworks of thought opposed to one's own
3. an ability to reason dialectically (multi-logically) in such a way as to determine when one's own point of view is at its weakest and when an opposing point of view is at its strongest.

Strong sense critical thinkers are not routinely blinded by their own points of view. They know they have points of view and therefore recognize on what framework of assumptions and ideas their own thinking is based. They realize the necessity of putting their own assumptions and ideas to the test of the strongest objections that can be leveled against them.

Teaching for Critical thinking in the strong sense is teaching so that students explicate, understand, and critique their own deepest prejudices, biases, and misconceptions, thereby discovering and contesting their own egocentric and socio-centric tendencies. Only if we contest our inevitable egocentric and socio-centric habits of thought, can we hope to think in a genuinely rational fashion. Only dialogical thinking about basic issues that genuinely matter to the individual provides the kind of practice and skill essential to strong sense Critical thinking.

Students need to develop all Critical thinking skills in dialogical settings to achieve ethically rational development, that is, genuine fair-mindedness. If Critical thinking is taught simply as atomic skills separate from the empathic practice of entering into points of view that students are fearful of or hostile toward, they will simply find additional means of rationalizing prejudices and preconceptions, or convincing people that their point of view is the correct one. They will be

transformed from vulgar to sophisticated (but not to strong sense) critical thinkers.

Glossary T-Z

Teach: The basic inclusive word for the imparting of knowledge or skills. It usually connotes some individual attention to the learner; instruct implies systematized teaching, usually in some particular subject; educate stresses the development of latent faculties and powers by formal, systematic teaching, especially in institutions of higher learning; train implies the development of a particular faculty or skill or instruction toward a particular occupation, as by methodical discipline, exercise, etc. See knowledge.

Theory: A systematic statement of principles involved in a subject; a formulation of apparent relationships or underlying principles of certain observed phenomena which has been verified to some degree. Often without realizing it, we form theories that help us make sense of the people, events, and problems in our lives. Critical thinkers put their theories to the test of experience and give due consideration to the theories of others. Critical thinkers do not take their theories to be facts.

Think: The general word meaning to exercise the mental faculties so as to form ideas, arrive at conclusions, etc.; reason implies a logical sequence of thought, starting with what is known or assumed and advancing to a definite conclusion through the inferences drawn; reflect implies a turning of one's thoughts back on a subject and connotes deep or quiet continued thought; speculate implies a reasoning on the basis of incomplete or uncertain evidence and therefore stresses the conjectural character of the opinions formed; deliberate implies careful and thorough consideration of a matter in order to arrive at a conclusion. Though everyone thinks, few people think critically. We don't need instruction to think; we think spontaneously. We need instruction to learn how to discipline

and direct our thinking on the basis of sound intellectual standards. See elements of thought, perfections of thought.

Truth: Conformity to knowledge, fact, actuality, or logic: a statement proven to be or accepted as true, not false or erroneous. Most people uncritically assume their views to be correct and true. Most people, in other words, assume themselves to possess the truth. Critical thinking is essential to avoid this, if for no other reason.

Uncritical person: One who has not developed intellectual skills (naive, conformist, easily manipulated, dogmatic, easily confused, unclear, closed-minded, narrow-minded, careless in word choice, inconsistent, unable to distinguish evidence from interpretation). Un-Criticalness is a fundamental problem in human life, for when we are uncritical, we nevertheless think of ourselves as critical. The first step in becoming a critical thinker consists in recognizing that we are uncritical. Teaching for insight into uncriticalness is an important part of teaching for criticalness.

Vague: Not clearly, precisely, or definitely expressed or stated; not sharp, certain, or precise in thought, feeling, or expression. Vagueness of thought and expression is a major obstacle to the development of Critical thinking. We cannot begin to test our beliefs until we recognize clearly what they are. We cannot disagree with what someone says until we are clear about what they mean. Students need much practice in transforming vague thoughts into clear ones. See ambiguous, clarify, concept, logic, logic of questions, logic of language.

Verbal implication: That which follows, according to the logic of the language. If I say, for example, that someone used flattery on me, I imply that the compliments were insincere and given only to make me feel positively toward that person, to manipulate me against my reason or interest for some end. See imply, infer, empirical implication, elements of thought.

Weak sense critical thinkers:

1. Those who do not hold themselves or those with whom they ego-identify to the same intellectual standards to which they hold "opponents"
2. Those who have not learned how to reason empathically within points of view or frames of reference with which they disagree
3. Those who tend to think mono-logically
4. Those who do not genuinely accept, though they may verbally espouse, the values of Critical thinking
5. Those who use the intellectual skills of Critical thinking selectively and self-deceptively to foster and serve their vested interests (at the expense of truth); able to identify flaws in the reasoning of others and refute them; able to shore up their own beliefs with reasons.

World view: All human action takes place within a way of looking at and interpreting the world. As schooling now stands, very little is done to help students to grasp how they are viewing the world and how those views determine the character of their experience, their interpretations, their conclusions about events and persons, etc. In teaching for Critical thinking in a strong sense, we make the discovery of one's own world view and the experience of other people's world views a fundamental priority. See bias, interpret.

APPENDIX 2 – List of Self-Assessment Questions

Introduction

Most of the questions listed below are from previous Kenyatta University examinations in both Critical and creative thinking, and, Critical thinking and Problem-solving. They will act as guide and help you into evaluating your thinking and problem solving prowess. The list is not exhaustive, further reading is advised.

Philosophy

1. Define philosophy and show its relevance in human life.
2. What are the uses of philosophy?
3. By way of examples, show the relationship between Philosophy and Critical thinking.
4. Discuss ***any two*** of the following branches (areas) of Philosophy
 - a) Logic
 - b) Epistemology
 - c) Metaphysics
 - d) Axiology
 - e) Ethics
 - f) Aesthetics
5. To what extent is philosophy a First order discipline?
6. Examine the view that logic is more of a first-order principle to philosophy than its branch.
7. “Philosophy is about the nature of, and essence of reality itself” Discuss.
8. “Everyone who is capable of thinking is a philosopher so there is no need of studying philosophy” Discuss.

9. “Philosophers do make life more difficult than it is” Do you agree with this statement? Give reasons.
10. What is the difference between a Philosopher and an African sage?
11. Distinguish between Logic and epistemology
12. Using philosophical arguments prove that God exist.
13. “The best way to solve the many problems bedeviling the world we need philosopher kings” Discuss

History of Critical Thinking

- a) Discuss the Socratic dictum that “an unexamined life is not worth living”
- b) Give a brief history of Critical thinking.
- c) Of the following three philosophers; Socrates, Rene Descartes, and Bertrand Russell, whom would you consider the *Father of Critical thinking and problem-solving*? Give reasons for your answer.
- d) What is the relevance of understanding the evolution of critical thought to the study of critical thinking?
- e) To what extent does the study of history of Critical thinking help in the understanding of the development of Critical thought?
- f) Define Critical thinking and show its relevance in an individual’s life.

The Socratic Questioning Method

1. Explain why the Socratic Method best exemplifies Critical thinking and problem solving
2. Highlight some of the positive lessons a student of critical thinking can learn from Socrates.
3. “An unexamined life is not worth living” To what extent is this Socratic Maxim relevant as a guide to a critical thinker?

Definitions, Nature, and Characteristics of Critical Thinking

1. “Kenya would be a better country to live if its leaders were guided by reason and not emotion and self-gratification” By way of examples discuss this statement in the context of Critical thinking tools of analysis and tools of evaluation.
2. What are the main characteristics of Critical thinking?
3. Discuss the extent to which the study of Critical thinking and problem-solving has helped in enhancing performance in your studies/work.
4. “The incessant bickering between Counties and National Government is not because of scarce resources, but the inability of our leaders to think critically” Discuss.
5. What are the essential aspects of critical thinking?
6. “Critical thinking and problem solving should be the basic induction training program to all elected Members of Parliament, Senators, Governors, Women Representatives, and MCAs before they occupy office”. Giving reasons, state why you agree or disagree.
7. Examine the view that Critical thinking and problem solving is essential for good life.
8. By way of specific examples critically examine the dimensional categories (tools of analysis) of thinking
9. Using at least **three** Critical thinking Tools of Analysis explain the relevance of Moreno O’Campo’s argument against the “O’Campo Six” that they bear the greatest responsibility in Kenya’s 2007 post-Election Violence.
10. With reference to the ongoing review of the education system in Kenya, examine the view that Critical

thinking and problem solving ought to inform the new curriculum.

11. Examine critical thinking tools of evaluation showing their role in checking the quality of proper thinking (reasoning)
12. Discuss critical thinking tools of analysis showing the intellectual standards (tools of evaluation) relevant to their application.
13. “The study of Critical thinking and problem solving should be made mandatory in all institutions for Higher Learning” Do you agree or disagree? Give reasons.
14. By way of examples discuss the relevance of any four tools of transformation (Valuable intellectual traits).
15. Show how Critical thinking and problem solving constitutes the core meaning of philosophy.
16. Critically examine the seven traits of mind and then show their relevance in enhancing roles and responsibilities for self-management.
17. Discuss the characteristics of Critical thinking and then show their relationship to the universal intellectual standards.
18. In view of the escalating state of insecurity in Kenya and the rising cost of living coupled with the growing cases of corruption being cited, how do you assess and rate Kenyan leaders in embracing criticality and creativity in their decision making and problem-solving strategies?
19. Illustrate the ways and means the following elements are involved in Critical thinking and problem solving;
 - a) Reasoning skills
 - b) Collaborative learning
 - c) Self-esteem

- d) Curiosity
20. Explain any four intellectual traits/tools of transformation and justify why they should be enhanced in Kenya's political life.
 21. Give examples to illustrate the main elements of critical thinking. How to reasoning skills, self-esteem and interactive learning fit in?
 22. Using examples to illustrate your answer discuss the following:
 - a) Common core thinking skills
 - b) The essential components of critical thinking
 - c) The dispositions to be cultivated by a critical thinker
 23. Examine the major intellectual traits and then show their relevance in determining the character of a critical and creative thinker.
 24. "There is no point in studying Critical thinking and problem solving since all normal human beings think." Give reasons for your answer.
 25. Discuss the relevance of Critical thinking tools of transformation as essential traits to a critical and creative thinker.
 26. "Critical thinking and problem solving enhances the quality of an individual's life" Discuss.

Education, Identity and Self Examination

1. "True education is that which leads to the holistic growth of the human person". Discuss this statement with reference to traits, attitudes, and dispositions of education for human development.
2. Education that transforms is the only education of which it can be truly said that it makes good citizens. Discuss

3. With reference to education for human development explain the meaning of two of the following:
 - a) Essential Skills for thinking
 - b) Dispositions for Critical Thought
 - c) Traits of a Critical Mind
 - d) Self-examination
4. In reference to Russell's work on education, examine the view that Education in the critical faculty is the only education of which it can be truly said that it makes good citizens.
5. Discuss the role of critical thinking in education for self-actualisation
6. Who am I? Discuss
7. What is the role of critical thinking in an individual's life?
8. "I am who I am" to what extent does this statement define the self of an individual?
9. "The only way to eradicate poverty is to empower the economically deprived through education." Do you agree Give reasons?
10. "I am because we are and since we are therefore, I am" To what extent does this statement negate the principle of self-identity?
11. "Of the three persons in me, namely, that whom people think I am, that whom I think I am and the unknown me, there lies the really me." Espouse on this statement.

Thinking for Oneself: Rene Descartes

Cogito ergo sum (I think, therefore I am)

1. Of what relevance is the Cartesian Methodic Doubt to the study of Critical thinking and problem-solving?

2. Examine the view that Cartesian Methodic Doubt is a precursor to Critical thinking and problem-solving.
3. Examine the view that Rene Descartes' Methodic Doubt exemplifies Critical thinking and problem-solving.
4. Critically examine the relevance of René Descartes dreams to his call as a philosopher and/or critical thinker.
5. What are the main philosophical foundations that informed the Cartesian methodic Doubt?
6. Critically examine the relevance of the Cartesian methodic Doubt to the process of self-knowledge.
7. By way of examples discuss the relationship between the Cartesian Methodic Doubt and the subject of Critical thinking and problem-solving.
8. By way of examples show the relevance of Cartesian Methodic Doubt to the process of self-examination and the knowledge of the self.

Appearance and Reality - Bertrand Russell

1. Using relevant examples demonstrate the extent to which conmen, politicians, advertisers, street/rogue preachers, and propagandists take advantage of appearance as reality.
2. To have a better understanding of the world in which we live, we must strive to distinguish between Appearance and Reality” Discuss.
3. “Senses are deceptive and it is only by use of reason that we can claim knowledge” Discuss this statement in the light of Bertrand Russell’s Appearance and Reality.
4. a) By way of examples demonstrate the problem of Appearance and Reality

- b) Show why a critical and creative thinker ought to distinguish between Appearance and Reality.
5. To what extent do conmen, advertisers, politicians and street preachers take advantage of appearance and reality?
6. Discuss the relevance of Appearance and Reality in our lives.
7. How can one apply Russell's thought on "Appearance and Reality" to everyday life in Kenya today?
8. Discuss how our understanding of the universe is enhanced by distinguishing Appearance from Reality.

On Liberty of Thought and Individuality - John Stuart Mill

1. "Freedom is only relevant insofar as it does not infringe on the liberties of others". Discuss this statement with reference to J.S. Mills' essay on Individuality.
2. "Individuality is a necessary condition to social progress in human society". Discuss.
3. Give a brief history of John Stuart Mill's life and then discuss his views on human liberty and freedom as expounded in *On Liberty*
4. "The attainment of autonomy is the ultimate goal in human development" Discuss this in light to J.S. Mills essay on Individuality and Liberty of Thought
5. Critically examine John Stuart Mill's view that attainment of autonomy is the prima facie principle for human existence.
6. What are the basic elements of individuality?
7. How can individuality enhance the wellbeing of society?

8. Individuality is crucial to Critical thinking. Is this justifiable given man's sociality?
9. Show the connection between individuality and freedom in the context of Critical thinking and problem solving.
10. In your view, what would you consider a fair relationship between social authority and individual autonomy in social life?
11. What do you consider to be the place of an individual in the state?
12. a) What are slogans?
b) Can slogans contribute positively to human well-being?
13. Autonomy is the ultimate goal of human development. Discuss this in the light of J.S. Mill's essay on Individuality.

Logic

1. Using your own examples demonstrate that the distinction between Inductive and Deductive reasoning is based on the degree of the evidential strength between premises and conclusions of arguments.
2. Define argument and then distinguish between the following types of arguments:
3. Define logic and then show its relevance in our everyday day life.
4. Distinguish between deductive and inductive reasoning.
5. Indicate the premises and conclusions of the arguments contained in the following passage:
6. *With regard to good and evil, these terms indicate nothing positive in things considered in themselves, nor are they*

anything else that modes of thought, or notion which are form from the comparison of one thing with another. For one and the same thing may at the same time be both good and evil or indifferent. Music for example, is good to a melancholy person, bad to one mourning, while to a deaf man it is neither good nor bad....

7. What is the meaning of:
 - a) an inference
 - b) a deductive argument
 - c) an Inductive argument
8. Distinguish between Truth and Validity
9. Show the relevance of deductive and inductive reasoning to the study of Critical thinking and problem-solving.

10. **Recognizing the Form of Simple Arguments**

Here are some short arguments in which the writer presents a conclusion (which is in bold) and provides some reasons for that conclusion.

Indicate beside each argument whether it is an example of deductive or inductive reasoning (you can use the letters D and I). If you are not sure, use a question mark.

Note: this exercise is not asking you whether you agree with the argument or not or whether the argument is a good one or not. It is asking you only to indicate the form of reasoning used, inductive or deductive. Remember the key test here: Does the argument rely upon an appeal to a general principle or upon assembled data.

1. Things equal to the same thing are equal to each other. Therefore, if A equals B and if B equals C, *then A must equal C.*
2. The doctrine of free speech is the most important element of our liberal democracy. *Therefore, this student*

newsletter must be free to print opinions offensive to many people.

3. Six out of ten test samples of the water in that lake, collected and analyzed by university researchers last week, revealed unsatisfactorily high levels of serious contamination. *We must investigate this problem further and post warning signs on the beach immediately.*
4. All human beings have the right to die with dignity when they wish. *Therefore, this terminally ill patient has the right to an assisted suicide.*
5. In this essay the writer frequently uses words like "perhaps," "maybe," and "alternatively." *This feature of the style creates doubts in the mind of the reader about the writer's confidence in his analysis.*
6. Giving minority groups the right to political self-determination is fundamental to liberty. Therefore, if a majority of Rift valley people vote for independence from Kenya, *they must be allowed to separate.*
7. All people in a free society must be treated equally under the law. *Homosexual citizens in our society must therefore be granted full legal spousal benefits, equivalent to those of heterosexual Kenyans.*
8. Model X gets better mileage, costs less to purchase and to maintain, and has a better all-around rating in the Consumer Reports than Model Y. *Therefore, it makes more sense for me to purchase Model X rather than Model Y.*
9. Hamlet keeps wondering about why he is not carrying out the murder. He frequently gets upset with himself for delaying, and yet he still seems unable to carry it out. *Clearly, there is something internal preventing him from murdering his uncle.*

10. To what extent do Critical thinking and problem solving improve the power of Rhetoric in an individual?

Fallacies

1. “Fallacious reasoning is repugnant to correct thinking” illustrate this statement using four examples two from each of the two general categories of informal fallacies.
2. (a) Distinguish between fallacies of relevance and ambiguity
(b) By way of examples discuss three fallacies of relevance and two fallacies of ambiguity.
3. Using examples, three each from both fallacies of relevance and ambiguity, demonstrate that fallacious thinking is repugnant to good thinking.
4. Discuss any **three** fallacies showing how they can be avoided. In each case furnish relevant examples.
5. Give **three** examples of fallacies of relevance and in each case, show how one is misled by the argument.
6. Fallacious reasoning is offensive to correct thinking. Illustrate this using four examples, two from each of the two general categories of informal fallacies.
7. Give **three** examples of fallacies and show why they are instances of incorrect reasoning.
8. By way of examples, distinguish between fallacies of relevance and fallacies of ambiguity.
9. To what extent can the study of Critical thinking and problem-solving help one in avoiding fallacious reasoning?
10. Identify the type of fallacy committed in each of the following statements:

- a) "I'd like to respond to that, but taking into account your background, education, and intelligence, I am quite sure that you would not be able to understand."
- b) "I have observed that those who disagree with me on the next point tend to be unsophisticated, and those who quickly recognize the validity of the point to be more educated. The point is...."
- c) "As you mature emotionally (or mentally, or spiritually), you will grow out of your present way of thinking, and you will eventually come around to my point of view."
- d) "You said 'feel' instead of 'think'. If you are feeling instead of thinking, I won't be able to convince you with reason."
- e) "Have I ever brought up the Kshs. 2,000 you owe me? Never! Have I ever embarrassed you or made you feel bad over it? Have I ever told you how much I need that money? No, I never have."
- f) "I agree with everything you said except the conclusion. It doesn't make any sense to me, and I cannot accept it. I am trying, but your brain must work much differently than mine."
- g) "Your problem is that you are thinking in a linear versus configurational framework."
- h) "In view of Kenyatta University budget deficit, staff uprisings, and students' politics, we need to consider that, notwithstanding the mitigating circumstances; this University has got to get back on its feet. Don't you agree?"
- i) "Take this example: suppose you were a person who was incredibly stupid but was trying to come off as intelligent. What would the proper response be if you were me?"

Decision Making and Problem Solving

1. a) Define a problem
b) Critically examine the **6** (six) phases of decision making, showing how they ease the process of problem solving.
2. “Being an excellent decision-maker and problem solver is not separable from being a good thinker.” Discuss.
3. “A good decision maker and problem solver is one that is appropriately moved by reason”. Discuss.
4. You have been appointed the CEO of a leading parastatal whose performance is declining, what decision making and problem solving strategies will you employ in order to salvage the institution?
5. Examine the view that Decision as Intuition negates the principle of rationality.
6. Discuss any **two** of the following types of decision making and show the advantages and disadvantages of each one of them:
 - a) Decision as Intuition
 - b) Decision as Calculation
 - c) Decision as Coherence
7. a) What is Emotional Coherence?
b) Examine the view that Intuition and Emotion can be used in making good decisions
8. In view of the fire and hunger tragedies that have engulfed Kenya in recent times and the escalating cases of corruption being cited, how would you assess and rate our leaders in embracing criticality and creativity in their decision-making and problem-solving strategies?

9. “A promiscuous man has a sexual affair with a Nanny (his house girl) and he tells her-‘you are so good’. Then the Nanny responds back – “yes thank you, in fact even the houseboy says am better than madam your wife”. How should this man proceed in making a decision that would sort out the mess in his household?
10. Assume that you are a girl aged 14 years and a victim of sexual assault by your own father. If you told your mother who is a housewife the incident is likely to spark off hatred and eventual divorce between your parents. If you keep it to yourself, you will continuously be traumatized by this grisly and heinous act. If your mum gets to know of the act via other sources or means she will never forgive you. And if the matter leaks to the wider community your father, the sole bread winner for the family will be jailed or face mob justice that may end his life, leaving you and your siblings helpless and out of school. How would you proceed in making your decision such that it does not hurt any of the parties involved but at the same time be a lesson to the offender?

Barriers to Critical Thinking and Problem Solving

1. Discuss any **two** of the following Baconian idols and then show how they impede clear thinking,
 - a) idol of the tribe
 - b) idol of the market place
 - c) idol of the theatre
 - d) idol of the cave

2. Discuss the extent to which paternalism, religious dogmas, peer influence, and authority constitute obstacles to Critical thinking and problem-solving.
3. Examine the view that a rigid school environment, authoritarianism, peer and social influence, indoctrination, paternalism, and religious fanaticism are impediments to Critical thinking and problem solving.
4. To what extent does the dictatorial political systems affect and block the free use of reason in deliberations?
5. In your view what are the other possible obstacles to clear and creative thinking?
6. To what extent is paternalism, traditions, religion, peer influence, and school environment an impediment to Critical thinking and problem-solving?

Study Puzzles and Intriguing Questions

1. A man is walking to Kisumu town. He comes to a fork in the road, with the two branches leading in two different directions. He knows that one of them goes to Kisumu, but he doesn't know which one. He also knows that in the house right beside the fork in the road there are two brothers, identical twins, both of whom know the road to Kisumu. He knows that one brother always lies and the other always tells the truth, but he cannot tell them apart. What single question can he ask to whoever answers his knock on the door which will indicate to him the correct road to Kisumu?
2. Tom survives a shipwreck in deep waters by hanging on a lifesaver balloon. As the balloon shifts a shore of an island, Tom soberly identifies the island two kilometers away the coastline. The island is inhabited by two distinct tribes, a fact Tom is very much aware

of. One of the tribes is called the Nobles while the other the Savages. These two tribes have very distinct characters; The Nobles always tell the truth while the Savages always tell lies. Tom is aware of these characteristics and he would like to identify himself with the nobles for positive assistance. As the balloon shifts, Tom sees a man at the shore and he calls out to him: "Are you a noble or a Savage? But when the man answers back, a wave breaks at the shore and Tom fails to hear the answer. The balloon shifts further on and Tom spots another man and he asks him the same question: "Are you a noble or a savage?" The second man points to the first man and he says: "He said he is a noble" and then he adds, "I am a noble." The balloon is pushed further south by the wind and Tom spots yet another man, the third one. To him, the same question is asked: "Are you a noble or a savage?" The third man points in the direction of the first two men and he says: "Both are liars, they are savages" then he adds, "I am a noble".

Question 1. Is the data given sufficient to tell us any man's tribe? Give reasons for your answer.

Question 2. Is the data given sufficient to tell us each man's tribe? Give reasons for your answer.

Question 3. To what extent can this puzzle ease our understanding of what critical thinking is and of what it consists?

3. Read the following passage then answer the questions that follow:

Servant Boy and His Boss

Jessie is a servant boy who every day drinks the wine of his Boss and puts water in the bottle to replace what he has drank.

But the Boss having suspicions as to the quality of the wine, decides to buy Pastis (a French wine that changes colour if you add water). Jessie as usual, took a mouthful and added water to replace what he drank.

However, soon after he added water the Pastis became milky. When the Boss came back and noticed it, he was sure he had managed to nail Jessie as thief!!!

At that same moment, Jessie realized he was in trouble and decided to go into the kitchen.

The Boss told his wife “Cherished, you will see, he will be obliged to acknowledge stealing”. He then shouted: “Jessie!”

Jessie answered: “Yes, Boss”.

Who drank my Pastis?” the boss asked, but there was No answer. The Boss reiterated his question: Still there was no answer from Jessie.

Then the Boss went to find Jessie in the kitchen and said to him: “Are you insane or what? Why when I call you, you say “Yes Boss” but when I ask you a question you don’t answer me?”

Jessie retorted that “It is that, boss, when you are in the kitchen there, you don’t understand anything at all, except the name” Then to prove that Jessie lies, the Boss says to him: “You stay besides Madam in the living room, me I go to the kitchen, and you ask me a question”.

Jessie accepted. The Boss went into the kitchen and Jessie shouted: “Boss”. He answered: “Yes, Jessie”.

Then Jessie asked: “Who goes to the House-girl’s bedroom when Madam is not there?” there was No answer from the kitchen. Jessie shouted again: “Boss, I say who made the House-girl pregnant?” No answer. He asked the Third time; “Boss, I say who made the House-girl pregnant?”

The Boss returns from the kitchen running and says “Jessie, it is true, you are right, when one is in the kitchen, one does not hear anything, only the name”.

1. How should the Boss proceed in punishing Jessie for stealing the wine?
2. Between Jessie and Boss, who is a better thinker and why? Give reasons
3. What fallacy or fallacies are committed in this passage? Explain
4. As a Critical and Creative thinker what lesson(s) can you learn from this passage?

