CHAPTER 2

REVIEW OF THE RELATED LITERATURE
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Critical Thinking

Introduction

It is hard to imagine how human social life could exist without some kind of language. The emergence of language, long ago in the prehistory of human species, made possible the kind of social existence which men take for granted today. It gave them a crucial evolutionary advantage over other animals, partly because it became possible for them to share useful information with clarity and explicitness, within and across generations. Language is a unique evolutionary invention. Mercer (4) asserts that “Through the evolution of language, we also became capable of thinking constructively and analytically together.”

But language is a completely different kind of communicative system because it is flexible, innovative and adaptable to the demands of changing circumstances. It enables people to create, share and consider new ideas and to reflect together on their actions. Words mean what humans agree together to make them mean, new words can be created as required and they can be combined to make an infinite variety of meanings. Language enables people to share thoughts about new experiences and organize life together in ways in which no other species can.

Language has not been designed as a means of transmitting ideas in a precise, unchanged form from one individual brain to another. Of course humans use language to share and exchange information quite effectively, on the whole. Yet on a practical, everyday level, all individuals know that they do not reliably make people understand exactly what they mean.

Misunderstandings regularly arise, despite one’s best efforts, because there is rarely one unambiguous meaning to be discovered in what someone puts into words. But variations in interpretation are not always ‘misunderstandings’. When people are
dealing with complex, interesting presentation of ideas, variations in understanding are quite normal and are sometimes even welcome (Mercer 5).

It is expected that many authors are frequently dismayed to discover that readers misunderstand their ‘message’; but they should not necessarily take this as a failure on their part. The act of reading any text relies on the interpretative efforts of a reader, as well as on the communicative effort and intention of the author.

Language offers something more valuable than mere information exchange because the meanings of words are not invariable and understanding always involves interpretation and the act of communicating is always a joint, creative endeavor. Words can carry meanings beyond those consciously intended by speakers or writers because listeners or readers bring their own perspectives to the language they encounter. Ideas expressed imprecisely may be more intellectually stimulating for listeners or readers than simple facts. The fact that language is not always reliable for causing precise meanings to be generated in someone else’s mind is a reflection of its powerful strength as a medium of creating new understanding. “It is the inherent ambiguity and adaptability of language as a meaning-making system that makes the relationship between language and thinking so special” (Mercer 6).

Language is designed for doing something much more interesting than transmitting information accurately from one brain to another. It allows the mental resources of individuals to combine in a collective, communicative intelligence which enables people to make better sense of the world and to devise practical ways of dealing with it.

On the other hand, movement to the information age has focused attention on good thinking as an important element of success in life (Huitt; Thomas and Smoot). These changing conditions require new outcomes, such as critical thinking, to be included as a focus of schooling. Old standards of simply being able to score well on a standardized test of basic skills, though appropriate, cannot be the sole means by which teachers judge the academic success or failure of their students.
Definitions of Critical Thinking

The definition of critical thinking has changed somewhat over the past decade. Originally the dominion of cognitive psychologists and philosophers, behaviorally-oriented psychologists and content specialists have recently joined the discussion. The following are some examples of attempts to define critical thinking:

- ... the ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems (Chance 6).
- ... a way of reasoning that demands adequate support for one’s beliefs and an unwillingness to be persuaded unless support is forthcoming (Tama 64).
- ... involving analytical thinking for the purpose of evaluating what is read (Hickey 175).
- ... a conscious and deliberate process which is used to interpret or evaluate information and experiences with a set of reflective attitudes and abilities that guide thoughtful beliefs and actions (Mertes 24).
- ... active, systematic process of understanding and evaluating arguments. An argument provides an assertion about the properties of some object or the relationship between two or more objects and evidence to support or refute the assertion. Critical thinkers acknowledge that there is no single correct way to understand and evaluate arguments and that all attempts are not necessarily successful (Mayer and Goodchild 4).
- ... the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Scriven and Paul).
- … reasonable reflective thinking focused on deciding what to believe or do (Ennis).

Critical thinking involves the application, analysis, synthesis and evaluation of information so it can be used to construct personal meaning. Scriven and Paul describe critical thinking as the intellectually disciplined process of actively and
skillfully conceptualizing, applying, analyzing, synthesizing and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication as a guide to belief and action.

Haplerm defines critical thinking as 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 while using skills that are thoughtful and effective for the particular context and type of thinking task. Critical thinking also involves evaluating the thinking process. Critical thinking is sometimes called directed thinking because it focuses on a desired outcome.

Maiorana believes that the purpose of critical thinking is to achieve understanding, evaluate view points and solve problems. Since all three areas involve asking questions, one can say that critical thinking is the questioning or inquiry in which a person engages while seeking to understand, evaluate or resolve.

Moore and Parker assert that critical thinking is the careful, deliberate determination of whether people should accept, reject or suspend judgment about a claim and the degree of confidence with which they accept or reject it.

Atkinson considers critical thinking a kind of social practice that has its origins in culturally determined sets of behaviors that cannot easily be defined by its users. Moreover, Gieve (126) comments that for students to think critically at the university level, they need to "examine the reasons for their actions, their beliefs and their knowledge claims, requiring them to defend themselves and question themselves, their peers, their teachers, experts and authoritative texts, both in class and in writing".

Schafersman affirms that critical thinking is correct thinking in the pursuit of relevant and reliable knowledge about the world. Another way to describe it is reasonable, reflective, responsible and skillful thinking that is focused on deciding what to believe or do. A person who thinks critically can ask appropriate questions, gather relevant information, efficiently and creatively sort through this information, reason logically from this information and come to reliable and trustworthy conclusions about the world that enables one to live and act successfully in it.
However, Benesch (547) challenges the notion of critical thinking as a tactic and unquestioned social practice, describing it as "a democratic learning process examining power relations and social inequities."

The Delphi Report explains critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference, as well as explanation of the evidential, conceptual, methodological, or contextual considerations upon which that judgment is based.

The Critical Thinking Glossary concludes that critical thinking is:

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.

Critical thinking means weighing up the arguments and evidence for and against. Edward Glaser, who developed a test of critical thinking, defines it in this way: Critical thinking calls for a persistent effort to examine any belief of supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends.

In other words, Glaser emphasizes the importance of:

- **Persistence**: considering an issue carefully, and more than once.
- **Evidence**: evaluating the evidence put forward in support of the belief or viewpoint.
- **Implications**: considering where the belief or viewpoint leads – what conclusions would follow, are these suitable and rational, and if not, should the belief or viewpoint be reconsidered?

The MCC General Education Initiatives emphasizes 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 by assimilating information.

Bensley defines critical thinking as reflective thinking involving the evaluation of evidence relevant to some claim so that a sound conclusion can be drawn about the claims. This definition is general enough to subsume deductive reasoning, inductive reasoning and informal reasoning. Additionally, he appends that if you draw a conclusion that is not based on the evidence, then your beliefs may simply be based on opinion or what you have heard from other people. If you draw a conclusion that is inconsistent with the facts, then you may simply be wrong. In either case, you would not be thinking critically.

Elder and Paul declare that critical thinking is best understood as the ability of thinkers to take charge of their own thinking. This requires that they develop sound criteria and standards for analyzing and assessing their own thinking and routinely use those criteria and standards to improve its quality.

“Critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do” (Ennis 9). As such, critical thinking can improve both how and what people think about a variety of questions. If critical thinking really is practical, then it should help a person to decide what to believe or do on a wide range of questions: from personal decisions, such as which is the best car to buy, to more scholarly questions, such as what is the best theory of depression.

Deciding what to believe or think involves weighing the evidence about a question or claim and then using reasoning to make up your own mind about the claim. To think critically, a person must decide the best conclusion to draw in a particular situation after carefully considering the evidence, examining the reasons for believing and for not believing some claim. As Hapler points out, the term critical describes thinking that emphasizes evaluation, such as the evaluation of the evidence for some claim; critical is not being used in the negative sense.
It is also useful to examine the similarities between the concepts of critical thinking and scientific thinking. D. Kuhn notes that critical thinking and scientific thinking both involve the coordination of theory and evidence. Lipman states that critical thinking involves the refinement of thinking. Critical thinking is thus like science in that the idea of improving upon ideas and theories is central to most conceptions of science (qtd. in Bensley: 5). Bensley (5) concludes that “critical thinking is reflective thinking involving the evaluation of evidence relevant to a claim so that a sound conclusion can be drawn from the evidence”.

Freely, Austin and Steinberg (2) define the critical thinking as the ability to analyze, criticize and advocate ideas; to reason inductively and deductively; and to reach factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief.

In essence, critical thinking is the ability to manage and interpret information in a reliable way. It is the ability to examine existing ideas and to develop new ones in college, the term argument refers not to an emotional confrontation but to reasons and information brought together in logical support of some idea. Critical thinking is the ability to recognize reliable evidence and form well-reasoned arguments.

Moriarty (xxi) defines critical thinking as the ability to differentiate what you see, what you think you see and what you think it means. In reviewing your thought process, you play the double role of the participant and the critic. As a critic, in the course of reconsidering the series of events, you start making some crucial discrimination. You separate the process into three parts: (1) what you see, (2) what you think you see and (3) what you think it means (Moriarty 2-3):

- **What you see** are two discrete events: You observe that (1) you carry a rabbit’s root and (2) you take a test successfully.
- **What you think you see** is a correlation: When you carry the rabbit’s foot, you pass the test; there is a pattern.
- **What you think it means**: A rabbit’s foot carries an inherent power to influence good grades or to directly cause good grades.

Moriarty (3) sums that:

To reduplicate your results under less random conditions, you might run trials by taking a quiz without the rabbit’s foot or by giving the rabbit’s foot to all your friends who will take examinations. In so
doing, you subject the pattern of perceived causal relations to testing. You might, in short, follow a systematic pattern of experimentation to subject your intuitions or perceptions to further scrutiny. This systematic pattern would enable you to determine the extent to which your intuition or thought had actual validation in the world. It would enable you to distinguish between what you see (observation), what you think you see (pattern), and what you think it means (significance).

Critical thinking [...] (is) a shift from viewing learning primarily as memorizing and repeating words and ideas heard in lectures (Pennycook) to conceptualizing learning as a constantly evolving process of discovering, questioning and reformulating hypotheses may be an extremely disconcerting and confusing experience for some students (Burns, qtd. in Thompson: 15).

Some educationalists have referred to critical thinking as a kind of reflective skepticism (e.g., McPeck,) and “reasonable, reflective thinking that is focused on deciding what to believe or do” (Ennis 22).

Atkinson (547) considers critical thinking a kind of social practice that has its origins in culturally determined sets of behaviors that cannot be easily defined by its users. Benesch, however, challenges the notion of critical thinking as a tacit and unquestioned social practice, describing it as “a democratic learning process examining power relations and social inequities.”

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Thompson (19) affirms that critical thinking highlights the interconnections between pedagogical activities and the realities of the worlds that lie beyond the confines of the classroom.

**Characteristics of Critical Thinking**

It is obvious that thinking goes on all the time. The teacher may be certain that all of the students in the classroom are thinking. However, the kinds of thinking in
Some psychologists divide thinking into several levels including, for example, reverie or daydreaming, perception, insight, memory, imagination, recall etc. None of these, by itself, is considered a high level of thinking. If the student daydreams about his great performance on the basketball court the preceding evening, if he is asked which is the largest river in the United States and he replies the Mississippi, if he hears a story about Hannibal’s trip across the Alps and forms a picture of it in his mind, he is engaging in forms of thinking.

Information-related assignments that develop critical thinking skills involve problem solving and problem finding (Laverty).

According to Kurland, critical thinking includes a complex combination of skills. Among the main characteristics are the following:

**Rationality**

People are thinking critically when they:

- rely on reason rather than emotion,
- require evidence, ignore no known evidence, and follow evidence where it leads, and
- are concerned more with finding the best explanation than being right, analyzing apparent confusion and asking questions.

**Self-awareness**

People are thinking critically when they:

- weigh the influences of motives and bias, and
- recognize their own assumptions, prejudices, biases, or point of view.

**Honesty**

Individuals are thinking critically when they recognize emotional impulses, selfish motives, nefarious purposes, or other modes of self-deception.

**Open-mindedness**

People are thinking critically when they:

- evaluate all reasonable inferences,
- consider a variety of possible viewpoints or perspectives,
remain open to alternative interpretations,
accept a new explanation, model, or paradigm because it explains the evidence better, is simpler, or has fewer inconsistencies or covers more data,
accept new priorities in response to a reevaluation of the evidence or reassessment of their real interests, and
do not reject unpopular views out of hand.

**Discipline**
People are thinking critically when they:
- are precise, meticulous, comprehensive, and exhaustive,
- resist manipulation and irrational appeals, and
- avoid snap judgments.

**Judgment**
Individuals are thinking critically when they:
- recognize the relevance and/or merit of alternative assumptions and perspectives, and
- recognize the extent and weight of evidence.

Across subject areas and levels, according to Potts, educational research has identified several discrete skills related to an overall ability for critical thinking. These are:
- Finding analogies and other kinds of relationships between pieces of information.
- Determining the relevance and validity of information that could be used for structuring and solving problems.
- Finding and evaluating solutions or alternative ways of treating problems.

As Scriven and Paul state critical thinking can be seen as having two components:

1. A set of skills to process and generate information and beliefs.
2. The habit, based on intellectual commitment, of using those skills to guide behavior.

Four Aspects of Critical Thinking

Good critical thinking cannot be learned overnight nor always accomplished in a neat set of steps. Yet as interpreted by William T. Daly, professor of political science at the Richard Stockton College of New Jersey, the basic skills of critical thinking divide pretty well into four basic types (Gardner and Jewler 37-39).

1. Abstract Thinking: Discovering Larger Ideas from Details
From large amounts of facts, seek the bigger ideas or the abstractions behind the facts. What are the key ideas? Ask yourself what large concepts the details suggest. Sometimes this process involves determining what broad ideas a writer is intending to convey. Other times it involves synthesizing information yourself in an effort to come up with a concept of your own.

2. Creative Thinking: Finding New Possibilities
Use the general idea you have found to see what further ideas it suggests. This phase can lead in many directions. In essence, the creative thinking stage involves extending the general idea – finding new ways it might apply or further ideas it might suggest. The important thing at this stage is not to reject ideas out of hand, but to explore wherever your general idea may take you.

3. Systematic Thinking: Organizing the Possibilities
Systematic thinking involves looking at the outcome of the second phase in a more demanding, critical way. If you are looking for solutions to a problem, which ones really seem most promising? Do some contradict with others? Which ones can be achieved? If you have found new evidence to refine or further test your generalization, what does that new evidence show? Does your original generalization still hold up? Does it need to be modified? What further conclusions do good reasoning and evidence support? Which notions should be abandoned?

4. Precise Communication of Your Ideas to Others
Great conclusions aren’t very useful if you cannot communicate them to others. Consider what your audience will need to know to follow your reasoning and be persuaded.
Differences between Critical and Non-critical Thinking

There are three primary areas in which to look for differences between critical and non-critical thinking. These are: views of knowledge, views of thinking and strategies for thinking.

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<th>Views of Knowledge</th>
<th>Critical Thinking</th>
<th>Non-critical Thinking</th>
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<tr>
<td>• shades of gray – strives for depth</td>
<td>• black and white – superficial level</td>
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<td>• interdisciplinary</td>
<td>• unidisciplinary</td>
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<td>• intertwined with thinking</td>
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<th>Views of Thinking</th>
<th>Critical Thinking</th>
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<td>• rational and consistent</td>
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<td>• strives to learn how to think</td>
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<td>• original/insightful</td>
<td>• second hand thinking</td>
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<td>• multiple frames of reference</td>
<td>• one or limited frame of reference</td>
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<th>Strategies for Thinking</th>
<th>Critical Thinking</th>
<th>Non-critical Thinking</th>
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<td>• suspends closure</td>
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<td>• explorer/probing</td>
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<td>• collaborative/communal</td>
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<td>• precise language</td>
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Attributes of a Critical Thinker

Based in part on the critical thinking theories of Glaser, Ennis, McPeck, Perkins, Jay, and Tishma, Bensley (10) argues that a proficient critical thinker must have four characteristics:

1. knowledge of reasoning,
2. a set of cognitive skills involved in reasoning,
3. knowledge that is relevant to the problem or question that is being thought about, and
4. a set of dispositions to think critically.

In contrast, the critical thinker does not believe in ‘theories,’ like astrology, for which little good evidence exists. Instead, critical thinkers and scientists remain skeptical or at least cautious about such claims, carefully evaluating the relevant evidence in order to draw sound conclusions about such claims.

Critical thinkers and scientists evaluate the evidence relevant to a claim in order to draw a sound conclusion. In other words, critical thinkers make and are persuaded by arguments – that is, conclusions supported by evidence. While people frequently use commonsense ‘theories’ to explain behavior and other events without giving much consideration to the quality of those ‘theories,’ critical thinkers realize that some theories are better than others. Specially, theories that can account for more of the evidence and that make better predictions are superior. Moreover, critical thinkers are skeptical of new claims for which little evidence or only low-quality evidence is provided and they do not believe claims, such as those made by astrology, for which there is no good evidence (Bensley 20).

Critical thinkers distinguish between fact and opinion, ask questions, make detailed observations, uncover assumptions and define their terms and make assertions based on sound logic and solid evidence. This is a course in logic. Being a critical thinker and being logical is pretty much the same thing.

Paul (ii) explains that:

[A critical thinker] is someone who is able to think well and fairmindedly not just about her own beliefs and viewpoints, but about beliefs and viewpoints that are diametrically opposed to her own. And
not just to think about them, but to explore and appreciate their adequacy, their cohesion, their very reasonableness [when compared with] their own. More, a person who thinks critically is not just willing and able to explore alien, potentially threatening viewpoints, but she also desires to do so. She questions her own deeply-held beliefs, and if there are no opposing viewpoints ready at hand, she seeks them out or constructs them herself.

Gardner and Jewler (36) propose that when thinking about an argument, a good critical thinker considers questions like the following:

- Are the assumptions (the pieces of information given in support of the argument) true?
- Do the assumptions really support the conclusion?
- Do I need to withhold judgment until better evidence is available?
- Is the argument really based on good reasoning, or does it appeal mainly to my emotions?
- Based on the available evidence, are other conclusions equally likely (or even more likely)? Is there more than one right or possible answer?
- What more needs to be done to reach a good conclusion?

Good critical thinking also involves thinking creatively and imaginatively about what assumptions may be left out or what alternative conclusion may not have been considered. When communicating an argument or idea to others, a good critical thinker knows how to organize it in an understandable, convincing way in speech or in writing.

Moreover, they assert that good critical thinkers have a high tolerance for uncertainty. Confronted by a difficult question, they begin by saying, ‘I don’t know.’ They suspend judgment until they can gather information and take the time it requires to find and verify an answer (Gardner and Jewler 57).

Effective critical thinkers resist finalizing their thoughts on important questions until they feel they have developed the best answers possible. This is not an argument in favor of ignoring deadlines, but it does suggest the value of beginning one’s research, reading and even the writing phases of a project early, so that one will have time to change direction if necessary as he/she gathers new insights.

In sum, Kurland declares that:
Critical thinkers are by nature skeptical. They approach texts with the same skepticism and suspicion as they approach spoken remarks.

Critical thinkers are active, not passive. They ask questions and analyze. They consciously apply tactics and strategies to uncover meaning or assure their understanding.

Critical thinkers do not take an egotistical view of the world. They are open to new ideas and perspectives. They are willing to challenge their beliefs and investigate competing evidence.

Critical thinking enables individuals to recognize a wide range of subjective analyses of otherwise objective data and to evaluate how well each analysis might meet their needs. Facts may be facts, but how they interpret them may vary.

By contrast, passive, non-critical thinkers take a simplistic view of the world.

- They see things in black and white, as either-or, rather than recognizing a variety of possible understanding.
- They see questions as yes or no without subtleties.
- They fail to see linkages and complexities.
- They fail to recognize related elements.

Non-critical thinkers take an egotistical view of the world.

- They take their facts as the only relevant ones.
- They take their own perspective as the only sensible one.
- They take their goals the only valid one.

Ferrett explains the attributes of a critical thinker as:

- asks pertinent questions.
- assesses statements and arguments.
- is able to admit a lack of understanding or information.
- has a sense of curiosity.
- is interested in finding new solutions.
- is able to clearly define a set of criteria for analyzing ideas.
- is willing to examine beliefs, assumptions, and opinions and weighs them against facts.
- listens carefully to others and is able to give feedback.
- sees that critical thinking is a lifelong process of self-assessment.
• suspends judgment until all facts have been gathered and considered.
• looks for evidence to support assumption and beliefs.
• is able to adjust opinions when new facts are found.
• looks for proof.
• examines problems closely.
• is able to reject information that is incorrect or irrelevant.

Raymond S. Nickerson, an authority on critical thinking, characterizes a good critical thinker in terms of knowledge, abilities, attitudes and habitual ways of behaving. Here are some of the characteristics of such a thinker:

• uses evidence skillfully and impartially.
• organizes thoughts and articulates them concisely and coherently.
• distinguishes between logically valid and invalid inferences.
• suspends judgment in the absence of sufficient evidence to support a decision.
• understands the difference between reasoning and rationalizing.
• attempts to anticipate the probable consequences of alternative actions.
• understands the idea of degrees of belief.
• sees similarities and analogies that are not superficially apparent.
• can learn independently and has an abiding interest in doing so.
• applies problem-solving techniques in domains other than those in which learned.
• can structure informally represented problems in such a way that formal techniques, such as mathematics, can be used to solve them.
• can strip a verbal argument of irrelevancies and phrase it in its essential terms.
• habitually questions one's own views and attempts to understand both the assumptions that are critical to those views and the implications of the views.
• is sensitive to the difference between the validity of a belief and the intensity with which it is held.
• is aware of the fact that one's understanding is always limited, often much more so than would be apparent to one with a noninquiring attitude.
• recognizes the fallibility of one's own opinions, the probability of bias in those opinions, and the danger of weighting evidence according to personal preferences.

In brief, an ideal critical thinker is disposed to try to get it right, to present a position honestly and clearly and to care about the worth and dignity of every person. Furthermore, an ideal critical thinker has the ability to clarify, to seek and judge properly the basis for a view, to infer wisely from the basis, to imaginatively suppose and integrate and to do these things with dispatch, sensitivity and rhetorical skill.

**Reasons, Arguments and Logic**

Reasoning well is a skill which is valuable to anyone who wants to understand and deal with the natural and social worlds. Scientists need to reason well in order to understand the causes of phenomena. Politicians need to reason well in order to be able to adopt the right policies. But one cannot leave reasoning to scientists and politicians, because one wants to know whether what they tell him and what they prescribe for him is right. So reasoning well is an important skill for all people. Dressel points out that reasoning which results in a value judgment is termed by many ‘critical thinking’ and is an aim of education which everyone accepts. “Critical thinking, then is evidently the desired integrating principle or goal of education (qtd. in C. B. Wellinngton and J. Wellington: 14).

Philosophers, including logicians, generally accept that judgment is inherent in critical thinking and that the latter is developed by and through reasoning. Black shows that reasoning is the background of critical thinking. He (6-7) writes, “A critic […] is able to give reasons for his favorable or adverse judgments […]. His judgment is grounded in knowledge of principles and standards appropriate to the subject matter.”

Knowing about reasoning, possessing reasoning skills and knowing and understanding a subject area alone do not ensure that one will be an effective critical
thinker. He/She must also be disposed to use his/her knowledge and skill. A disposition to think critically is the tendency to use one’s critical thinking skills in approaching a situation or question. An assertion is a statement claiming that someone or something has a particular characteristics or property. Claims and assertions are open to dispute and can be either true or false. One way is to take into account what other people think. Often, the truth value of an assertion depends on whether there is a consensus of opinion about it. A consensus of opinion occurs when there is general agreement about the truth or falsity of some claim. That many people share the same opinion as your friend might be a reason to believe your friend’s assertion. Another reason for believing an assertion might be that it is based on fact. A fact is a commonly observed event that is taken as actual and not likely to change. A third reason for believing an assertion might be that research evidence or systematic observation supports the claim. A basic characteristic of assertions is that it has truth value: It can be judged as true or false. In some kinds of reasoning, like deductive reasoning, examining the truth value of statements is part of deciding whether an argument is sound.

Critical reasoning is centrally concerned with giving reasons for one’s beliefs and actions, analyzing and evaluating one’s own and other people’s reasoning, devising and constructing better reasoning. Common to these activities are certain distinct skills, for example, recognizing reasons and conclusions, recognizing unstated assumptions, drawing conclusions, appraising evidence and evaluating statements, judging whether conclusions are warranted; and underlying all of these skills is the ability to use language with clarity and discrimination.

In common with other skills, reasoning skills can be improved and polished with practice. If a person thinks of reasoning as analogous to a game, he can see it as involving a set of particular skills and also the ability to deploy this set of skills when engaged in playing the game. In tennis, for example, players need to be good at executing particular strokes – driving, volleying and serving. But, in order to win a game, they need to be able to put these skills together in an appropriate way and also be able to respond to moves made by their opponent.

When ‘playing the game’ of reasoning, the person needs to be good at certain basic activities, such as drawing conclusions and evaluating evidence. But he also needs to be able to put the skills together, in order to present an effective piece of
reasoning to someone else. He needs to be able to respond to the moves in reasoning made by others. For example, when someone presents a piece of evidence of which he was unaware, he needs to be able to judge how it affects his argument. The tennis coach will improve the tennis players' ability by sometimes requiring them to practice particular skills and then to play a game in which they must remember to deploy those skills and also select the appropriate strategy.

Reasoning is presented in language, but not all communications in language involve reasoning, so one needs to be able to pick out those features of language which tell him that reasoning is taking place. It is clear that he uses language for a variety of purposes. For example, he may use it to tell a joke, to insult someone, to report factual information, to describe a scene or a personality, to tell a story, to express his feelings, to explain why he has acted in a particular way, to ask questions, to issue orders etc. What most uses of language have in common is the attempt to communicate something to others.

Sometimes a person wants to persuade others to accept the truth of a statement and one way of doing this is to offer them reasons or evidence in support of this statement. This is the essence of argument. The simplest examples of arguments occur when someone, who believes some statement, will present reasons which aim at persuading others to adopt this same point of view. In more complex cases, someone may wish to assess and evaluate someone else's reasoning, or someone may be reasoning about their own or someone else's reasoning. All the people use language in this way, often without thinking of what they are doing as being something so grand as 'presenting an argument'.

- He must be older than he says he is. He told us he was forty-two, but he has a daughter who is at least thirty years old.

In the context of reasoning and critical thinking, an argument is defined as a conclusion together with the evidence supporting it. Often, when one hears the word argument in everyday conversation, he thinks of people yelling at each other in a heated dispute. When he says that a critical thinker makes an argument, he means that the critical thinker is making an assertion that is supported by evidence.

When someone gives reasons to justify a belief, he or she is presenting an argument and so the study of the standards of reasoning is described as the study of the characteristics that distinguish acceptable arguments from those that are not
acceptable. The study of reasoning helps one to evaluate sources of information (and misinformation) and it also helps one to see how to justify the conclusions, in other words, one will be learning how to identify, develop, present and evaluate arguments.

People often use the word argument to refer to a dispute. An argument has two components. The reasons presented as justifications are the premises of the argument and the claim they are intended to justify is the conclusion. The language of reasoning can be very complex, but there are some relatively simple linguistic clues which can signal that reasoning is taking place. In presenting an argument, the speaker or writer needs to state the premises and conclusion in a way that enables the audience to tell what the argument is. To consider a paragraph or series of paragraphs presenting an argument and to evaluate whether the argument presented is a good argument, one must be able to identify the premises and conclusion of the argument. The line between premises and conclusion is called an inference bar and its purpose is to distinguish steps in reasoning. The bar should be read as standing for ‘therefore’. This style of setting out arguments is called standard form. The purpose of setting out arguments in this manner is to maximize clarity. Using this method helps an individual to see the stages of reasoning clearly and to make comparisons between arguments of similar form. When dealing with arguments as they are ordinarily presented, distinguishing the exact conclusion from the premises, the premises from each other and the premises and conclusion from other irrelevant material can be difficult. Writing the argument in standard form provides the most comprehensive and clearest possible view of it, ensuring that while discussing the argument and attempting to evaluate it, people do not lose track of exactly what the argument is.

Several indicator words aid him in doing this. If he sees one of these, he can suspect that a conclusion is about to follow.

So
Hence
Thus
Therefore
It must be that
It can be concluded that

➢ The president is very unpopular, so the opposition party will make significant electoral gains.
The word ‘so’ helps to make it clear what is premise and what is conclusion. There are also words indicating that a premise is about to follow.

For
Since
Because
Due to the fact that
➢ *Since* the president is very unpopular, the opposition will make significant electoral gains.

These indicator words aid in identifying premises and conclusion.

One must use all of these aids with care. Many of these words, especially ‘since,’ ‘because’ and ‘so,’ have other uses to indicate temporal, causal, or other types of connections.

➢ *Since* Tuesday he has not studied.
➢ It broke *because* it dropped.
➢ He shouted ‘Help!’ *so* that everyone would look at him.

Another way of expressing an argument is to contain the premises and conclusion in one sentence with an indicator word separating them. … ‘The fact that Matthew Bordillo is a politician *proves* that he has a very big ego.’ Other words that serve the same function are:

• … implies …
• … establishes …
• … shows …

Commonly, a writer or speaker will state the conclusion of their argument before stating the premises. … ‘Gordon Brown must be a very important man *since* he is Chancellor of the Exchequer.’

Other words:

• … because …
• … for …
• … follows from the fact that …
• … is established by …
• … is implied by …

It is also important to note that one can present an argument without any of these indicator words; i.e. some passages which contain arguments have no argument
indicator words. In order to recognize them as argument, it is necessary to consider the relationships between statements in the passage, to assess whether some of the statements can be taken to support a statement expressing a conclusion. For example, the following passage can be constructed as an argument:

- Knowing the dangers of smoking is not sufficient to stop people from smoking. One third of the population still smokes. Everyone must know that smoking causes lung cancer and heart diseases.

It is using the reasons to support the conclusion that knowing the dangers is not sufficient to stop smokers from smoking. It should also be noted that in this example, the conclusion does not appear at the end of the passage. One needs to be aware that conclusions can appear anywhere within a passage, even though it is possible for him to ‘tidy up’ an argument by writing out the reasons first and ending with a conclusion introduced by ‘so’ or ‘therefore’.

Here is another example:

- The president is very unpopular, and his party has not used its legislative majority effectively. The opposition will make significant gains in the next election.

As long as one finds some sentence or sentences asserted as reasons for believing some further claim, he/she knows that he has an argument. Here, what is said in the first sentence seems to be offered as a reason for accepting the second. Still, the absence of indicator words can make it harder to know whether an argument is being given and it is generally better to use indicator words to let the audience see clearly when one is offering premises in support of a conclusion.

Even when it is clear that an argument is being presented and the conclusion has been clearly stated, the other elements of the argument are not always perfectly explicit. Sometimes one can leave critical premises unstated because they are general knowledge or because they are assumptions indicated in an obvious way by the rest of what he says.

- Whales must have lungs, because all mammals have lungs.

Clearly the conclusion is that whales have lungs. The word ‘must’ in a sentence frequently indicates that the sentence is a conclusion and the word because is being used here to indicate the premise of an argument. However, one can connect the conclusion with the explicitly stated premise, ‘all mammals have lungs,’ only if one
assumes that whales are mammals. The speaker does not need to make that premise explicit, because it is generally known to be true and because the rest of what is said clearly indicates that the speaker is making this assumption.

A. Thomson (12) summarizes the following steps to be taken when trying to assess whether a passage is an argument:

1. Look for ‘conclusion indicator’ words, i.e. words such as ‘so’, ‘therefore’, ‘must’, ‘cannot’, ‘should’.
2. If there are no ‘conclusion indicator’ words, look at each sentence in turn and ask, ‘Does the rest of the passage give any extra information which tells me why I should believe this?’ If the answer is ‘No’, then this sentence is not a conclusion. If the answer is ‘Yes’, then the sentence is a conclusion.
3. If none of the sentences in a passage is a conclusion, then the passage is not an argument: no conclusion, no argument. If one of the sentences in a passage is a conclusion supported by a reason or reasons in the rest of the passage, then the passage is an argument.
4. When you have found a conclusion in a passage, rewrite the passage with the conclusion at the end, introduced by ‘So’. Read through this re-written passage to check that it makes sense. If it does, then you can be certain that this passage is an argument.

Reasoning

Reasoning is the basic tool the critical thinker uses to come to a conclusion. Psychologists and thinkers in all disciplines use reasoning to help them think more clearly about the questions they ask and to advance the state of their knowledge. Reasoning is a powerful tool in this inquiry process because it prescribes conventional ways for using language so that arguments can be communicated clearly and analyzed consistently and effectively. In particular, reasoning provides rules for relating evidence to conclusions.

Arguments often use hypothetical or conditional statements as reasons. These are statements which begin with ‘If’ (or ‘when’ or ‘where’) and which say that something is true, or will be true, or will happen, provided that (on the conclusion
People may sometimes need to assess the truth of statements by relying on other people as authorities because being certain about the truth of a particular statement depends upon direct experience, which they lack.

Reliability of Authorities: If one of your acquaintances has a record of being untruthful, then you are much more cautious about accepting his/her statements as true than you would be about believing someone who, you thought, had never lied to you.

Of course, people who are not habitual liars may deceive others on occasions. They may do so because they stand to lose a great deal – money, respect or reputation – by telling the truth. So when persons have to make judgments about the reliability of people they know to be generally truthful and about people with whom they are not acquainted, they should bear this consideration in mind. That is not to say that they should assume people are being untruthful, simply because it would be damaging to them if others believed the opposite of what they say. But when they have to judge between two conflicting pieces of information from two different people, they should consider whether one of those people has a vested interest in making them believe what they say.

If someone was not in a position to have the relevant knowledge about the subject under discussion, then it would be merely accidental if their statements about the subject were true. There are a number of circumstances which prevent people from having the relevant knowledge. The subject under discussion may be a highly specialized subject which is understood only by those who have had appropriate education or training. Persons would not expect reliable information on brain surgery to be given by people who have had absolutely no medical training. This is why in many areas of knowledge, they have to rely on what experts say. Of course, people who are not experts can read about specialized subjects and pass on information to others about such subjects, so they do not have to disbelieve people simply because they are not experts. But they would be wise to ask the source of their information.

Another circumstance in which someone would not be in a position to have the relevant knowledge would be where eye-witness testimony was crucial and the person could not have seen clearly what happened – perhaps because of poor eyesight, or perhaps because they did not have a clear line of vision on the incident.
Someone who aims to tell the truth and who is in a position to have the relevant knowledge may nevertheless be unreliable because of circumstances which interfere with the accuracy of his or her judgment. For example, emotional stress, drugs and alcohol can affect perceptions. A person can be distracted by other events which are happening concurrently. A parent with fractious children in the car may notice less about a road accident than someone who is traveling alone.

Sometimes when persons have evidence from more than one source, they find that two (or more) people agree in their description of events – that is to say, their evidence corroborates the statements of others. In these circumstances, unless there is any reason to think that the witness has attempted to influence others, they should regard corroboration as confirming the reliability of evidence.

_Evaluating Support for Conclusions:_ A reason will not support a conclusion if it is not relevant to the conclusion. This may seem very obvious, since if a reason is concerned with some topic completely unrelated to the subject matter of the conclusion, it would be clearly mistaken to think that the reason could support the conclusion. However, when talking about a reason being relevant to the conclusion, it is not meant that it is about the same topic. What is meant is that the reason, if true, makes a difference to the acceptability of the conclusion. Relevance in this sense does not necessarily mean that a relevant statement supports a conclusion. A statement could be relevant and yet count against the conclusion.

_Identifying Flaws in Reasoning:_ If the reasons which are presented in an argument do not support the conclusion at all, then the argument has a flaw. The skill of identifying flaws in reasoning is being able to see that the conclusion does not follow from the reasons or evidence and being able to say why it does not follow.

- Some people say that the depiction of violence on television has no effect on viewers’ behavior. However, if what was shown on television did not affect behavior, television advertising would never influence viewers to buy certain products. But we know that it does. So it cannot be true that television violence does not affect behavior.

If a person is asked to say what the flaw in the reasoning is, he could express it as follows:
The fact that some things which are shown on television affect viewers' behavior is not a good reason for thinking that violence shown on television must affect viewers' behavior.

Or:

The fact that advertising shown on television affects viewers' behavior is not a good reason for accepting that everything shown on television affects viewers' behavior.

The ability to state flaws in this way is an important skill to develop, because it can be an effective way of showing other people that there is something wrong with their reasoning. Note that this flaw has been stated without ever considering whether the basic reason — that television advertising affects viewers' behavior — is true. If one can identify flaws in reasoning, then s/he can often be satisfied that a particular piece of reasoning does not establish its conclusion, without needing to dispute the truth of the claims upon which the conclusion is based.

Evaluating Further Evidence: Being able to assess the impact of additional evidence is valuable because people frequently challenge each others’ reasoning by offering some new piece of information. One response to such challenges would be to question the truth of the new piece of evidence. Another response might be to say that even if the new piece of evidence were true, it would not weaken the conclusion.

Of course, the context may not be one in which people are trying to defend a conclusion — nor should they be thinking in terms of the necessity to defend a conclusion at all costs. That would be to indulge in uncritical thinking — being determined to believe something even in the face of evidence to the contrary. So they must be prepared to acknowledge that sometimes additional evidence will weaken conclusions. Sometimes new evidence comes to light not in the context of a discussion, not when someone else is trying to undermine one’s own reasoning, but simply in relation to a subject upon which they already hold an opinion and believe that they hold that opinion for good reasons. Once they see that the new evidence is relevant to the issue, they must then consider whether it counts for or against their earlier opinion — that is to say they must consider whether it strengthens their reasoning and not merely whether it weakens it.

There are strategies one can use to attempt some assessment of an explanation. One is to examine any questionable assumptions underlying the explanation. Another
is to think of possible alternative explanations. If a person can think of two or three equally plausible explanations of something, then s/he should be cautious about accepting any of them as the correct explanation until s/he has further information.

One important aspect of reasoning is the ability to go farther than the information you have been given, to draw conclusions from evidence, to see what follows from statements which other people make. This is an ability which all people exercise to a certain extent in their daily lives.

Having understood the vitality of reasoning, two kinds of reasoning should be distinguished: inductive and deductive reasoning, commonly used in psychology and other disciplines. In inductive reasoning, one reasons from specific cases and events to a general rule or principle, such as theory. For example, a brain scientist makes repeated observations of people with schizophrenia, a severe mental disorder involving thought disturbances such as hallucinations and delusions. S/He observes that schizophrenics have too much of a certain brain chemical called dopamine. The brain scientist reasons from these specific cases to the general theory that too much dopamine causes people to have the symptoms of schizophrenia. Whereas in deductive reasoning, one proceeds in the other direction, s/he is reasoning from a general rule or principle to a specific case or event. For example, a psychologist may reason deductively from the general theory that schizophrenia is caused by too much dopamine to a conclusion about a specific person. The psychologist concludes that if John has too much dopamine in certain areas of his brain then he will show symptoms of schizophrenia, such as thought disturbance. As such, deductive reasoning is useful in reasoning from a theory to a prediction, in reasoning from a definition to an example and in analyzing some formal arguments. Deductive reasoning is also useful in that it provides the rules for deciding whether arguments are sound by first helping to decide whether an argument follows valid form and then by helping to decide whether a true conclusion follows from true premises. When an argument is sound, a true conclusion must necessarily follow from true premises. So, deductive reasoning allows a person to draw conclusions with certainty because, in a sense, the conclusion is implied and contained within the premises. Many everyday arguments and those that psychologists often make are more like inductive arguments, which involve much more uncertainty.
In psychology, “a theory is a set of general principles that attempt to explain and predict behavior or other phenomena” (Myers & Hansen 24). Often, a theoretical prediction is put into the form of a conditional (if ... then) deductive argument. One kind of deductive argument, called the conditional argument, is especially useful for making predictions from a theory in scientific thinking. The conventional form of a conditional argument contains at least three statements. The first two statements are called premises. The premises of a conditional argument are divided into two parts: one called the antecedent, which goes first, often preceded by the word if; and a second part, the consequent, which follows and is often preceded by the word then. The final statement is the conclusion, which should logically follow from the premises. A conclusion drawn from premises is also called an inference. When a true conclusion must necessarily follow from true premises, then one says that the argument is valid.

Conditional deductive reasoning allows researchers to test general theories by making specific predictions from them in the form of 'if ... then' statements. Specific predictions made from a general theory are often referred to as hypotheses. A hypothesis is an educated guess about what will happen if one assumes that certain conditions are present.

Understanding and evaluating arguments would be much easier if people always stated all the premises they use in arguments. However, people frequently make assumptions in arguments; that is, they often take for granted that some premise not explicitly stated in their argument is true (Reese). The ability to identify assumptions is important to the ability to evaluate arguments fully. If a person makes an unwarranted assumption – that is, one that lacks reasonable justification – then that assumption may lead to a wrong conclusion. Keeley declares that unfortunately there is evidence that college students are not very good at identifying assumptions in arguments.

To analyze an inductive argument, one must evaluate a number of statements to see how they bear upon some conclusion. Inductive arguments are sometimes written in the form of premises. Premises are defined as statements that make an assertion and that are offered as individual reasons supporting the conclusion that follows. One must carefully examine the evidence presented in each premise to evaluate the degree of support it provides for the conclusion. More specifically, before
he can draw a conclusion in an inductive argument, he must evaluate both the quality of the evidence, or how good it is and the quantity of the evidence, or how much evidence exists.

Unlike a deductive argument, in which a conclusion must necessarily follow from premises that are assumed to be true, the conclusion in an inductive argument may be accepted even when its premises are not all certainly true. In the present example, whereas some studies have shown increases in critical thinking after implementing specific instructional variables, courses and programs designed to teach critical thinking, other studies have shown no positive effect on critical thinking from these. At least some of these failures can be explained by the idea that developing critical thinking ability may take very specific and extensive training. For example, Tomlinson-Keasey and Eisert failed to show any effect of their training program after one year, but Tomlinson-Keasey, Williams and Eisert showed a significant effect after two years of training.

A second important difference between deductive and inductive arguments is that in deductive reasoning, if the argument is valid and all the premises are true, one is certain of one’s conclusion; in inductive arguments, one is typically much less certain. So using inductive reasoning, one generalizes that most of the evidence supports the idea that thinking skills can be taught, but one is not completely certain.

Garnham and Oakhill claim that although critical thinkers and scientists try to develop theories that are as general as possible, negative evidence that is consistently obtained may indicate specific conditions under which the theory does not apply.

One standard frequently used to decide whether an explanation is a good one is plausibility. A plausible explanation could conceivably account for some phenomenon using the usual assumptions made while explaining. In other words, one first looks for an explanation that could be true, given other things s/he already knows about the world. A person tries to explain new phenomena with the established theories and knowledge before starting to consider more farfetched explanations.

Critical thinkers and scientists often must use inductive reasoning to evaluate an argument. To do so they must evaluate conclusions they draw in terms of the quality and quantity of the evidence supporting those conclusions. The critical thinking task for inductive reasoning is summarized below (Bensley 32):

1. Identify and understand the claims or question.
2. Gather, compare and weigh the evidence relevant to the claim.
3. Draw a sound conclusion taking into account the quality and quantity of the evidence.

Nonscientific Approaches and Evidence (Bensley 32-34):
1. common sense
2. anecdotal evidence
3. statements of authority
4. rational approach
5. empirical approach

There are approaches to knowledge that are self-correcting – namely, critical thinking and science. In both critical thinking and science, the person examines the evidence relevant to some claim or hypothesis and then draws a sound conclusion from it. If s/he later discovers that more or better evidence supports the other side of the argument, then s/he changes the conclusion. Similarly, if an individual discovers that her/his reasoning was faulty, then s/he also changes the conclusion.

How strong an inductive inference can be made depends also on the quantity of evidence that supports or does not support a claim. The quantity of evidence is a factor in two ways. First, one must consider the number of studies supporting or not supporting a theory. Assuming that the quality of the studies is equal, if many more studies support a hypothesis or theory than do not, one is inclined to accept the hypothesis or theory until more or better evidence comes along that does not support it. In practice, quantity considerations can seldom be separated from considerations of quality. A second quantity consideration involves taking into account the number of observations made on the variable, with more observations preferable to fewer observations. It is assumed that in the long run, data from a study with more observations are more reliable than data from a study with fewer observations.

Through inductive reasoning, one may reason from observations, facts and specific cases to a general rule or principle, such as a theory. To draw a sound conclusion in an inductive argument, the critical thinker must evaluate all the evidence relevant to all sides of a question in terms of the evidence’s quantity and quality. The more evidence and the higher its quality, in support of one side rather than another, the stronger the support for that side. The strength of the inductive conclusions one draws may vary from weak to strong, but, unlike deductive
arguments, inductive arguments never lead to certainty. Consequently, critical thinkers and scientists are cautious about the inductive conclusions they draw. The critical thinking task involves evaluating the evidence relevant to a claim, taking into account both the quantity and quality of the evidence in order to draw a sound conclusion.

An important use of deductive reasoning in science is to make predictions from theories, so that the implications of the theory or hypothesis can be tested. A prediction based on a theory can also be made about a specific person. In this case, one might predict that a person showing helpless behavior would be depressed. This prediction is a deductive inference, because it involves reasoning from the theory to the specific case.

- If people learn to be helpless by encountering negative, uncontrollable life events (antecedent), then they will become depressed (consequent).

A valid deductive argument must first be valid or have correct logical form and then have all true premises leading to a true conclusion. This means that one should first decide that this deductive argument is valid, then the rule ‘if all the premises are true, then the conclusion must necessarily be true’ has to be applied and next it can be concluded that the argument is sound.

Bandura argues that people learn not simply through reinforcement of behaviors that they have actually engaged in but also by observing the consequences of other people’s behaviors. This kind of learning is called observational learning. According to Bandura’s social learning theory, people frequently learn how to behave and react by observing how other people who model certain behaviors respond in particular situations.

*Reasoning from a Behavioral Definition of Learning:* Learning is a relatively permanent change in behavior that is due to practice or experience.

The strategy for reasoning from a definition to an example has three steps (Bensley 110).

1. Identify and break down the various parts of the definition so that they can be stated as a set of conditions in the general premise.

2. Identify and break down the parts of the example that seem relevant to the definition and then assert them as specific cases of the antecedent to make a valid argument.
3. Decide whether each of the statements is true. If they are all true, then the conclusion must follow that your example is a true example of learning.

_Reasoning from a Cognitive Definition of Learning_: It is useful to learn how to reason from a definition focused more on cognitive aspects of learning: Learning is a relatively permanent change in knowledge due to practice or experience. If one breaks down this definition, he sees that it is nearly identical to the behavioral definition of learning, except for one important condition. Learning is (1) a change in knowledge (2) that is relatively permanent (3) due to practice or experience. The difference is that the cognitive definition emphasizes that the knowledge of the learner is changing, rather than the behavior.

**Rhetorical Ploys and Fallacies**

Sometimes speakers or writers attempt to persuade others in ways which appear to provide good reasons but actually do not. These persuasive devices are called sham-reasons and the process of employing them are described as sham-reasoning. As a critical thinker one should be cautious of the possibility of sham-reasoning, take care to avoid being persuaded by attempts to persuade which rely upon it and avoid using sham-reasons in one’s attempts to persuade others. Two types of sham-reasoning exist: rhetorical ploys and fallacies.

Neither rhetorical ploys nor fallacies provide good reasons to accept the claim they are intended to support. Fallacies are argumentative sham-reasoning. That is, they are still arguments in the sense that fits the definition of a set of propositions, some of which are premises, one of which is a conclusion, the latter intended to follow from the former. But in one way or another, they are bad arguments. Rhetorical ploys, on the other hand, are non-argumentative sham-reasoning, i.e., some of these persuasive devices may pretend to provide reasons for accepting a claim, but their real persuasive capacity depends on something non-argumentative.

Rhetoric means any verbal or written attempt to persuade someone to believe, desire or do something that does not attempt to give good reasons for the belief, desire or action, but attempts to motivate that belief, desire or action solely through the power of the words used. Arguments appeal to individuals’ critical faculties, their reason. Rhetoric, on the other hand, tends to rely on the persuasive power of certain
words and verbal techniques to influence their belief, desires and actions by appeal to their desires, fears and other feelings.

Rhetorical techniques can be manipulative and coercive and their use should generally be avoided by those who aspire to think critically and persuade by reason. That is not to say that rhetoric is always undesirable. Often it is used to great effect for good causes.

Many fallacious arguments may function at the very same time as an effective rhetorical ploy, thus causing the audience not to notice the fallacy. Insofar as one aims to be rational and to appeal to the rationality of others, s/he should avoid using rhetorical ploys and fallacies in her/his attempts to persuade and should take care not be persuaded by others’ rhetorical or fallacious attempts to do and believe things. The best way of doing so is to familiarize herself/himself with various common rhetorical ploys and fallacious forms of argument. The difference between fallacies and rhetorical ploys is understood most easily as a difference in the function of language being employed. Rhetorical ploys typically make a more or less direct appeal to feeling and emotion rather than to reason, which is the domain of argument. Fallacies, on the other hand, are simply defective attempts at argument. Of course, many writers and speakers will use a mixture of rhetorical ploys, fallacies and genuine arguments when attempting to persuade the truth of their claim. In fact, it is possible for a given form of words, as advanced by a would-be persuader, to constitute a fallacy, yet, function as a rhetorical ploy.

- More mothers use namby-pambies for their babies than any other disposable nappy. Shouldn’t you?

This is an example of the fallacy of majority belief: The advertisement wants mothers to accept the argument: X is used by more people than any other product of its kind, therefore X is the best such product. That argument is fallacious because its implicit premise – that the most popular thing is the best, or the most popular belief is true – is unjustified. But the advertisement also exemplifies the rhetorical ploy of appeal to population, i.e., the mere fact that something is popular often causes others to desire it (possibly by awakening a fear of being left out).
Fallacies

A fallacy is a mistake in reasoning. One commits a fallacy when the reasons accepted in support of a claim fail to justify its acceptance.

A fallacious argument or inference is one in which there is an inappropriate connection between premises and conclusion. Bowell and Kemp (110) believe that almost all fallacies fall under one of the following two types:

- **Formal fallacies.** Sometimes the inappropriate connections are failures of logical connection, for example in the case of the fallacy of affirming the consequent; here the argument or inference is neither deductively valid nor inductively forceful, even where all implicit premises have been made explicit. It is simply a logical mistake.

- **Substantive fallacies.** Sometimes the inappropriate connections involve reliance on some very general unjustified assumptions or inferences. We need only make these premises explicit in order to see that they are false and unjustified. What distinguishes a fallacious argument of this kind from an ordinary unsound argument is that the implicit, false premise will be of a very general nature, having nothing specifically to do with the subject-matter of the argument.

A fallacious argument can have true or false premises: simply having false premise does not make an argument fallacious. Nor does having true premises guarantee that an argument is not fallacious.

A person’s character and actions are certainly relevant to his/her credibility, that is, the degree to which someone’s having said something constitutes a reason to think it true, i.e. one should be on his/her guard against believing the claims of people whom he/she knows to be dishonest.

Arguments

Arguments go wrong in many different ways. Since Aristotle (384-322 B.C.) founded the first university and introduced the idea of studying logic, the study of fallacies of argument has been important. This study encourages the recognition of
common types of argument that one should not accept as sound. So that he will have a better chance to avoid being persuaded by such arguments. Once one recognizes a fallacious argument, s/he should also have effective patterns of response, so that s/he will be able to explain, in a convincing way, what is wrong with the argument.

When a person asks the question ‘why?’ s/he’s asking for a reason for doing what s/he is being enjoined to do, or believe what s/he is being enjoined to believe. When a person asks for a reason, s/he is asking for a justification for taking the action recommended or accepting the belief – not just a reason, but a good reason that ought to motivate her/him to act or believe as recommended to do.

Critical thinking ensures that individuals have good reasons to believe or do that which people attempt to persuade them to do or to believe. To attempt to persuade by giving good reasons is to give an argument. Individuals encounter many different types of attempts to persuade. Attempts to persuade may be argumentative or non-argumentative. The former, persuade individuals by giving reasons to accept a claim or take the action suggested. Not all arguments are good arguments. Good arguments are those that provide good reasons to act or to accept a claim. Critical thinkers should primarily be interested in arguments and whether these arguments succeed in providing good reasons for acting or believing them. But people also need to consider non-argumentative attempts to persuade, as they must be able to distinguish these from arguments. Most of them count as rhetoric, which is any attempt to persuade that does not attempt to give good reasons for the belief, desire or action in question, but attempts to motivate that belief, desire or action solely through the power of the words used. This is not always straightforward, particularly as many attempts to persuade involve a mixture of various argumentative and non-argumentative techniques to get readers and listeners to accept a point of view or take a certain course of action.

One may find it surprising to think of an ‘argument’ as a term for giving someone a reason to do or believe something. Perhaps in one’s experience the word ‘argument’ means a disagreement – shouting the odds, slamming doors, insults, sulking.

Argumentation is reason giving in communicative situations by people whose purpose is the justification of acts, beliefs, attitudes and values – a definition based on a definition adopted at the National Development Conference on Forensics. British
philosopher, Stephen Toulmin (qtd. in Freeley and Steinberg: 3) makes a similar point when he asks, “What kind of justificatory activities must we engage in to convince our fellows that these beliefs are based on ‘good reasons’?” Zarefsky defines good reasons as “reasons which are psychologically compelling for a given audience, which make further inquiry both unnecessary and redundant – hence justifying a decision to affirm or reject a proposition” (qtd. in Freeley and Steinberg: 3).

The creation of an argument is one of the most complex cognitive acts students can engage in. Freeley and Steinberg (30) maintain that to create arguments, students must:

(1) research issues (which requires knowledge of how to use libraries and databases), (2) organize and analyze the data, (3) synthesize different kinds of data, and (4) evaluate information with respect to the quality of conclusions it may point to. To form the arguments after this process, students must (1) understand how to reason, (2) be able to recognize and critique different methods of reasoning, and (3) comprehend the logic of decision making. The successful communication of arguments to audiences reflects another cognitive skill.

Bowell and Kemp (6) propose that when analyzing attempts to persuade individuals have to perform three tasks:

- The crucial first stage involves distinguishing whether an argument is being presented. We need to identify the issue being discussed, and determine whether or not the writer or speaker is attempting to persuade by means of argument.
- Once we have established that the writer/speaker is presenting an argument, we can move to the task of reconstructing the argument so as to express it clearly, and so as to demonstrate clearly the steps and form of the argument’s reasoning.
- A clear reconstruction makes our third and final stage – evaluating the argument, asking what’s good about it and what’s bad about it – much easier to perform and to justify.

To reconstruct the argument and the end product – the argument set out in standard form – is called a reconstruction of the argument, or an argument-
reconstruction. In reconstructing arguments, Bowell and Kemp (10) propose the following steps:

- Identify the conclusion.
- Identify the premises.
- Number the premises and write them out in order.
- Draw in the inference bar.
- Write out the conclusion, placing ‘C’ in front of it.

**Matters of Meaning**

The ability to use words plays a central role in all activities. The critical evaluation of reasons and beliefs requires an understanding of some of the ways in which these resource affect cognitive life.

The value of language is most apparent in its use in communicating with others. Language plays a crucial role in the development of ideas. An examination of some of the problems and resources associated with the words one uses will enhance his ability to use language in a clear and effective way in formulating, presenting and evaluating reasoning. The person needs to develop his sensitivity to ambiguity and vagueness and the effects these have on argument; he needs to practice clarifying his own arguments and learn to be aware of multiple possibilities in the interpretation of other’s words; and he needs to learn the power of suggestion inherent in the connotations of his words, so that he can identify some poor substitutes for justification and so that he can control the effect of his own words.

**Vagueness**

The use of a word can be meaningful even when no precise and general application exists. The vagueness of a word is really a feature of its meaning. The meaning of a word or expression is vague if it is indefinite or uncertain what is conveyed by the word. Sometimes, someone aware of the weakness of their own position will deliberately leave their meaning vague in order to disguise that weakness and to evoke strong feelings of approval or disapproval in their readers or listeners. A
particular use of a word has an application that should be contextually appropriate; it should make a contrast or apply to some individual or set that is salient in the particular context of conversation. Once a person has the idea of the relevant contrast being made (this afternoon, not tonight; this year, not last; this meteorological period, not the ice age), it is not required to know the precise boundaries of the time period. This holds true for much of what the person says. If one says that his sister wore red lipstick, s/he marks a contrast (with white, black, orange and so on), even if s/he is somewhat uncertain about whether to apply the term red to certain shades of magenta. Clear discussion does not require precise limits for the set of things the person would apply ‘red’ to, as long as the use of the word makes an adequate contrast in the situation at hand.

Words and conversational context together should enable an audience to figure out, well enough for the conversational purposes, what the speaker is talking about. If Uncle Bill says to his young nephew, ‘You have certainly grown bigger,’ that is precise enough. If Uncle Bill is a laboratory technician, then he will probably find it inappropriate to report, ‘We heated the piece of titanium quite a bit and it certainly grew bigger.’ In understanding people’s statements and arguments, the person must use his/her good judgment about the purpose at hand in determining what the appropriate standards of precision are.

**Ambiguity**

A sentence is ambiguous in a given context when there is more than one possible way of interpreting it in that context – that is, if there is more than one proposition it could plausibly be taken to express in that context.

- Cassandra: The stability of the banks is threatened. Everyone should take precautions.
- Simon: So I should get my money out now.

If Cassandra was warning about a danger of flooding, then Simon had drawn the wrong conclusion from the premises she offered. Cassandra’s predictions would be much more useful if she were careful to avoid such misleading ambiguity.

There are at least three ways in which a sentence can be ambiguous.
Lexical Ambiguity:

This is a property of individual words and phrases that occurs when the word or the phrase has more than one meaning. The set or group of things to which an expression applies is called its extension. The word ‘match’ is one such word. The sentence ‘He is looking for a match’ could be intended to mean any of the following propositions:

- He is looking for a small stick of wood with an inflammable tip.
- He is looking for another one the same [as this one].
- He is looking for [wants] a game of tennis (or some such).

Or ‘The banks were important to the town.’ This could be true because of the town’s financial situation or because it is near a high river. The word bank has multiple meanings and in this sentence (without additional context), it is not clear which meaning is intended. Ambiguous words create the possibility that the sentences that contain them will also be ambiguous. Of course, the context of discussion will often make it clear which meaning is intended, so that the audience often has no difficulty in understanding the speaker.

Syntactic Ambiguity:

Some sentences have more than one structural interpretation and consequently have multiple possible meanings. In other words, the arrangement of words in a sentence is such that the sentence could be understood in more than one way (as expressing more than one proposition.). There does not need to be any ambiguous word. The word syntax refers to the way words (or symbols) are put together, so the existence of multiple structural interpretations is called syntactic ambiguity.

- Judy and Alice or Jane will clean your engine.

That sentence is ambiguous because nobody knows what its structure is. Although no word is ambiguous, there are two possible structures, which can be indicated with brackets:

- [Judy and Alice] or Jane will clean your engine.
- (Either Judy and Alice will do it (together) or Jane will do it.)

- Judy and [Alice or Jane] will clean your engine.
- (Judy will do it, and either Alice or Jane will do it with her.)

From the original sentence alone, it cannot be told what the speaker meant.
US President Bush has cancelled a trip to Scotland to play golf. One can easily imagine a real context in which this sentence is ambiguous as to whether the purpose of the cancelled trip was to play golf or whether the trip was cancelled so that the president could play golf.

We should not tolerate those homeless people living on our streets. They might be saying that we should be intolerant of homeless people themselves. Or they might be saying that the people who do live on the streets should not be allowed to live on the streets. On the other hand, the intended proposition might be that we should not tolerate the fact that there are homeless people living on our streets.

Modifying phrases can often be a source of syntactic ambiguity, because more than one way can be found to apply the modifier.

John attacked the woman with a knife. It is not clear who has the knife. Careful presentation of ideas requires sensitivity to such ambiguities, so that one can rewrite (paraphrase) the sentence in question in a way that makes the meaning clear.

Seeing that the woman had a knife, John attacked her.

Using his knife, John attacked the woman.

Contextual Ambiguity:

When conversational context needs to play a role, contextual unclarity can infect a sentence, creating an ambiguity.

Alice wanted Mary’s father to go with her. Here the word ‘her’ needs to refer to some contextually apparent female. It could refer to Alice, to Mary or even to some other female the speaker points at when speaking the sentence. Context could provide multiple candidates, so the application of the word ‘her’ could be unclear.

Irony

Speakers and writers sometimes express their claims using irony. This takes the form of language that, taken literally, would convey the opposite of what they wish to convey, or something otherwise very different from it.
Ambiguity in Argument

When ambiguity infects an argument, there is an equivocation. An equivocation occurs when the words that appear in the premises and conclusion appear to link in the right way but this appearance of validity is superficial because there is an ambiguity. In other words, a word or phrase is used in an argument with more than one meaning or application. The argument may appear superficially valid, because the premises and conclusion have properly connected words or phrases, but it is not really valid, because the words or phrases are not used in a uniform way. Proper connection of the meanings of the expressions is ultimately the most important thing for validity of an argument. Multiple meanings and shifts of meaning can cause a failure of connection for the meaning even when the expressions appear to be appropriately linked.

When there is equivocation, words that appear to be the same, in reality have a different meaning, so there is no real linkage of meaning. This is a fallacy of argument – a way of arguing that may at first appear adequate but really is not. In ordinary cases of validity, the meanings of the premises and conclusion must be appropriately connected; similar words without an appropriate connection of meaning are ineffectual in producing validity.

When two words differ in the attitudes and emotional responses they express or evoke, they are said to have different connotations and words with the same content (or denotation) may have very different connotations indeed. Euphemism: Often a familiar word for something carries a definite impact and a set of associations that a speaker wishes to avoid.

- Tax increases have been called revenue enhancement, receipt strengthening and tax surcharges.
- To avoid the word recession, those in office have used other words, like slump, flat economy, correction, downturn, slowdown, spasm, or (creatively) sidewise waffling.
Problems with Quantifiers

Quantifiers are words that tell how many/much of something there are/is, or how often something happens. Not all quantifiers specify an exact quantity of the thing, rather they provide a rough guide.

- All men drive too fast.
- Few doctors support the health reforms.
- Lots of computers develop faults.
- He always writes his own speeches.

There are four potential problems with quantifiers: First, speakers and writers don’t always use quantifiers with sufficient precision, so that the proposition they intend to convey is unclear and open to misinterpretation and rhetorical abuse. Suppose your friend says, ‘premiership footballers all earn massive payments from sponsorship deals’. You don’t agree and you mention an exception – Fergie Footballer receives only his footballer’s salary, with an extra money from endorsing sports shoes or shirts. Second, some quantifier words are themselves vague. ‘Some Members of Parliament support the decriminalization of cannabis use.’ What does ‘some’ mean here? It could mean that only a handful hold the view described, it could mean that a larger minority of members hold that view. Third, often people simply omit quantifiers. ‘Lecturers don’t give students a chance to complain.’ At face value this might appear to convey the proposition that ‘No lecturer (ever) gives a student a chance to complain.’ Yet it is likely that what the speaker really wants to say is something like ‘Most of the lecturers I’ve encountered haven’t given students enough chance to complain.’ And the last, quantifiers are used to express generalizations and even where at least one quantifier is used explicitly, it can be unclear exactly what generalization is intended. ‘Everyone has tried drugs at some time in their lives.’ Taken literally, the claim is a generalization stating that every single person in the world has tried some drug or other at least once. Even if one gives ‘drugs’ the widest possible interpretation, the claim will be falsified by those cases of people who, for instance, have never even taken an aspirin for a headache.

To get a better grasp of which types of generalization may cause problems during the analysis and assessment of arguments, one needs to distinguish between hard and soft generalizations. The quantifiers such as ‘in more cases’, ‘usually’,
'almost all' are used in soft generalizations. Soft generalizations are used when people want to express the idea that such and such is true of certain things normally, typically, generally, usually, on average, for the most part.

- Private schools generally attain better examination results than state schools.
- Almost all students have contemplated cheating in an examination.
- Few of the applicants are sufficiently qualified for the job.

On the other hand, someone using a hard generalization does intend it be applicable without exception. Such a generalization is rightly conveyed by a quantifier such as ‘all’, ‘every’, ‘no’, ‘always’, ‘never’.

- Every passenger must hold a valid passport.
- All passengers must fasten their seatbelts for take-off and landing.

**Logic**

If people’s aim is to give the best possible reconstruction of an argument, then they have to know something of what makes an argument good or bad. Fortunately, logic gives some very clear answers as to what does make arguments good and bad.

The fundamental concept of logic is the concept of truth. For one thing, the overarching concern of the critical thinker is typically with the truth, or lack of it, of the conclusions of arguments. Sometimes individuals will speak of the truth-value of a proposition. This just means that truth of the proposition, if it is true, or its falsity, if it is false. There are two truth-values, true and false.

**Deductive Validity**

This sort of generalization is also needed in order to define the important concept of deductive validity. It would be impossible for the premises to be true but the conclusion false. The truth of the premises, in any possible or imaginable situation, would necessitate the truth of the conclusion. An individual can tell that an argument is valid or not without knowing the truth-value of the propositions it comprises, because the validity of an argument (or lack thereof), does not depend upon the actual truth-values of those propositions.
The concept of validity pertains to the connection between the premises and conclusion of an argument, not their truth-values considered individually. Thus, it should be clear that it would be nonsense, to say of a single proposition, that it is valid. There are two definitions of validity:

To say that an argument is valid is to say: It would be impossible for all the premises of the argument to be true, but the conclusion false.

To say that an argument is valid is to say: If the premises are true, the conclusion would also have to be true.

The only case in which an argument cannot be valid is the case when the premises are all true, but the conclusion is false.

**Test for Validity**

Whether or not the premises are actually true, suppose or pretend that they were all true; then in that situation — aside from how things really are — could the conclusion conceivably be false? If it could not be, then the argument is valid. If it could, then the argument is invalid.

The systematic study of validity is the concern of logic. Logicians are concerned to devise perfectly reliable procedures for detecting validity, or the lack of it, even in the case of extremely complex arguments such as those occurring in mathematical proofs.

Logic has no concern with particular truths. In a sense, the logician does not have to know anything. The logician is concerned only with relations between propositions, not with their truth-values.

In critical thinking people are doing what might be called practical logic. They want to learn to identify the reasoning in commonly encountered attempts to persuade them and to assess it as good or bad. For this, they need the concept of validity, but they do not need elaborate technical procedures for detecting validity. The reason is that the logic of the vast majority of arguments in everyday life is rarely of any great complexity.

A conditional is said to be true or false, rather than valid or invalid. For a conditional is not itself an argument. A conditional is one proposition that comprises
two propositions as parts, joined by ‘if-then’ or a similar device. An argument cannot be just one proposition. It needs at least two.

To say that an argument is deductively sound is to say: the argument is valid and all its premises are true.

It follows from the definition that the conclusion of a deductively sound argument must be true. There cannot be a deductively sound argument with a false conclusion.

An argument which is not deductively sound – which has one or more false premises, or is invalid or both – is said to be deductively unsound. Deductive soundness, like validity, pertains to whole arguments and not to single propositions.

**Inductive Force**

The logician, knowing nothing but the truth of P1 and P2, could happily accept that if the premises are true, then, probably, so is C. One recognizes this by calling such an argument inductively forceful and inserting the word ‘probably’, in parentheses, before the conclusion:

- P1) Fiona lives in Inverness.
- P2) Almost everyone in Inverness owns at least one item of woolen clothing.
- C) (Probably) Fiona owns at least one woolen item of clothing.

An inductively forceful argument is one that is not deductively valid – the truth of the premises would not ensure the truth of the conclusion – but whose premises provide good reasons to expect the conclusion to be true rather than false.

[P] stands for one or more premises, and A stands for a conclusion.

- [P] ...
- C) A

To say that such an argument is inductively forceful is to say that the conditional probability of A relative to the set [P] is greater than one-half, but less than 1. To say that an argument is inductively forceful is to say: The argument is not deductively valid, but: if the premises are true, then, given no other information about the subject-matter of the argument, it would be more reasonable to expect the conclusion to be true than it would to expect it to be false.
By ‘probable’, it is meant the case in which the probability is greater than 1/2; by ‘improbable’ it means the case in which it is less than 1/2; something can be neither probable nor improbable, if its probability is exactly 1/2).

One cannot say that one argument is more valid than another, but he can say that one argument is more inductively forceful than another. To say that an argument is inductively sound is to say: it is inductively forceful and its premises are true.

The important thing to note here is that an inductively sound argument, unlike a deductively sound argument, may have a false conclusion. That possibility is precisely what is left open by the definition of inductive force – an inductively forceful argument is the case in which the truth of the premises would probably make the conclusion true. But not necessarily make it true. It is called inductive inference. This is the case when one extrapolates from a sample of a total population of things either to something outside the sample, or to a generalization about the population as a whole.

To say that an inference is an inductive inference is to say: (a) it is not deductively valid; (b) its premise is a generalization about a sample of a given population, and (c) its conclusion is a generalization about the total population from which the sample is drawn.

The larger and more representative the sample used for a given generalization, the more inductively forceful, or the stronger the inductive inference. An inductive inference that is not forceful – one whose premise does not really support its conclusion – is a weak one.

**Coping with Uncertain Knowledge (Fuzziness)**

Suppose it is told that Pat Jenkins is five feet tall. One measures Pat’s height and discovers that Pat is actually five feet and one inch. Is this statement that Pat Jenkins is five feet tall false?

The answer to the question depends upon how a person interprets the sentence “Pat Jenkins is five feet tall.” If s/he interprets the sentence as saying that Pat Jenkins is exactly five feet tall, not a fraction of an inch more or less, the sentence is clearly asserting a false proposition. On the other hand, if s/he interprets the sentence as saying that Pat Jenkins is five feet tall, give or take an inch or two, the sentence
asserts a true proposition. It will be false only if Pat Jenkins is actually, say, five foot
six.
If it is told that Pat is tall, the situation gets worse. If Pat is four feet tall, surely this
statement is false and if she is six feet tall, the statement is true. In between four feet
and six feet is a gray area that the word tall refers to.
The issue illustrated by the above example is that of Fuzziness. In both everyday
knowledge and academic knowledge, people need to make assertions about the world
that lack total exactness. Even in the so called ‘exact sciences’ like physics and
astronomy, the claims people make about the world need to recognize a certain
amount of gray area. This margin of error is explicitly acknowledged in quantitative
reasoning in the statements about standard deviation, margin of error, confidence
interval and so on. In qualitative reasoning, individuals acknowledge it using words
like almost all, most, generally, most likely and so on.
What is called fuzzy logic was designed to capture the legitimacy of such inferences.
Fuzziness, or the absence of total exactness, is part and parcel of human knowledge.
One may view fuzziness as a form of uncertainty. Another form of uncertainty is that
of fallibility.
Fallibility: Consider the following statements:
1) a. The sun always appears in the east in the morning,
   b. The sun always appears in the west in the morning.
2) a. Human beings have one head,
   b. Human beings have two heads.
Both (1b) and (2b) are rejected as clearly false. What about (1a) and (2a)? Are persons
justified in believing that they are true?
The answer depends on what is meant by the term justification. If justifying a claim
requires proving that the claim is true, (1a) and (2a) by definition are not justified.
Persons can prove that within the framework of Euclidean geometry, the sum of
angles of a triangle is 180 degrees, but they cannot prove (1a) or (2a). On the other
hand, if justifying a claim means providing reliable evidence to support the claim,
then both (1a) and (2a) are justified. On the basis of observing a large number of
instances of the sun rising in the east and never in the west, people consider
themselves justified in concluding that the sun always appears in the east in the
morning. Similarly, on the basis of observing a large number of human beings with
one head and having never observed a human being with more than one head, they consider themselves justified in concluding that all human beings have one and only one head. Such conclusions are made on the basis of inductive reasoning.

Are individuals totally certain that the sun will not appear in the west in the morning some day? Are they totally certain that they will not find a two-headed human being some day? The answer is no. They are reasonably certain, but not totally certain. This means that the beliefs that the sun will always appear in the east in the morning and that there are no two-headed humans are fallible, that is, subject to the possibility of turning out to be false. In other words, no belief that people consider to be knowledge of the world can be proved to be true beyond the shadow of doubt.

Individuals may think of fuzziness and fallibility as different aspects of uncertainty. While conclusions in classical deductive reasoning are absolutely certain, those in probabilistic deductive reasoning are less than absolutely certain. Probabilistic reasoning lacks exactness, while inductive reasoning has a choice between inexactness. Therefore, it may be noticed that probabilistic reasoning and inductive reasoning are both forms of uncertain reasoning, in the sense that they do not yield conclusions with total certainty.

**Analogy**

An analogy is a comparison, especially a comparison of things of very different sorts. The essential characteristic of analogical reasoning is that it allows one to make inferences in one domain on the basis of information from some other domain. Analogies are used sometimes to clarify, sometimes to persuade without argument and sometimes to persuade in connection with an argument. They are especially useful when someone wants to call attention to similarities that are easier to visualize than to describe or that resist easy description for other reasons.

An analogy invites a comparison of the analogue and the principal subject, looking for a family of similarities. Because an analogy invites one to ‘cast about’ for similarities, an analogy often suggests similarities that are not related to the main comparison being made. In addition, one has attitudes towards the analogue and the analogy invites one to transfer those to the principal subject.
Critical Thinking and Debate

Debate education improves the ability to think critically. In a comprehensive review of the relevant research, Kent Colbert concludes, “The debate-critical thinking literature provides presumptive proof favoring a positive debate-critical thinking relationship” (qtd. in Freeley and Steinberg: 2).

Much of the most significant communication of lives is conducted in the form of debates. These may take place in intrapersonal communications in which people weigh the pros and cons of an important decision in their own minds, or they may take place in interpersonal communications, in which they listen to arguments intended to influence their decision or participate in exchanges to influence the decisions of others.

Debate is the process of inquiry and advocacy; the seeking of a reasoned judgment on a proposition. It is the process of inquiry and advocacy, a way of arriving at a reasoned judgment on a preposition. Individuals may use debate to reach a decision in their own mind; alternatively, individuals or groups may use it to bring others around to their way of thinking. Debate provides reasoned arguments for and against a proposition. Because it requires that listeners and opposing advocates comparatively evaluate competing choices, debate demands critical thinking. Society, like individuals, must have an affective method of making decisions.

The ancient Greeks were among the first to recognize the importance of debate for both the individual and society. Plato, whose dialogues were an early form of cross-examination debate, defined rhetoric as “a universal art of winning the mind by arguments, which means not merely arguments in the courts of justice and all other sorts of public councils, but in private conference as well (qtd. in Freeley and Steinberg: 4)

As Freeley and Steinberg (4) explain:

Aristotle listed four functions for rhetoric. First, it prevents the triumph of fraud and injustice. Aristotle argued that truth and justice are by nature more powerful than their opposites, so when poor decisions are made, speakers with right on their side have only themselves to blame. Thus, it is not enough to know the right decision
ourselves; we also must be able to argue for that decision before others.

Second, rhetoric is a method of instruction for the public. Aristotle pointed out that in some situations scientific arguments are useless; a speaker has to “educate” the audience by framing arguments with the help of common knowledge and commonly accepted opinions.

Third, rhetoric makes us see both sides of a case. By arguing both sides, we become aware of all aspects of the case, and we will be prepared to refute our opponents’ arguments.

Fourth, rhetoric is a means of defense. Often knowledge of argumentation and debate will be necessary to protect ourselves and our interests. As Aristotle stated: ‘If it is disgrace to a man when he cannot defend himself in a bodily way, it would be odd not to think him disgraced when he cannot defend himself with reason. Reason is more distinctive of man than is bodily effort.’

Individuals need debate not only in the legislature and the courtroom but in every other area of society as well, since most of their rights are directly or indirectly dependent on debate. Debate is needed both to maintain freedom of speech and to provide a methodology for investigation of and judgment about contemporary problems.

Debate can be classified into two broad categories: applied and educational. Applied debate is presented before a judge or audience with the power to render a binding decision on the proposition. By the same token, it is conducted on propositions in which the advocates have a special interest and the debate is presented before a judge or an audience with the power to render a binding decision on the proposition. Academic debate is conducted under the direction of an educational institution for the purpose of providing educational opportunities for its students. In other words, it is conducted on propositions in which the advocates have an academic interest and the debate typically is presented before a judge or an audience without direct power to render a decision on the proposition. In fact, in academic debate the judge is instructed to disregard the merits of the proposition and to render a decision
on the merits of the debate. The purpose of the debate is to provide educational opportunities for the participants.

**Critical Thinking and Emotions**

Emotion might serve several functions. It may facilitate learning, direct and redirect attention to important environmental events, enhance expressive communication in social interactions, or help maintain goals and direct actions toward them in general. The idea that emotions make individuals think and behave irrationally is an old one in Western thought that remains popular today. Philosophers have viewed the emotions as in opposition to reason since the time of Plato and Socrates. The idea that emotions interfere with judgment is reflected in the popular saying love is blind (Fischer & Jansz). In a recent informal survey, Parrott found that most people associate emotion with a disruption in thinking. Moreover, emotions are often viewed as involuntary while reason is thought to be voluntary.

Several surveys suggest that emotional states, especially negative ones, impair the ability to think rationally. Ellis (*Basic Clinical Theory*) argues that people become depressed because they hold irrational beliefs about themselves and the world. Furthermore, Ellis (*Research Data*) asserts that a large body of literature supports the idea that negative, irrational thinking is related to depression. Other research by Tobacyk and Milford suggests that people who endorse irrational beliefs tend to show greater dogmatism and to make less critical inferences.

Other research on the effects of depression shows mixed results. Palfai and Salovey declare that the effects of emotion on performance on two reasoning tasks are complex. On the one hand, they found that subjects who were experimentally induced to be in a depressed mood performed significantly more slowly on an inductive reasoning task than those induced to be in neutral mood. On the other hand, the subjects experimentally induced to be in an elated mood performed significantly more slowly than depressed and neutral condition subject on a deductive reasoning task. In another study by Camp and Pignatiello, subjects induced to be in a depressed mood failed to show any impairment in their inferential reasoning using world knowledge as...
compared to subjects who were in either a happy mood group or a neutral mood group.

Fear has also been shown to interfere with rational thinking and behavior. Keinan found that when subjects were induced to be fearful by the threat of an electric shock they were less likely to examine alternatives to an anagram problem than subjects who were not made fearful.

Anxiety may also produce many negative effects on performance, including reasoning, especially when time pressure is involved, as in taking a test. Hembre reviewed a large number of studies in which test anxiety negatively impacted cognitive performance.

Other research suggests that emotions and moods can have effects on a variety of kinds of judgments. Johnson and Tversky found that subjects whose mood changed as a result of reading a tragic newspaper story increased their judgments of the frequency of other risks and undesirable events. On the other hand, subjects who read a positive story decreased their estimates of the frequency of risks. Another study found that happy subjects were willing to bet more on a long shot than subjects who were not made happy, suggesting that happiness can lead to greater risk taking under certain conditions (Isen & Patrick).

Although sometimes positive mood has helpful effects upon behavior and thinking, other research has shown that positive mood can bias thinking and judgment. Isen and Daubman found that positive mood causes people to be more inclusive in grouping things into categories. In other words, if people have been put in a positive mood, they are more likely to say that a marginal example of a category was an instance of the category than subjects who were not put in a positive mood. Schwartz and Bless argue that when people are in positive moods, they are likely to use a processing strategy that lacks logical consistency and attention to detail.

Performance on tasks requiring logical, detail-oriented strategies may be impaired by a positive mood, but a positive mood may actually help a person on creative kinds of tasks (Isen, Johnson, Mertz & Robinson). Creative thinking often requires that one sees remote connections between stimuli, so a positive mood might be adaptive and helpful in solving some kinds of problems. In another study, Isen and Means found that subjects in a positive mood were more efficient in their decision making than were control subjects not put in a positive mood.
Mood has also been shown to have a variety of effects on persuasion. Some of which are complex (Petty, Gleincher & Baker). Bless, Bohner, Schwartz and Strack found that happy subjects were just as persuaded by weak arguments about a message that was opposite to their own attitudes on a topic as they were by strong arguments, unless they were told to pay attention to what the message said. Sad subjects, however, were more influenced by strong arguments than weak ones.

**Emotional Effects on Thinking**

The following describes several ways in which emotions can affect thinking and can be misused in the critical thinking process.

1. * Interruption of Thinking:* Strong emotions tend to shut down critical thinking, causing people to come to hasty and often irrational conclusions or to behave in ways that appear to be opposed to their goals.

2. * Distortion of Judgment:* Judgments may be biased or altered by emotional states. For example, people who have a depressed outlook on life tend to expect failure even in situations in which failure is not likely. Also, people who are in a good mood tend to use categories in a more inclusive fashion than those not experiencing happiness.

3. * Appeals to Emotion:* In persuasion and argumentation, a person may appeal to an emotion instead of providing a reason or evidence in support of some claim.
   a. *Poisoning the Wall:* In this strategy, a person arguing for a position seeks to make it uncomfortable or embarrassing for another person to offer an opposing viewpoint or evidence. In this way disagreement and examination of all sides of an argument can be avoided.
   b. *Direct Appeals to Emotion:* Information is presented or situations are described for the purpose of arousing an emotion, such as pity or contempt, in order to influence or persuade.
   c. *Emotional Language:* In making an argument, emotionally charged language is introduced in order to bias interpretation of the evidence or to color the argument.
Emotions have been shown to exert effects on thinking that may interfere with and interrupt rational thinking, as in the cases of jealousy, test anxiety and depression. Emotions are motivated states and as such they direct and arouse behavior. They are marked by changes in subjective experience, such as feeling state, by expressive behaviors such as frowning and by physiological changes such as changes in heart rate.

**Recent Studies on Critical Thinking**

Asian learners of English are often characterized by constructs which claim that they lack an individual voice and critical thinking skills. Contrary to this claim, in an attitude survey of 70 Japanese undergraduates, Stapleton (250) found that participants possessed a firm grasp of elements of critical thinking. This result suggests that traditional constructs describing Asian students may no longer be accurate.

In recent years there has been extensive discussion about the need to consider the culture of the learner in order to improve teaching practices. These discussions often use the culture of Asian learners as focus of comparison with Western culture. Constructs which characterize Asian learners as group-oriented, harmony-seeking, hierarchical and non-critical thinking, are typically contrasted with the individualistic, adversarial, horizontal and critically-thinking behavioral patterns of their Western counterparts (Atkinson; Fox; Ramanathan and Kaplan).

Fox claims that the critical thinking which results in what is perceived as good writing is a product of U.S. culture. However, very few cultures share this way of thinking. Atkinson (80) suggests that “the very notion of critical presupposes that individual conflict and dissensus are a social reality, if not a tool for achieving socially desirable ends, while thinking – at least in the Western context – assumes the locus of thought to be within the individual.” Atkinson contends that such a supposition naturally conflicts with the sociocultural norms of certain cultures outside of the United States. He states that critical thought is more of a social practice than a teachable set of behaviors.

A recent study comparing Asian and European students' attitudes has raised
further doubt about prevailing constructs that portray Asian students as passive learners lacking in critical thinking skills. Littlewood (34) found that “Asian students do not, in fact, wish to be spoonfed with facts from an all-knowing ‘fount of knowledge’. They want to explore knowledge themselves and find their own answers.” Accordingly, these findings suggest that a new generation of Asian learners is not being depicted accurately by conventional constructs.

Another research was conducted by Alivandi in Iran about the relationship between critical thinking and Tabriz university students’ academic achievement. In her research, Alivandi concludes that there is a significant relationship between applying critical thinking strategies and academic achievement of the students in Tabriz University. As the students improved their critical thinking skills and strategies their academic achievements also improved. Moreover, she asserts that students in different fields of study possess different levels of critical thinking skills, i.e., critical thinking abilities of art students (Law and Language) are much better than those of engineering students (Computer and Civil) and in turn, engineering students performed better than science students (Mathematics and Geology) in critical thinking test. Further, she maintains that there wasn’t significant difference between the critical abilities of males and females, i.e., male and female students have the same level of critical thinking skills and abilities.

In order to display critical thinking skills, it is important to question the claims of others, as well as to go beyond simply duplicating what they have said (Browne and Keeley 8). To fulfill the requirements of such a process, the status of those making claims, while perhaps relevant to some degree, must not deter counter or alternative views. Ramanathan and Atkinson, in citing studies performed on students from interdependent cultures, claim that maintaining harmony and preserving face, as well as observing the norms of social hierarchy, result in the avoidance of criticism. This behavior is contrasted with individualistic mainstream American social practice. Two clear implications can be taken from Ramanathan and Atkinson and many of the works they cite. Firstly, they imply that in order to think critically, one must harbor an individual voice. Secondly, this voice should not be influenced by concerns of group cohesiveness or the status of those making alternative claims. The first notion is shared by the thrust of Stapleton’s study. Based on the results of his study, the second notion, i.e. the idea that the Japanese, as collectivist and
hierarchy-oriented people, are unable to overcome these cultural attributes to express their individual voices and think critically, may be open to question.

Siegal claims that the critical thinker has to reject partiality, while seeking reasons and evidence. Any effort to achieve harmony with one’s audience on a contentious issue, whether it is one’s teacher or not, compromises the product of what may be critical thought because it takes into account a factor which are extraneous to reasons and evidence.

In Littlewood’s study, Asian learners replied to an attitude survey performed in eight Asian and three European countries in which students were questioned on their feelings towards the teacher as an authority figure. Hence, Littlewood found that the stereotype of the obedient and passive Asian student is only a surface phenomenon, which does not reflect the real desires of the students.

Collaborative Learning Enhances Critical Thinking:

The concept of collaborative learning has been widely advocated throughout the professional literature. The term ‘collaborative learning’ refers to an instruction method in which students at various performance levels work together in small groups toward a common goal. The students are responsible for one another's learning as well as their own. Thus, the success of one student helps other students to be successful.

Proponents of collaborative learning claim that the active exchange of ideas within small groups increases interest among the participants and promotes critical thinking. According to R. T. Johnson and D. W. Johnson, there is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals. Totten, Sills, Digby and Russ declare that the shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning and thus become critical thinkers.

Gokhale explains that the advances in technology put an increased emphasis on teamwork within the workforce. Workers need to be able to think creatively, solve problems and make decisions as a team. Therefore, the development and enhancement of critical-thinking skills through collaborative learning is one of the primary goals of education in technology. In his research on the effectiveness of collaborative learning as it relates to learning outcomes at the college level, he examined the effectiveness of individual learning versus collaborative learning in enhancing and critical-thinking skills. As a result, he found that students who participated in collaborative learning
had performed significantly better on the critical thinking test than students who studied individually. This result is in agreement with the learning theories proposed by proponents of collaborative learning. From this research study, it can be concluded that collaborative learning fosters the development of critical thinking through discussion, clarification of ideas and evaluation of others' ideas. Therefore, he concludes that if the purpose of instruction is to enhance critical thinking and problem solving skills, then collaborative learning is more beneficial. Moreover, he asserts that for collaborative learning to be effective, the instructor must view teaching as a process of developing and enhancing students' ability to learn. The instructor serves as a facilitator for learning and not as a transmitter of information. This involves creating and managing meaningful learning experiences and stimulating students' thinking through real world problems.

On the other hand, according to Vygotsky, students are capable of performing at higher intellectual levels when asked to work in collaborative situations than when asked to work individually. Group diversity in terms of knowledge and experience contributes positively to the learning process. Bruner contends that cooperative learning methods improve problem solving strategies because the students are confronted with different interpretations of the given situation. The peer support system makes it possible for the learner to internalize both external knowledge and critical thinking skills and to convert them into tools for intellectual functioning.

**Reading**

**Introduction**

Reading is a process – Chastain (216) believes – involving “the activation of relevant knowledge and related language skills to accomplish an exchange of information from one person to another.” Reading requires that the reader focuses his/her attention on the reading materials and integrates already acquired knowledge and skills to absorb what someone else has encoded in a written mode.

Reading is being described as an active process which suggests that the reader uses his/her background knowledge and skills to recreate the writer’s intended meaning (Goodman; Paulston and Bruder; Chastain). Reading is a receptive skill in
that the reader is receiving a message from a writer. It is also referred to as decoding skills by the same authors.

Establishing a clear definition of reading provides an important perspective for evaluating approaches to teaching word-identification skills. Most educators would agree that the major purpose of reading should be the construction of meaning – comprehending and actively responding to what is read. Two of the most widely cited and agreed-upon definitions of reading are the following:

Reading is the process of constructing meaning from written texts. It is a complex skill requiring the coordination of a number of interrelated sources of information (Anderson and Freebody).

Reading is the process of constructing meaning through the dynamic interaction among: (1) the reader's existing knowledge; (2) the information suggested by the text being read; and (3) the context of the reading situation (Wixson, Peters, Weber & Roeber).

According to Walker, reading is an active process in which readers shift between sources of information (what they know and what the text says), elaborate meaning and strategies, check their interpretation (revising when appropriate) and use the social context to focus their response.

Perfetti (Reading Acquisition) defines reading as “thinking guided by print” (40-41). Likewise, Brindley describes reading as making a correlation between the shapes on the page and the language in the hand. The recognition that shapes on a page relate to the meaning ascribed to spoken words represents an enormous leap of conceptual development for the small child.

Other authors define reading as the act of simultaneously reading the lines, reading between the lines and reading beyond the lines (Manzo and Manzo). The first part of their definition, reading the lines refers to the act of decoding the words in order to construct the author's basic message. The next part, reading between the lines, refers to the act of making inferences and understanding the author's implied message. And finally, reading beyond the lines involves the judging of the significance of the author's message and applying it to other areas of background and knowledge.
Reading Processes

Most researchers are convinced that reading is a multifaceted process that goes beyond the description of any single facet, e.g. Duran, Mclaughlin, Rumbelhart, Schank, Swaffar, Weaver (qtd. in Celce Murcia). Celce Murcia believes that reading is the most complex and difficult skill among other skills. Mclaughlin affirms that in fact the child is engaging in complex interactive processes that are dependent on multiple subskills and an enormous amount of coded information.

Process Models

Process models may be sequential, i.e. they model the reading process as a series of stages, each of which is complete before the next stage begins; or they may be non-sequential, as in the case of Stanovich’s (35) interactive-compensatory model, where “a pattern is synthesized based on information provided simultaneously from several sources.”

The popular view of the development of process models are as follows. The first one is the bottom-up approach, which was then replaced by the top-down model, which in turn was replaced by interactive models. The most frequently cited example of a bottom-up model was proposed by Gough in 1972, whereas the corresponding most frequently cited example of top-down theory, that of Goodman, was first published in 1967. Although Goodman is usually cited as a top-down theorist, there is a good argument that his theory is an interactive one.

Bottom-up and Top-down Approaches

Bottom-up analyses begin with the stimulus, i.e. the text or bits of the text. Gough claims that the reader begins with letters, which are recognized by a scanner. The information gained is passed to a decoder. Decoder converts the string of letters into a string of systematic phonemes. Then the string of systematic phonemes is passed to a library, where with the help of the lexicon, it is recognized as a word. The reader then fixates on the next word and proceeds in the same way until the words in a
sentence have been processed, at which point they proceed to a component called merlin, in which syntactic and semantic rules operate to assign a meaning to the sentence. Vocal system is the final stage, where the reader utters orally what has first been accessed through print. Gough’s model of the reading process is a model of the reading aloud process.

As Rayner and Pollatsek point out, Gough’s model is explicit enough to be tested at various points. In the original model, for example, the letters were seen as being fed serially into the scanner for recognition. If this were true, then a word should take longer to recognize than a single letter. But in fact experiments have shown that this is not the case: words can be recognized more quickly than individual letters. It appears that letters are processed in parallel. More importantly, readers have been shown to use syntactic information to deal with ambiguous words.

On the other hand, it is difficult to see how one stage of the process is over before the next stage begins. If all the words in a sentence had to be recognized before syntactic processing began, then the model would not appear to have any way of knowing when to stop processing words and move to processing sentences.

Bottom-up models start with the smallest text unit, either letters or letter features. One might expect that top-down models should begin with the largest unit, the whole text. However, it is virtually impossible to see how a reader can begin by dealing with the text as a whole, then proceed to smaller units of the text, say paragraphs, then down to individual sentences, ending with single letters. In fact, the term ‘top-down’ is deceptive, appearing to offer a neat converse to ‘bottom-up’, a converse which in reality does not exist.

On the other side, top-down model is used to refer to approaches in which the expectations of the reader play a crucial role in the processing of the text. The reader is seen as bringing hypotheses to bear on the text and using the text data to confirm or deny the hypotheses. Regarding the somewhat misleading nature of the term ‘top-down’, it is supposed that the related terms ‘text (or data)-driven’ and ‘reader-driven’ are more useful when describing the contrast between ‘bottom-up’ and ‘top-down’. In the first, the reader processes the text, accepting the author as the authority. In the second, the reader comes to the text with a previously formed plan and perhaps omits chunks of the text which seem to be irrelevant to the reader’s purpose.
Furthermore, Hosenfeld claims that the good reader is a good guesser. It is the aspect which has turned out to be most vulnerable. Rayner and Pollatsek point out that fixations occur on the majority of the words in a text. While this is only indirect evidence of the process of reading, it does not confirm easily to Goodman’s claims that only part of the text was sampled. But perhaps the most damaging criticism concerns the claim by Goodman, Smith and other writers that good readers guess more and use the context more than poorer readers. A great deal of work has shown that while all readers use context, good readers are less dependent on it than poor ones. In fact, it has been shown that what distinguishes good from poor readers is the ability of the members of the first group to decode rapidly and accurately. Consequently, it is possible that Goodman’s model is more appropriate for L2 readers at certain stages of development than it is for skilled adult L1 readers.

**Interactive Approach**

In interactive models the regular sequence of bottom-up models does not occur. Stanovich (35) proposes that in interactive models, a pattern is synthesized based on information “provided simultaneously from several sources.” In Rumelhart’s model, once a Feature Extraction Device has operated on the Visual Information Store, it passes the data to a Pattern Synthesiser which receives input from Syntactical, Semantic, Lexical and Orthographic Knowledge, all potentially operating at the same point. If one takes Stanovich’s description as defining interactive models, then Goodman’s is one such, since, according to him, “Readers utilize not one, but three kinds of information simultaneously” (Goodman 266). The information is orthographic, syntactic and semantic.

**Interactive-compensatory Approach**

Stanovich calls his model an ‘interactive-compensatory’ one. The compensatory refers to the idea that a weakness in one area of knowledge or skill can be compensated for by strength in another area. On the other hand, Goodman’s account contains this notion, since he refers to weaknesses in the orthographic area
being made up for by the ‘strong syntax’ of a real text. The notion of compensation has been emphasized by Alderson and Urquhart (The Effect), where it was hypothesized that background knowledge might make up for inadequate language skills.

Interactive-compensatory models have received a great deal of support. As Rayner and Pollatsek point out, their main weakness is that they are very good at explaining results but comparatively poor at predicting them in advance. To some extent this is because each reader must be viewed as potentially different, with different strengths and weaknesses.

Reading Strategies

The current explosion of research in second/foreign language reading has begun to focus on readers' strategies. Reading strategies are of interest for what they reveal about the way readers manage their interaction with written text and how these strategies are related to text comprehension. Research in second/foreign language reading suggests that learners use a variety of strategies to assist them with the acquisition, storage and retrieval of information (Rigney). Strategies are defined as learning techniques, behaviors, problem-solving or study skills which make learning more effective and efficient. In the context of second/foreign language learning, a distinction can be made between strategies that make learning more effective, versus strategies that improve comprehension. The former are generally referred to as learning strategies in the second language literature. Comprehension or reading strategies on the other hand, indicate how readers conceive of a task, how they make sense of what they read and what they do when they don't understand. In short, such strategies are processes used by the learner to enhance reading comprehension and overcome comprehension failures.

Both Olshavsky and Sarig view reading as ‘a problem-solving process’. Strategies can be seen as responses to local problems in a text. Olshavsky (656) claims that a strategy is “a purposeful means of comprehending the author’s message.” Pritchard (275) defines a strategy as “a deliberate action that readers take voluntarily to develop an understanding of what they read.”
On the other hand, how readers extract meaning from a text has long been a focus of attention because the process of extracting meaning gives invaluable information about readers' cognitive processes during reading. Reading researchers usually divide reading strategies into two major categories: cognitive and metacognitive.

Cognitive Strategies: Cognitive strategies aid the reader in constructing meaning from the text. In general, studies in L1 and L2 reading research provide a binary division of cognitive strategies as bottom-up and top-down (e.g., Block; Carrell (metacognitive awareness); Davis & Bistodeau). According to Aebersold and Field, during reading, readers' minds repeatedly engage in a variety of processes. Using bottom-up strategies, readers start by processing information at the sentence level. In other words, they focus on identification of the meaning and grammatical category of a word, sentence syntax, text details and so forth. As they process information that each sentence gives them, they check to see how this information fits, using top-down strategies such as background knowledge, prediction, getting the gist of a text and skimming (Barnett; Carrell (metacognitive awareness)).

Metacognitive Strategies: Metacognitive strategies are strategies that function to monitor or regulate cognitive strategies (J. Devine; Flavell). They include "checking the outcome of any attempt to solve a problem, planning one's next move, monitoring the effectiveness of any attempted action, testing, revising and evaluating one's strategies for learning" (Baker & Brown 354). In other words, skimming a text for key information involves using a cognitive strategy, whereas assessing the effectiveness of skimming for gathering textual information would be a metacognitive strategy (Devine 112).

Studies conducted on reading instruction and reading strategies (e.g., Bereiter & Bird; Carrell (Facilitating ESL); Carrell, Pharis, & Liberto; Cotterall; Palincsar & Brown,) indicated that non-proficient L1 and L2 readers either don't possess knowledge about strategies or mainly engage in bottom-up strategies. The findings of these studies also indicate that strategy instruction can help less skilled readers overcome their difficulties in reading. The types of strategy instruction used in these studies mainly consist of teacher modeling of the strategies followed by student practice in the form of group work.
Bereiter and Bird in their study in the L1 context identified four repair strategies: restatement, re-reading, demanding relationship and problem formulation. Bereiter and Bird conclude that students will not readily acquire reading strategies simply by imitating models; they also need comprehension-monitoring activities which consist of recognizing comprehension problems and selecting repair strategies.

In another study in the L1 context, Palincsar and Brown analyzed the effects of helping young L1 learners with special problems by teaching them to monitor comprehension. They called this instruction “Reciprocal Teaching.” It trained the students in the use of four strategies: clarifying, identifying the main idea of a section of text, summarizing and predicting. During instruction, the teacher modeled the use of each strategy. At the end, the experimental group which was exposed to this particular instruction scored higher than the control group which was not exposed to it.

Carrell (Facilitating ESL) found that overt teaching of the rhetorical organization of texts facilitated reading comprehension of English. She conducted a training study with 25 high-intermediate proficiency English as second language (ESL) students. The training covered the four major expository discourse types (comparison, causation, problem/solution and description). At the end of the training, the students receiving instruction on text organization recalled more idea units (a single clause consisting of main, subordinate, adverbial and relative clauses) than the control group. Modeling her study on Carrell’s study, Raymond also conducted a strategy instruction in the ESL context on text structure and obtained positive results on the comprehension post-test.

Carrell, Pharis and Liberto conducted a study in the L2 context to examine the combined effects of cognitive and metacognitive strategy instruction on reading comprehension. Results showed that the combined effects of metacognitive and cognitive strategy instruction were effective in enhancing reading comprehension.

In another study Cotterall replicated Palincsar and Brown's study conducted in the L1 context. Cotterall analyzed the effects of metacognitive strategy instruction on four Japanese and Iranian ESL learners. The findings indicated that the learners benefited from the strategy instruction. Song also replicated Palincsar and Brown's study in the English as a foreign language (EFL) context and found that strategy training enhanced the reading ability of Korean EFL college learners.
Auerbach and Paxton also brought metacognitive awareness training into their L2 reading classes through pre- and post-course reading interviews, reading comprehension questionnaires, strategy awareness questionnaires, reading inventories and think-aloud protocols. The results indicated that the students' metacognitive awareness increased at the end of this one-semester awareness-raising program.

Additionally, Bernhardt (Reading) claims that many reading processes in L1 and L2 are identical. However, L1 students have a broader knowledge base than students reading on L2. Bernhardt proposes a sociocognitive view of L2 reading which considers the following textual elements: linguistic (semantics and syntax), structure, pragmatic nature, intentionality, content and topic. All of these elements interact with the individual reader who makes his/her own “decisions about what is important in texts and makes sense of it or ‘reconstructs’ it according to those decisions” (Bernhardt 15). “As a result, the input text and the output text are […] different entities” (Bernhardt 15).

Swaffar, Arens and Byrnes outline a procedural model for integrative reading. Their model integrates both reader and text-based processing stages. Thus, they consider the knowledge readers bring to the process and how this knowledge may be distorted from the cultural assumptions of the text. The model deems comprehension as a “synthesis of text and reader views” (74).

Over and above, differences in strategy use were examined by Anderson. He carried out a study to investigate the individual differences in strategy use by adult second language learners while engaged in two reading tasks: taking a standardized reading comprehension test and reading academic texts. Analysis of both quantitative and qualitative data revealed that there was no single set of processing strategies that significantly contributed to success on these two reading measures. Both high and low scoring readers appeared to be using the same kinds of strategies while answering the comprehension questions on both measures; however, high scoring students seemed to be applying strategies more effectively and appropriately. Anderson's study seems to indicate that strategic reading is not only a matter of knowing which strategies to use, but the reader must know how to apply strategies successfully. This may be one factor contributing to the relationship between proficiency level and reading strategies used by readers.
Various other studies in the area of reading strategies have found that younger and less proficient students use fewer strategies and use them less effectively in their reading comprehension (Garner; Waxman and Padron). The results of Waxman and Padron's study showed that the most cited strategies were asking questions about the parts of the story that were not understood, checking through the story to see if the student remembers all of it, imaging or picturing the story and looking up words in the dictionary. The least cited strategies were reading as fast as one could, thinking about something else while reading, writing down every word and skipping parts in the story that were not understood. Results of the questionnaire were compared to results on the task which indicated that students' perceptions of the strategies they use have predictive validity for their reading comprehension.

**Different Kinds of Reading**

Urquhart and Weir (102-3) propose the following kinds of reading:

*Skimming:* Reading for gist. The reader asks: What is this text as a whole about?, while avoiding anything which looks like detail. Reading schemes like SQ3R recommend starting the reading to learn process with skimming, so that the reader has a framework to accommodate the whole text.

*Search Reading:* Locating information on predetermined topics. The reader wants information to answer set questions or to provide data. It differs from skimming in that the search for information is guided by predetermined topics so the reader does not necessarily have to establish a specific structure for the whole of the text.

*Scanning:* Reading selectively to achieve very specific reading goals, e.g. finding the number in a directory or finding the capital of Bavaria. The main feature of scanning is that any part of the text which does not contain the preselected symbol(s) is dismissed. It may involve looking for specific words/phrases, figures/percentages, names, dates of particular events or specific items in an index.

*Careful Reading:* This is the kind of reading favored by many educationalist and psychologists to the exclusion of all other types. It is associated with reading to learn, hence with the reading of textbooks. The defining features are (a) that the reader attempts to handle the majority of information in the text, that is, the process is not
selective; (b) that the reader adopts a submissive role and accepts the writer’s organization, including what the writer appears to consider the important parts; and (c) that the reader attempts to build up a macrostructure (the gist) on the basis of the majority of the information in the text.

**The Characteristics of a Critical Reader**

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 means entering into a point of view other than his own, 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.

Schumm and Post (282) define that critical readers are:

- willing to spend time reflecting on the ideas presented in their reading assignments.
- able to evaluate and solve problems while reading rather than merely compile a set of facts to be memorized.
- logical thinkers.
- diligent in seeking out the truth.
- eager to express their thoughts on a topic.
- seekers of alternative views on a topic.
- open to new ideas that may not necessarily agree with their previous thought on a topic.
- able to base their judgments on ideas and evidence.
- able to recognize errors in thought and persuasion as well as to recognize good arguments.
- willing to take a critical stance on issues.
- able to ask penetrating and thought-provoking questions to evaluate ideas.
- in touch with their personal thoughts and ideas about a topic.
• willing to reassess their views when new or discordant evidence is introduced and evaluated.
• able to identify arguments and issues.
• able to see connections between topics and use knowledge from other disciplines to enhance their reading and learning experiences.

Text Analysis

Reading critically forces the reader to investigate the text at hand. S/he collects evidence through careful examination of content. This is done by first identifying or discovering various parts of the text, then relating them all in an attempt to understand the text as a whole. Only when the reader realizes that a text as a whole is greater than the sum of its parts will s/he succeed in arriving at a critical analysis of the text.

Inference

Critical thinking mainly relies on reaching a conclusion based on specific evidence from a text, which should generally match the reader’s knowledge of the world. The evidence provided by the text ‘implies’ ideas and it is the role of the reader to ‘infer’ or make educated guesses, based on the supporting evidence provided by the text. It is basically a process of interpreting textual information through examples. Not all readers will reach the same conclusion, which produces the difference in text interpretation from one reader to another.

Steps of Critical Reading

Critical reading examines the specific choices made by the author in terms of content, language use and text structure. It also examines the effects of these choices on overall meaning. The first step consists of examining what a text ‘says’. This is
achieved by a simple restatement of facts within a text. Then the focus is on what a text ‘does’, which includes arguing, criticizing, describing or contrasting the structure and content of the text. Finally, the reader infers what the text as a whole ‘means’, thus reaching a final whole interpretation of the meaning of the text.

Harris and Hodges (74) explain critical reading as:

(1) the process of making judgments 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 judgments 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.

Moreover, they (48) append that critical evaluation is:

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 Reading Strategies**

A critical reader determines what is important when reading any text. S/He draws inference to interpret facts by using prior background knowledge. S/He asks questions before, during and, most importantly, after reading a text. This also means that a critical reader questions whether or not a text makes sense and also whether or not the information presented is valid. Finally, creating mental images of text content may enhance critical reading in general.

The following critical reading strategies (from Longview Community College, Lee's Summit, Missouri) can be learned readily and then applied not only to reading
selections in a Literature class, but also to other college reading. Mastering these strategies will help one handles difficult material with confidence.

- **Annotating**: Fundamental to each of these strategies is annotating directly on the page: underlining key words, phrases, or sentences; writing comments or questions in the margins; bracketing important sections of the text; constructing ideas with lines or arrows; numbering related points in sequence; and making note of anything that strikes you as interesting, important or questionable.
  - Most readers annotate in layers, adding further annotations on second and third readings.
  - Annotations can be light or heavy, depending on the reader's purpose and the difficulty of the material.

- **Previewing**: Learning about a text before really reading it. Previewing enables readers to get a sense of what the text is about and how it is organized before reading it closely. This simple strategy includes seeing what you can learn from the head notes or other introductory material, skimming to get an overview of the content and organization, and identifying the rhetorical situation.

- **Contextualizing**: Placing a text in its historical, biographical and cultural contexts. When you read a text, you read it through the lens of your own experience.
  - Your understanding of the words on the page and their significance is informed by what you have come to know and value from living in a particular time and place. But the texts you read were all written in the past, sometimes in a radically different time and place.
  - To read critically, you need to contextualize, to recognize the differences between your contemporary values and attitudes and those represented in the text.

- **Questioning** to understand and remember: Asking questions about the content. As students, you are accustomed to teachers asking you questions about your reading.
  - Questions are designed to help you understand a reading and respond to it more fully, and often this technique works.
When you need to understand and use new information though it is most beneficial if you write the questions, as you read the text for the first time.

With this strategy, you can write questions any time, but in difficult academic readings, you will understand the material better and remember it longer if you write a question for every paragraph or brief section.

Each question should focus on a main idea, not on illustrations or details, and each should be expressed in your own words, not just copied from parts of the paragraph.

Reflecting on challenges to your beliefs and values: Examining your personal responses. The reading that you do for this class might challenge your attitudes, your unconsciously held beliefs, or your positions on current issues.

As you read a text for the first time, mark an X in the margin at each point where you feel a personal challenge to your attitudes, beliefs or status.

Make a brief note in the margin about what you feel or about what in the text created the challenge.

Now look again at the places you marked in the text where you felt personally challenged.

What patterns do you see?

Outlining and Summarizing: Identifying the main ideas and restating them in your own words.

Outlining and summarizing are especially helpful strategies for understanding the content and structure of a reading selection.

Whereas outlining reveals the basic structure of the text, summarizing synopsizes a selection’s main argument in brief.

Outlining may be part of the annotating process, or it may be done separately.

The key to both outlining and summarizing is being able to distinguish between the main ideas and the supporting ideas and examples.

The main ideas form the backbone, the strand that holds the various parts and pieces of the text together.
Outlining the main ideas helps you to discover this structure.
When you make an outline, don't use the text's exact words.
- **Summarizing** begins with outlining, but instead of merely listing the main ideas, a summary recomposes them to form a new text. Whereas outlining depends on a close analysis of each paragraph, summarizing also requires creative synthesis. Putting ideas together again – in your own words and in a condensed form – shows how reading critically can lead to deeper understanding of any text.
- **Evaluating an Argument** means testing the logic of a text as well as its credibility and emotional impact. All writers make assertions that they want you to accept as true.
  - As a critical reader, you should not accept anything on face value but to recognize every assertion as an argument that must be carefully evaluated.
  - An argument has two essential parts: a claim and support.
  - The claim asserts a conclusion – an idea, an opinion, a judgment, or a point of view - that the writer wants you to accept.
  - The support includes reasons (shared beliefs, assumptions and values) and evidence (facts, examples, statistics and authorities) that give readers the basis for accepting the conclusion.
  - When you assess an argument, you are concerned with the process of reasoning as well as its truthfulness (these are not the same thing).
  - At the most basic level, in order for an argument to be acceptable, the support must be appropriate to the claim and the statements must be consistent with one another.
- **Comparing and Contrasting Related Readings**: Exploring likenesses and differences between texts to understand them better.

Many of the authors on the subject of thinking critically approach the topic in different ways. Fitting a text into an ongoing dialectic helps increase understanding of why an author approached a particular issue or question in the way he or she did.
Critical thinking, which is a consequence of reading critically, needs to be based upon a number of specific reasoning skills: consciously raising questions, reaching conclusions, discriminating between fact and conjecture, testing one’s reasoning for consistency, finding evidence to support generalization, synthesizing ideas and finally judging the validity of one’s ideas.

Critical Thinking when Reading

Cotterall (Developing Reading) claims that critical thinking when reading involves the following:
1. Identifying the line of reasoning in the text.
2. Critically evaluating the line of reasoning.
3. Questioning surface appearances and checking for hidden assumptions or agendas.
4. Identifying evidence in the text.
5. Evaluating the evidence according to valid criteria.
6. Identifying the writer’s conclusions.
7. Deciding whether the given evidence supports these conclusions.

Critical thinking when reading is essential to academic success since much of the writing individuals do for assignments will include critical analysis of the work of other people. It is the ability to think, examine, analyze and evaluate texts; yet this whole complex process begins with simple skepticism, which generally refers to challenging assumptions and preconceived notions. Only then can they as educators succeed in teaching critical to their students.

1. Identify the Line of Reasoning
Most of the texts a student is required to read will include an argument. In academic writing an ‘argument’ is:
- A line of reasoning or
- An angle or a point of view or
- A position that is being defended or
- A case that is being made:
Backed up by evidence and examples and 
Leading to conclusions.
When reading, the readers need to keep asking themselves, what are the main things this writer wants them to accept? What reasons does he present to encourage them to accept this?

**Passage 1: Rochborough Health**

Outdoor play has beneficial effects for children in terms of both their health and their levels of social interaction. According to clinical trials carried out by Rochborough’s Health Council Advisory Body in September this year, children who played outside for over fifty days in the year had a 20% higher lung capacity and 30% lower incidence of asthma and bronchial conditions than children who played indoors. Children who played outdoors also reported having more friends than those who played indoors. A survey of 30 families by Rochborough Social Amenities Committee found that parents were more likely to let their children play outdoors if they had their own gardens or if there were supervised play areas nearby. Mr. Arkash of Milton Road said his children did not feel safe playing on the Children’s Meadow on the outskirts of Rochborough, as his son had been frightened by a fox there in the past. His little son looked quite tearful as his father spoke. ‘He often cries because he has nowhere to play,’ said his father. Supervised play areas can be expensive to provide. However, only 18% of homes in Rochborough have gardens. Therefore, to improve the health of all its children, Rochborough needs to provide more supervised outdoor play areas.

*Rochborough Play Council Newsletter*

2. **Critically Evaluate the Line of Reasoning**

An argument can be critically evaluated in terms of whether it contains:

A. Relevant, contributing and sufficient propositions (reasons)
B. Logical progression
C. False premises
D. Flawed reasoning

**Relevant, Contributing and Sufficient Propositions:** When examining the line of reasoning, individuals need to consider whether the reasons given are relevant and whether they support (that is, contribute to) the overall argument. It is important to
check that reasons and evidence are both relevant and supportive of the main argument, as this helps to identify whether the writer’s conclusion is valid. The Rochborough Health passage makes a number of statements or propositions. For example:

- Outdoor play improves levels of social interaction.
- Only 18% of Rochborough homes have gardens.

These are some of the reasons it gives to support its argument. When examining the line of reasoning, one needs to consider whether the reasons given are relevant and whether they support (that is, contribute to) the overall argument. For example:

- The reference to the isolated incident of a fox is not very relevant to the argument about health.
- The reference to the expense of supervised play areas is relevant to the argument – however, it weakens or undermines the argument rather than contributing to it because the piece does not make clear how the expense could be met.

It is important to check that reasons and evidence are both relevant and supportive of the main argument, as this helps one to identify whether the writer’s conclusion is valid. Even if the writer has given relevant reasons that contribute to the argument, he may not have given sufficient reasons to prove this is the only conclusion that could be drawn.

**Passage 2: Injuries**

There has been a tremendous rise in the rate of industrial injury. This year there were over thirty reports of repetitive strain injury in the factory (Millex Injuries Report 1999). All those injured worked in the fiber department. Ten years ago there were no reported injuries. This shows that our work conditions are taking a more serious toll upon our health than in the past.

_Millex News_

The writer of Passage 2 begins from the premise (starting point) that there has been a great rise in industrial injury. The conclusion is that work conditions are having a more serious effect on health than in the past. He gives a relevant and contributory reason: the rise in the number of reported injuries. However, he does not
consider other reasons why the number of reported injuries might have increased – such as whether repetitive strain injury was known about thirty years ago, or whether people were less likely to report accidents in the past.

In addition, the writer has not looked at figures for any other types of injury nor at the health of workers in other departments. He makes generalizations based on only one kind of injury and one part of the factory. He may still be right about the rise in industrial injury, but he has not proved his case. He has not given sufficient reasons (or evidence) to justify the conclusion.

Logical Progression: In everyday conversation, it is common practice when someone is speaking to assume that there is a logical connection between one thing that is said and the next. For written arguments and in academic contexts in general, people need to question whether one point does indeed follow logically from another. A line of reasoning will:

- Begin from a premise.
- Follow in logical stages (A leads to B; B leads to C; C to D…).
- Lead to a conclusion that follows directly from what has gone before (there are relevant reasons, in a logical order, which build towards the stated conclusion).

The premise in Passage 1 is that outdoor play is good for children’s health. The logical progression is:

- Local evidence supports the health argument (that outdoor play is desirable).
- Parent’s attitudes support this argument.
- A lack of facilities prevents outdoor play.
- More outdoor play facilities are needed.

False Premises: It is useful to be on the lookout for false premises: many arguments are based on weak foundations of this kind. If there were a reason why outdoor play was not good for Rochborough children, the writer of Passage 1 would have started from a ‘false premise’. The writer of Passage 2 may indeed have begun from a ‘false premise’ – believing that industrial injury is on the rise in the Millex factory. No conclusive evidence of this is given, so it may not be true.

Flawed Reasoning: Here are some examples of flawed reasoning.
Assuming a Casual Connection: If two things occur at the same time or place, it is easy to assume either that they must be connected or that one must have caused the other. For example:

➢ I revised really well for that exam and got a low mark, so next time I won’t revise and I should get a better mark.

This assumes a connection between revision and failure, without considering other possible reasons for failure similarity:

➢ The number of cows in Britain has gone down and the amount of cheese consumed is on the increase. Psychologically, people seem to eat more cheese when they feel that it will run out.

This assumes that the increase in cheese consumption is related to the number of British cows, whereas it may have been for other reasons such as increased vegetarianism, or a rise in cheese imports. The decrease in the cow population might relate only to herds reared for meat – perhaps the number of milking cows is unaltered.

These examples are chosen to highlight the faulty logic, but flawed reasoning of this sort is not always easy to spot.

Drawing General Conclusions Based on One or Few Examples:

➢ The woolen jacket caused a serious skin reaction in the three-yard-old, so sale of woolen clothing should be banned.

Here a generalized conclusion is made on the basis of a very limited experience-just one example. There may have been reasons for the reaction unique to that child.

Inappropriate Comparisons: In the Passage 1 a comparison is drawn between children who play indoors and those who play outdoors. However, it may have been that the children who played outdoors were already healthier and those who played indoors did so because of poor health which might get worse if they played outdoors.

For example, asthma sufferers are often allergic to pollen and might have been discouraged from playing outdoors.

3. Question Surface Appearances

Critical thinking requires that you examine these factors:

• Is the evidence what it appears to be?
• Might there be other explanations apart from the obvious one?
• Has all necessary information been given, or might other details lead to a different conclusion?
• Are there interested parties who would gain if the conclusion were accepted?
• Are there hidden assumptions or agendas?
• Does the evidence come from a reliable disinterested source?

4. Identify Evidence in the Text

Identifying evidence in the text is usually fairly straightforward. Look for statistics, examples, and case histories, findings from experiments, surveys, questionnaires or case studies. The evidence may be anecdotal – that is, stories told by one or a few people about their experiences.

5. Evaluate the Evidence

It is not enough for a student to write in an essay or report: there is evidence on both sides. Evidence is not all of equal weight. How can individuals decide which evidence is better? Some basic guidelines are outlined below.

Use Valid Criteria to Evaluate Evidence:

Critical thinking involves identifying valid criteria against which something can be evaluated. For example, when a doctor declares that somebody is healthy, s/he takes into account certain criteria, such as body temperature, blood measurements and the absence of known (or common) symptoms of illness. S/He evaluates whether signs of potential ill-health is a matter of concern and based on her/his experience and established medical knowledge, comes to a conclusion whether the evidence points more towards good health than towards sickness.

The followings give some criteria against which individuals can evaluate evidence in academic texts and for their own research.

A. Check the Date of the Research.

Data may be out of date or conclusions based upon it may have been revised. How would your attitude to the ‘Rochborough Health’ article change if you found out that it was written in 1300 or 1927 or 1999?

B. Check the Source of Your Information.

Articles in academic journals and textbooks are usually based on in-depth research and are more reliable than findings recorded in magazines or newspapers. Newspapers and magazines may be useful primary sources for some subjects such
as cultural studies but are not generally regarded as 'authorities' to quote in essays.

C. Check for Bias in Your Sources.

Bias may not be obvious. If somebody has a strong interest in the survival of a particular hospital, the evidence they present may be accurate/yet not the whole story. When thinking critically, individuals need to be continually questioning in their minds whether there may be hidden agendas or reasons why the evidence appears to point one way rather than another.

It is always worth considering what political or economic interests might prevent the whole truth from emerging. One should consider how easy it would be, or would have been, for alternative views to be printed and circulated. For example, in some societies, such as sixteenth-century Britain, people who spoke, printed or sold certain viewpoints could be punished by death or loss of limb.

Today, it can be difficult for small organizations or individuals to get the funding they need to research and validate an alternative viewpoint. The overall picture may be distorted if not all the evidence has come to light.

Whilst it is not necessary for people to write about issues of economics, politics and media access in every essay, it is important to be aware of who has access to power, resources and information, who does not, and the possible implications.

D. Beware the Allure of Numbers and Statistics.

It is important to check numerical data, and words that imply numerical data, as these are often misused and amounts misrepresented in order to sway the reader.

1. Most/Many: Notice words such as ‘most’ and ‘many’:
   - Most people said that they preferred oranges to apples.
     Most is a very vague amount. If it mattered whether this statement was true or false, one would need more details. How many people were asked? How many preferred oranges? Under what circumstances?

2. Percentages: Notice when percentages are given. Supposing, instead, the statement above read:
   - 60% of people preferred oranges; 40% said they preferred apples.
   This looks convincing: numerical quantities are given. But is the difference between 60% and 40% significant? Here persons would need to know how many people were asked. If 1000 people were asked, of whom 600 preferred
oranges, the number would be persuasive. However, if only 10 people were asked, 60% simply means that 6 people preferred oranges. 60% sounds convincing in a way that ‘6 out of 10’ does not. As a critical reader a person needs to be on the lookout for percentages being used to make insufficient data look impressive.

3. **Sample Size:** The sample size is the number of people, animals or objects used in the research, whether it’s an experiment, a survey or whatever. Small samples give very unreliable information. All other things being equal, the bigger the sample, the more reliable the data. A thousand participants is often taken as a reasonable number for considering statistics to be ‘significant’. If just 2 more people arrived who preferred apples, there would be 6 of each. A very small increase in the sample (the database of people asked) could easily overturn the original percentage, changing it to 50% for apples and 50% for oranges – no difference at all.

4. **Representativeness:** The sample should be representative of the overall group being studied. If all those asked about fruit preference came from Seville and made their living from oranges, one might not consider them to be either typical or reliable as a sample. Similarly, if all those asked about their preferences were women, or aged ten, or from the south of England, it would not be safe to generalize from them to the rest of the population. To make the sample representative, researchers aim for a good mix of men and women, of different ages, backgrounds and interests.

5. **Conditions of Data Collection:** If an individual found out that those who said they preferred oranges had each been given one free by the person conducting the survey, he might wonder whether the participants had had an ulterior motive in giving their answers, and whether the data was reliable. Similarly, if the data was collected in face – to face interviews by personnel wearing the logo of a company known for its orange juice, it is possible that some participants wished to please the interviewers. It is important to find out, where possible, about conditions in which data was collected, to determine how trustworthy it is. Articles in academic journals usually give full details about the research conditions.
E. Emotive Language and Persuader Word.

Certain words can be very persuasive and can trigger a position of trust in the reader. Which words they are will vary from subject to subject. For example, for some people the word experiment summons up notions of scientific accuracy and reliability. However, the fact that an experimental approach was used does not in itself mean that the evidence is sound.

Emotive Words: The use of words and phrases such as cruel, unfair, abuse, natural, normal, commonsense, innocent child, old, little, massive, unique, extremist, radical, youth, new and even final offer can prompt emotional responses that may lead the reader away from an accurate appraisal of the evidence presented. Emotive images such as people crying can be used in a similar way.

Persuader Words: These words and phrases draw an individual in by appealing to what they claim is evident. It may be true that what follows is evident, but the individual still needs to be on the alert when he sees such words. They include surely, clearly, obviously, it is evident that, it is plain to see that, naturally and of course.

6. Identify the Writer’s Conclusions

Conclusions generally come at the end of the piece of writing. However, they may also be found at the beginning of the text or even in the middle. They then are harder to find and tend to be less effective. Often conclusions are indicated by trigger words such as therefore, so, hence, or thus; or by the use of imperatives – words indicating that something has to be done, such as must, should or need to.

7. Evaluating Whether the Evidence Supports the Conclusions

A writer may present evidence which could be considered reliable, being based on good research but then draw conclusions which are not warranted by the evidence. An exaggerated example illustrates this:

- Proposition 1: The karate champion is a woman (verifiable fact).
- Proposition 2: My mother is a woman.
- Conclusion: My mother is a woman; therefore she is a karate champion. (False conclusion)

Check for hidden false assumptions: In the above example, the faulty reasoning was based on the false assumption that if one woman is a karate champion, then all
women are karate champions. This false assumption is easy to spot, but it is not always so simple. Researchers may try to be objective, but it is very difficult to stand completely outside of the commonsense views and ideological context of the society in which one is writing.