

# THOUGHT ON THINKING: CRITICAL & CREATIVE

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## Abstract

Critical thinking could be described as the process of actively and skillfully conceptualizing, applying, analyzing, synthesizing and evaluating information to reach an answer or conclusion. Creative thinking is generally considered to be involved in creation or generation of new ideas, processes, experiences or objects. Critical and Creative thinking are two different mental processes but both of them are necessary for successful problem solving. Critical thinking is logical, sequential disciplined process which seeks to assess worth or validity of something that already exists on the other hand, Creative thinking is a way of looking at problems or situations from a fresh perspective to conceive of something new or original This paper aims to outline the need and importance of critical and creative thinking and also highlights the differences between both.

**Key Words:** Critical thinking, Creative thinking, Tools & Techniques

## Introduction

A central goal of contemporary education is to improve the thinking skills of students and the notions of critical thinking and of creative thinking provide focuses for this effort. As educators we would like our students to be better critical thinkers. This implies thinking more effectively within curricular subject is as understanding the reasoning employed, assessing independently and appropriately and solving problems effectively. It involves, as well, improved thinking skills in dealing with real life problems-in assessing information and arguments in social contexts and making life decisions. We also want students to be more creative-not simply to reproduce old patterns but to respond productively to new situations, to generate new and better solutions to problems and to produce original works. These goals of fostering critical thinking and of creative thinking are generally considered to be quite separate and distinct. Critical thinking is seen as analytic. It is the means for arriving at judgments within a given framework or context. Creative thinking, on the other hand, is seen as imaginative, constructive and generative. According to Marzano (1992), Critical thinking involves the use of declarative knowledge, procedural knowledge and conditional knowledge to solve a problem. Creative thinking is a whole brain process, which involves generating ideas, evaluating ideas and selecting ideas, hence its basic function is to rearrange structures and patterns and bring novel and original solutions to the problems. The process of creative thinking involves generating multiple ideas and then making selection of more useful, effective or appropriate ideas in order to have a workable solution to the problem.

## Critical Thinking

Critical thinking is not a new concept. In ancient Greece over 2500 years ago, Socrates began teaching what is today known as critical thinking; he has been herald as the first teacher of critical thinking (Irfaner, 2006). The term critical thinking began to surface in the 1970s and was initially linked to solve problems. In 1977 the Tbilisi declaration stated the importance of preparing students to wrestle with complex social and environmental issues by teaching critical thinking skills (UNESCO, 1980). Critical thinking refers to the use of cognitive skills or strategies that increase the probability of a desirable outcome. Critical thinking is purposeful, reasoned and goal-directed. It is the kind of thinking involved in solving problems, formulating inferences, calculating likelihood and making decisions. Critical thinkers use these skills appropriately, without prompting and usually with conscious intent, in a variety of settings. That is, they are predisposed to think critically. When we think critically, we are evaluating the outcomes of our thought processes- how good a decision is or how well a problem is solved (Halpern, 1996).

## Aspects of Critical Thinking

- Critical thinking is a productive and positive activity.
- Critical thinking is a process, not an outcome.
- Manifestations of critical thinking vary according to the contexts in which it occurs.
- Critical thinking is triggered by positive as well as negative events.
- Critical thinking is emotive as well as rational.

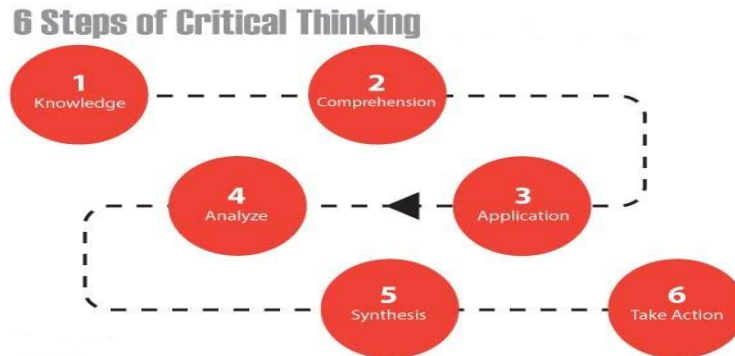
## Elements of Critical Thinking

The “discrete activities” that comprise critical thinking are categorized differently by different learning theorists. For the sake of simplicity and utility, we are categorizing the elements of critical thinking as including:

Observations, from a series of observations, we can come to establish facts. From a series of Facts, or from an absence of Facts, we make Inferences. Testing the validity of our Inferences, we can make Assumptions. From our assumptions, we form our Opinions. Taking out opinions, we use the principles of logic to develop Arguments and when we want to challenge the arguments of others, we

employ Critical Analysis (through which we challenge the observations, facts, inferences, assumptions and opinions in the arguments that we are analyzing).

Critical thinking, in educational context, draws heavily on literature and pedagogy from Socratic questioning, inquiry- based learning and bloom's taxonomy. Educators are particularly interested in encouraging critical thinking, in which students consciously and purposefully direct their thoughts to find a solution to a problem (Halpern, 1998). *"Critical thinking is more than the successful use of the right skill in an appropriate context. It is also an attitude or disposition to recognize when a skill is needed and the willingness to exert the mental effort needed to apply it."* (Halpern, 2000)



**Critical thinking skills can be developed by:**

- Asking questions that encourage students to express their views and developed their ideas
- Providing opportunities for students to discuss open- ended issues and prepare arguments
- Providing opportunities for students to take part in collaborative talk to draw things out, to solve problems and make decisions
- Directing teaching at specific skills, for example classifying, analyzing, evaluating, drawing conclusions
- Teaching some of the principles of logical thinking and giving practice at identifying the flaws in logical arguments.

Critical thinking is important for students as it teaches them how to think rather than what to think about any subject or issue they deal with while they are able to effectively solve the issue. Critical thinking enable us to recognize a wide range of subjective analyses of otherwise objective data and to evaluate how well each analysis might meet our need. In (Shakirova, 2007) view critical thinking skills are important because they enable students "to deal effectively with social, scientific and practical problems". The lack of critical thinking skills utilized within the classroom greatly diminishes the students' chance for success (Irfaner, 2006).

### Creative Thinking

A way of looking at problems or situations from a fresh perspective that suggests unorthodox solutions. Creative thinking can be stimulated both by an unstructured process such as brainstorming and by a structured process such as lateral thinking. Creative thinking in a disciplined manner can play a real role in innovation. Creativity and innovation are normally complementary activities since creativity generates the basis of innovation which, in its development, raises difficulties that must be solved once again with creativity. It is not possible to conceive innovation without creative ideas, as these are the starting point. Creativity is a cluster of skills that are needed to produce ideas that are both original and valuable (Sternberg, 2001), and Teaching Creatively has been defined as 'teachers using imaginative approaches to make learning more interesting, exciting and effective' (NACCCE, 1999).

**Creative education** is when students are able to use imagination and critical thinking to create new and meaningful forms of ideas where they can take risks, be independent and flexible. Instead of being taught to reiterate what was learned, students learn to develop their ability to find various solutions to a problem.

### Benefits of Creative Teaching

Research has found the following benefits for students using creativity in education:

- Makes learning more fun for students where they can learn faster and can increase their performance.
- Students' dislike for science, mathematics and social studies subjects can be diminished.
- Improvement in student achievements.

### Barriers to Creative Teaching

- Some teachers may not have the mindset of teaching their students how to be creative.
- Some teachers might view creative work as "extra" and not needed.

- There is a “creativity gap” in classrooms where creativity is discouraged.
- Some studies have found that teachers cannot be creative in classrooms due to pressures by the system, standards and big classroom size.

### Ways to Increase Creativity in Classroom

There are few ways in which creativity in classroom can be increased:

- Don't limit assignments to one format. For example, instead of limiting the student to the writing assignments, they can create a podcast, video, role playing, poem, composing songs, etc.
- Set time aside for creativity. For instance, set aside one hour in a school day to let students explore their ideas.
- Use technology to broaden your idea of assignments. For example, you can use Google Maps to teach geography and make the class more interactive.
- Introduce unconventional learning materials into class. Besides using the books in the classrooms, you can use educational podcasts and videos such as Radio lab and Ted Talks, which can create entertainment with education.
- Reward creative ideas, thoughts and products. Encourage risk-taking, allowing mistakes and imagining from various perspectives.
- And finally, teach teachers to be more creative in classrooms and hold creativity workshops for them.

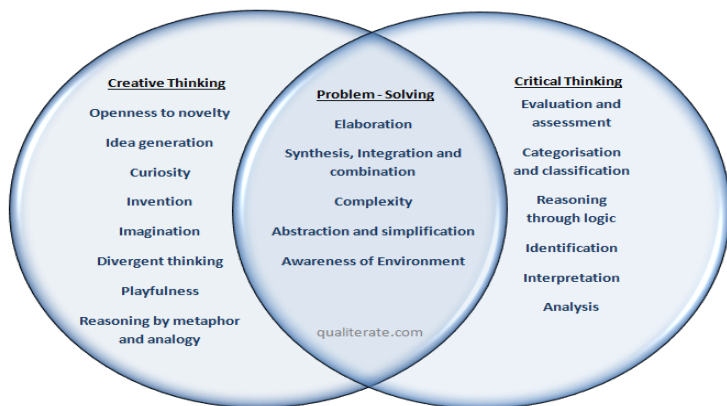
### Distinguish between Critical and Creative Thinking

*Whereas creative thinking is divergent, critical thinking is convergent; creative thinking tries to create something new, critical thinking seeks to assess worth or validity in something that exists; whereas creative thinking is carried on by violating accepted principles, critical thinking is carried on by applying accepted principles. Although creative and critical thinking may very well be different sides of the same coin they are not identical. (Beyer,1989).*

Where problem solving requires creative thinking, evaluating claims requires critical thinking. Students need to think in both critical and creative ways and therefore to teach or encourage one style of thinking may be counter-productive. Instead, an approach is needed which can combine both of them. This table follows by Fisher (2002):

Critical Thinking	Creative Thinking
Left-brain	Right-brain
Closed	Open-ended
Linear	Associative
Logic	Intuition
Reasoning	Speculating
Convergent	Divergent
Analytic	Generative
Vertical	Lateral
Probability	Possibility
Judgement	Suspended judgement
Objective	Subjective
Hypothesis testing	Hypothesis forming

In an activity like problem solving, both kinds of thinking are important. First we must analyze the problem then we must generate possible solutions next we must choose and implement the best solution finally, we must evaluate the effectiveness of the solution. This process reveals an alternation between the two kinds of thinking, critical and creative. In practice, both kinds of thinking operate together much of the time and are not really independent of each other. Following mentioned image clarify the distinguish concept between the two.



Fogarty & Bellanca (1986) had given some examples of thinking skills that include both the critical and creative thinking skills can be given to teachers as follows:

Tools & Techniques for Facilitating	
Critical Thinking Skills	Creative Thinking Skills
Attributing	Brainstorming
Comparing	Visualizing
Classifying	Personifying
Sequencing	Inventing
Determining cause/ effect	Associating relationships
Prioritizing	Inferring
Drawing conclusions	Generalizing
Analyzing for bias	Predicting
Analyzing for assumptions	Hypothesizing
Solving for analogies	Making analogies
Evaluating	Dealing with ambiguity & paradox

### Need and Importance of Critical and Creative Thinking

Though the two are not interchangeable, they are strongly linked, bringing complementary dimensions to thinking and learning. Critical thinking is a process that challenges an individual to use reflective, reasonable, rational thinking together, interpret and evaluate information in order to derive a judgement. It is at the core of most intellectual activity that involves students in learning to recognise or develop an argument. Examples of critical thinking skills are interpreting, analyzing, evaluating, explaining, sequencing, reasoning, comparing, questioning, inferring, hypothesizing, appraising, testing and generalizing. Creative thinking involves students in learning to generate and apply new ideas in specific contexts, seeing existing situations in a new way, identifying alternative explanations and making new links that generate a positive outcome. This includes combining parts to form something original and refining ideas to discover possibilities, constructing theories and objects.

Critical thinking is the foundation and premise of creative thinking and can enhance accuracy of creative thinking to a certain extent. Good critical and creative thinking abilities provides students with the tools needed for independent and life-long learning. Critical thinking saves creative thinking from pursuing novelty for its own sake, while creative thinking prevents critical thinking from being merely reactive and negative. Both are fostered to use dispositions such as broad and adventurous thinking, reflecting on possibilities and metacognitions.

Critical and creative thinking can be encouraged simultaneously through activities that integrate reason, logic, imagination and innovation; for example focusing on a topic in a logical, analytical way for some time, sorting out conflicting claims, weighing evidence, thinking through possible solutions and then following reflection and perhaps a burst of creative energy coming up. Fisher (2005) stated that, critical and creative thinking are both important because we need instruction as well as reason in our thinking: Critical thinking is necessary to judge those new ideas, process and products which have been generated by creative thinking.

### Conclusion

Critical and creative thinking are interrelated and complementary aspects of thinking that are combination of abilities, values, knowledge, attitudes, skills and processes. Both thinking skills are valuable and none is superior. In fact it has been shown that when either is neglected during the problem solving process effectiveness declines. Educational community must encourage both creative and critical thinking of the students so that they must gain motivation to think and develop new ideas, support for learning community which provides information, feedback and encouragement.

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