

CATEGORIES OF CRITICAL THINKING IN INFORMATION MANAGEMENT. A STUDY OF CRITICAL THINKING IN DECISION MAKING PROCESSES

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Abstract.- This article focuses as a survey on the qualities of Critical Thinking on reviewing its definitions in recent history of academic research and compared to other intellectual processes. On the one hand we will compare the basic characteristic qualities of Critical Thinking with other types of thinking. On the other hand we will give examples how Critical Thinking is a part of the decision making processes both in personal human issues and institutional decision making processes. Since Critical Thinking is an intellectual skill, we show the applications of this intellectual skill within contemporary life. Critical Thinking has several academic roots of philosophy, rhetorical argumentation, logic and social science, but also is an auxiliary tool in other academic disciplines. Coming from these roots Critical Thinking also finds its applications in contemporary private and professional life. Based on this historical and exemplifying discourse of criticism, we will argue for a general importance of Critical Thinking contrary to contemporary predominance as an applied skill and educational tool.

Keywords.- *Critical Thinking, intellectual skill, education.*

This article focuses on Critical Thinking (CT) and its elements and applications in management in the post-modern media age. While Critical Thinking is considered a personal skill related to a person, who uses several qualities in a decision making process, it is also an important feature for the connection between entities of human thinking and institutions and institutional processes. Critical Thinking has the ability to make management and planning decisions, while other decision-making processes depend on other factors and are based upon media and methods that are far more institutionally organized. If we use the term 'applied Critical Thinking' in this paper for the use of Critical Thinking skills in other areas, we utilize it –in other words- for the application of any Critical Thinking skills that may can be used as a tool for research and decision making processes. This article demonstrates the

usability of Critical Thinking in decision-making processes. In this article we will also look at the relation between Critical Thinking and other types of thinking. Critical Thinking is one of the main skills of any Think Tank and we will have to take a look at the connections of different types of thinking in order to see its functions. Management we understand here as the organized handling of information according to a certain purpose; Critical Thinking is the methodical way to reach this goal.

1. Introduction to Criticism

Historical definitions of Critical Thinking and Research

Critical Thinking itself is based on the assumption that is a certain logic in the way of thinking about any subject exist. Critical Thinking is a general method and way of human thinking. Humans think within concepts. Critical Thinking is concerned with such concepts of ideas or thoughts. Critical Thinking is a way to approach problems and make decisions. Critical Thinking can be understood as a way of becoming aware of and taking control of the thinking processes itself in order to increase the efficiency of thinking to make it more rational, clear, accurate, and consistent. Critical Thinking serves for evidence in questions supported by arguments, interpretation, and final decisions. Critical Thinking is thinking that proceeds as the basis of careful evaluation of premises. Conclusions use the consideration of all factors and valid procedures. Critical Thinking means a correct thinking applied on relevant knowledge about the topic in a judgement process. It is a reasonable, reflective, responsible kind of thinking, which focuses on reflection, the decision what to decide or do on a meta-level according to Miller (95) and White (77-80). Introductions were made by Fisher, Wright, and Weil. For Doddington critical thinking has come to be "defined as and aligned with 'good' thinking. It connects to the value placed on rationality and agency and is woven into conceptions of what it means to become a person and hence deserve respect. Challenges to the supremacy of critical thinking have helped to provoke richer and fuller interpretations and critical thought is prevalent in talk of what it is to become a person and more fundamentally to educate." Doddington also stated that "critical thinking is broadly seen as the kind of logical thinking that helps us to analyse and make sense of, or interpret, all forms of situations or information so that the conclusions we draw from our interpretations are sound" (Doddington: 449). Papastephanou wrote: "I argue that the discourse of critical thinking in education is exemplary of the tensions generated by such consolidated meanings. Through this prism, I aim to offer a nuanced account of ways in which the trivialisation of critique nurtures narcissistic and conformist tendencies that do not leave unaffected any critical philosophical line of thought." (Papastephanou: 369) Biesta et alii discussed philosophical "groundwork" for contemporary debates about the status of the idea(l) of critical thinking in as criticality (Karl-Otto Apel), and deconstruction (Jacques Derrida). It is shown that these conceptions not only differ in their answer to the question what it is "to be critical." Arguing that transcendental critique is able to solve some of the problems of the dogmatic approach to criticality, while deconstruction provides the most coherent and self-reflexive conception of critique (Biesta: 57). Obviously the application of critical thinking depends on social and cultural factors. Mann et alii using

questionnaire results concluded that students from the three Western, individualistic cultures were more confident of their decision-making ability than students from the three East Asian, group-oriented cultures. No cross-cultural differences were found in scores on decision vigilance (a careful decision-making style). (Mann: 325) Oliver used the term `information culture` for information management in organisations. His findings show that “different values and attitudes to information are influencing factors of the information culture in the organisations studied.” (Oliver: 363) The term personal information management was first used in the 1980s in the midst of popular excitement over the potential of the personal computer to greatly enhance human ability to process and manage information (PIM). (Teevan; Jones: 40)

Recent definitions of Critical Thinking use both the definition of it as a method of thinking as well as its tools. Critical Thinking encompasses the entire process of obtaining, comprehending, analysing, evaluating, internalising, and acting upon knowledge and values. In the *Consensus statement regarding Critical Thinking and the ideal critical thinker* (1990) the following definition of Critical Thinking is made:

We understand Critical Thinking to be purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing CT skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society.

In *A Working Definition of Critical Thinking* Michael Scriven and Richard Paul make a definition of Critical Thinking as a process:

Critical Thinking is 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. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications and consequences, objections from alternative viewpoints, and frame of reference. Critical Thinking - in being responsive to variable subject matter, issues, and purposes – is incorporated in a family of interwoven modes of thinking, among them:

scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking.

Critical Thinking is also called informal thinking, a term, which expresses this assumption. If a situation or decision needs to be figured out, then a Critical Thinking approach is needed. Critical Thinking has also become a broad term for academic work and scholarly education across the disciplines classified as humanities as a group of academic subjects studying aspects of the human condition. 'Critical Theory' entails reflection upon the premises, concepts and categories and is a meta-discipline used for any approach done here historically developed in Europe.

Critical Thinking can be seen as a tool with certain components to handle information. It involves a particular way in which information is treated. According to Scriven and Paul as a method Critical Thinking varies according to the purpose and motivation. Its quality is therefore typically a matter of 'degree' and dependent on the quality and 'depth' of experience in a given domain of thinking or with respect to a particular class of questions.

Critical Thinking has features that are useful for any management process. Critical Thinking is the intellectually disciplined process of using information in a process of observation, experience, reflection, or reasoning using the following strategies:

Conceptualising information

Applying information

Analysing information

Synthesizing information

Evaluating information

Following the statement for the U.S. *National Council for Excellence in Critical Thinking Instruction* Critical Thinking is based on universal intellectual values that transcend subjective aspects. It entails the examination of those structures or elements of thought implicit in all reasoning such as 'purpose', 'problem', or 'question-at-issue'.

Following the Delta report of 1990 Critical Thinking is a purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations that judgment is based upon.

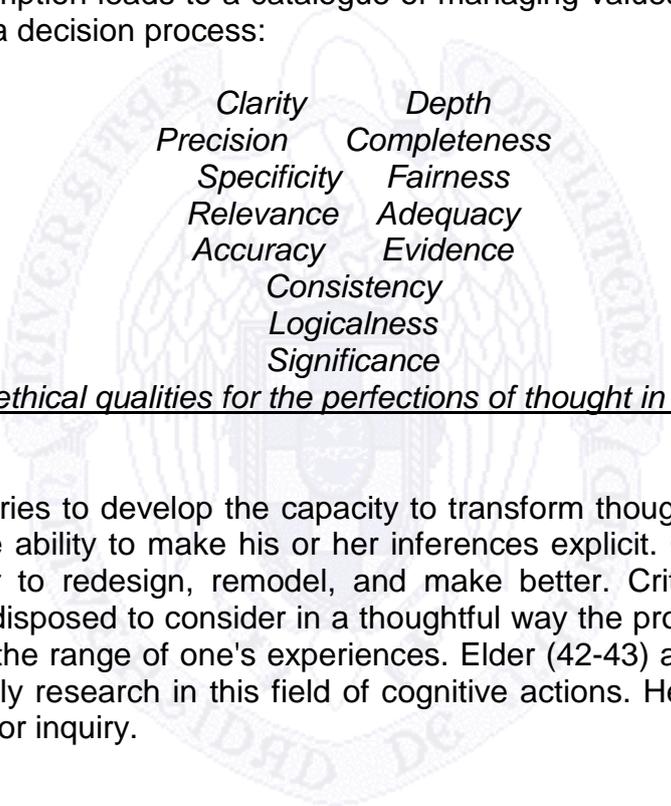
A skill and virtue catalogue - Description of the managing values of a critical thinker

In recent time an image of a critical thinker was produced, which focuses also on practical skills in a process of delivery of information. We will show the main features

using the description made by the Delphi Project and Steven D. Schafersman, who has differentiated between diverse types of Thinking.

A person who thinks critically asks appropriate questions in order to gather relevant information, uses reason logically for this information, and comes to reliable conclusions about the topic that enable one to live and act successfully according to the results. A critical thinker understands - in the words of Jonathan Dolhenty - the 'sources' and 'nature' of knowledge, and the 'nature' of any kind of 'truth'. Based upon research in medical science Ganzini et alii stated that "as a matter of practical reality, what role patients will play in decisions about their health care is determined by whether their clinicians judge them to have decision-making capacity." (Ganzini: 100)

All in all this description leads to a catalogue of managing values of a critical thinker setting priority in a decision process:



<i>Clarity</i>	<i>Depth</i>
<i>Precision</i>	<i>Completeness</i>
<i>Specificity</i>	<i>Fairness</i>
<i>Relevance</i>	<i>Adequacy</i>
<i>Accuracy</i>	<i>Evidence</i>
<i>Consistency</i>	
<i>Logicalness</i>	
<i>Significance</i>	

Rational and ethical qualities for the perfections of thought in Critical Thinking

A critical thinker tries to develop the capacity to transform thought into reasoning at will, and uses the ability to make his or her inferences explicit. Critical thinkers use critiques in order to redesign, remodel, and make better. Critical Thinking is an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences. Elder (42-43) and Helliwell (44-46) also made recently research in this field of cognitive actions. Here Critical Thinking uses questioning or inquiry.

2. Elements of Critical Thinking

Critical Thinking and other thinking modes and skills

It is important to have a definition of Critical Thinking in order to compared it in contrast with other forms of non-critical thinking. Critical Thinking can be defined as a rational analytical approach by objectivation both the topic and the approach towards it. The English word 'to think' is a deriverate from Middle English 'thenken' and from Old English 'thencan'. Old High German 'denken' means 'to think', Latin 'tongere' 'to know'. This etymology shows how thinking and knowledge derive from the same root. Thinking in general can be divided into several types of thinking. Non-critical thinking can be subjective and take the form of habitual thinking;

brainstorming without evaluation can be used as a technique prior to Critical thinking; prejudicial thinking to support a particular position and emotive thinking are forms of subjective thinking according to Schafersman. Each type of thinking contains skills also used by Critical Thinking.

<i>Scientific thinking</i>	<i>Rational analysis of objects</i>
<i>Mathematical thinking</i>	<i>Objectivation of objects</i>
<i>Historical thinking</i>	<i>Historical analysis of objects</i>
<i>Anthropological thinking</i>	<i>Comparative and social analysis of objects</i>
<i>Ethical / moral thinking</i>	<i>Ethical analysis of objects</i>
<i>Philosophical thinking</i>	<i>Analysis of wisdom of objects</i>
<u><i>Types of thinking according to applied field</i></u>	

<i>Critical Thinking</i>	<i>Analytical</i>	<i>Discourse</i>
<i>Logical thinking</i>	<i>Analytical</i>	<i>Discourse</i>
<i>Analytical thinking</i>	<i>Analytical</i>	<i>Discourse</i>
<i>Synthetic thinking</i>	<i>Synthetic</i>	<i>Discourse</i>
<i>Hermeneutical thinking</i>	<i>Synthetic</i>	<i>Discourse</i>
<i>Emotional thinking</i>	<i>Synthetic</i>	<i>Description</i>
<i>Cognitive thinking</i>	<i>Synthetic</i>	<i>Invention</i>
<i>Empirical thinking</i>	<i>Phenomenal</i>	<i>Description</i>
<i>Pragmatic thinking</i>	<i>Phenomenal</i>	<i>Description/Order</i>
<i>Inductive thinking</i>	<i>Analytical</i>	<i>Induction</i>
<i>Deductive thinking</i>	<i>Analytical</i>	<i>Deduction</i>
<i>Computational thinking</i>	<i>Analytical</i>	<i>Description</i>
<i>Connotational thinking</i>	<i>Analytical</i>	<i>Interpretation</i>
<i>Logical thinking</i>	<i>Analytical</i>	<i>Description</i>
<i>Sceptical thinking</i>	<i>Analytical</i>	<i>Doubt</i>
		<i>Falsification/ verification</i>
<i>Dialectical thinking</i>	<i>Synthetic</i>	<i>Discourse</i>
<u><i>Types of thinking according to methods and aims</i></u>		

Elements of 'Pure' logical thinking types in Critical Thinking

According to Schafersman logical thinking is characterized by reliance on correct forms of reasoning using logic in a proper manner. Fallacious reasoning with specious arguments or false analogies characterize a form of illogical thinking. Its knowledge claims supported by inadequate or unreliable premises. Computational thinking (Lat. *computare*, 'to think') results from all previous development of thoughts. Connotational thinking (Lat. *connotare*, 'to imply') is the thinking, which uses elements already implied in a word or mind concept in addition to its literal or primary meaning. Cognitive thinking (Lat. *cogitare*, 'to think') is based upon cognition as the psychological result of perception and learning and reasoning. Rational thinking or logical thinking is based upon logical possibilities. Inductive thinking is a process of reasoning from parts to the whole or from examples to generalizations. Deductive thinking is the opposite type of reasoning from the whole to its parts as generalization to demonstrate concepts with examples. Sceptical thinking is

analytical and is a process of doubt with the aim of verification or falsification. Dialectical reasoning involves cognition processes including thinking about reasoning, motives, and arguments of others facing all sides of a question and analysing the strengths and weaknesses of opposing points of view.

Elements of scientific and applied scientific thinking types in Critical Thinking

Scientific thinking in general is interested in knowledge and has different areas of application and objects it focuses on. For example mathematical thinking is based upon numbers and arithmetic as subjects of knowledge. Historical thinking is based upon historical events or puts things or persons in relation to history. Anthropological thinking is based upon knowledge of the human species. Economic thinking focuses on the relation of things to economy. Moral thinking focuses on ethics. Philosophical thinking is interested in wisdom. Analytical thinking and synthetic thinking base upon the comparison of elements. Synthetic thinking is the major method of applied thinking types. Synthetic thinking and evaluation are two types of thinking that both focus on making an assessment or judgment based on a synthesis of available knowledge. The evaluation presents this knowledge in an analysis of certain immanent values. Synthetic thinking requires an investigation in parts and relationships (analysis) of a whole and then to put these together in a new and original way. Hermeneutical thinking focuses on the indirect approach to a result; it presents the results within the process of intellectual reflection and is quite different to the steps Critical Thinking takes to reflect the way of approaching a goal.

Elements of non-scientific pre-rational thinking types in Critical Thinking

Creative thinking (Lat. *creare*, 'to create') is a divergent synthetic thinking, which generates something new or different. It involves a different idea or concept that works as well or better than previous ones. Creative Thinking is the process of putting facts, concepts, and principles together in new and original ways. Its results are the creation or generation of ideas, processes, experiences, or even new objects. Bahr Bleedorn made further investigations in this field.

Emotional and intuitive thinking are 'out of the realm of consciousness'. Emotional thinking is based upon emotions and feelings, while logical thinking is based upon reasoning. Intuitive thinking consists of belief in the superiority of the mind's ideas and knowledge of reality obtained by subjective experience or intuition without consciousness. They can be related to Critical Thinking serving as the ground for ethical reflection.

Empirical thinking uses empirical knowledge and facts of observation rejecting e.g. metaphysical or theoretical concepts. Empirical thinking relies on data from objective sensory experience or empirical evidence. The results of such evidence must be repeatable, measurable, and testable in order to have a general importance for a major group of objects.

We now need to look for signs of Critical Thinking in a context of thinking methods we listed above in order to see the relations and applications of this method of

thinking. We can see Critical Thinking placed together within a field of connected types of thinking with the other types of thinking like an element in a rhizome connected with the other elements. This concept helps us to be aware that no single type of thinking is in general dominant, but all of them are interrelated. But when Critical Thinking becomes the dominant intellectual tool, it may use approaches of other kinds of thinking. The Critical Thinking process can be compared with a rhizome, where all cognitive institutions of the process (i.e. all kinds of) are linked with each other. None of them must follow the other in a strict order, but all work together towards a solution. Several areas of thinking can be used for several applied fields of thinking supporting Critical Thinking like for example mathematical and computational media can support the process of the evaluation of data collected regarding a specific topic. The process of argumentation, where the data are reviewed and finally become object of the concrete judgment process of Critical Thinking, is a process that can be made using a wide range of arguments for the decision. Critical Thinking can find its documentation in one's mind (memory), in a dialogue or any other communication way media such as abstract concepts of written language, numbers or visual forms. Even the last step, when finally the decision of a solution is made and we see how the problem is solved, can be presented in many media.

The identification, construction, and evaluation of information is another level of the rhizome where Critical Thinking is linked with steps of the process from the identification of the objectified topic of thinking to the solution. Critical Thinking is concerned with the organisation of the steps of these processes as managing institution in order to achieve results. While this constructing of the process is a personal responsibility, the process of Critical Thinking not only includes the application of structures of our mindset, but also practical tools to use them. It preserves us to produce just 'meaning' without any reflection.

<i>Inductive thinking</i>		<i>Ethical thinking</i>
<i>Deductive thinking</i>		<i>Emotional thinking</i>
<i>Logical thinking</i>	Critical Thinking	<i>Creative thinking</i>

<i>Objective types of thinking</i>		<i>Subjective types of thinking</i>
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Critical Thinking between objective types of thinking and subjective types of thinking

Excuse: Critical Thinking between good and bad

Critical Thinking is the disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and actions. But how is it related to ethics? Or, in other word, how can Critical thinking guarantee that it is neuter in terms of ethics and intends to favour ethical acceptable decisions? As an internal ethnic value it should imply inter-subjective judgement that can be transferred from one topic to another. As a criterion of cross-checking the results should meet the actual ethical standards of its time and place. And finally – it

should not contain the results of the process before it starts to avoid prejudice; one method for this is a maximum of separation between judging subject and object to be judged in the process. On the contrary, a prejudice is a judgment, belief, opinion, point of view-favourable or unfavourable-formed before actual facts are known. A prejudice would be also resistant to any evidence and reasoning in the process, or disregards facts that contradict it. We finally look at the ethical dimension of thinking and the neglecting of Critical Thinking:

<i>Subjective thinking</i>	<i>Objective thinking</i>
<i>Bias</i>	<i>Rational judgement</i>
	<i>Egocentric thinking</i>
	<i>Ethnocentric thinking</i>
	<i>Sociocentric thinking</i>
	<u><i>Types of thinking</i></u>

Critical Thinking itself has no ethical implementation like 'good' or 'bad'. Critical thinking can detect built-in biases of the subject, ourselves. A bias is a mental leaning or inclination derived from a human-centered perspective:

Egocentricity
Ethnocentricity
Sociocentrism
Bias typology

Non-Critical Thinking can also have the form of habitual thinking based upon habits, rules, or regulations based on traditions, old practices without considering current data, unreflected brainstorming by saying whatever comes to mind without evaluation, and even creative thinking can put facts, concepts and principles together in new and original ways without a critical reflection. Prejudicial thinking may use gathered evidence to support a particular subjective position without questioning the position itself or the alternatives. Emotional thinking can be a response to the emotion of a message rather than the content.

The intellectual processes as method of evaluation in Critical Thinking

1. The process of observance

In the process of observance the first state is concerned with the conditions of an intellectual process itself. Claiming this way intellectual autonomy means having rational control over the means, tools and methods to apply in the decision making process. The ideal of Critical Thinking is a command over the process of thinking prior to its start. Knowledge is also the knowledge regarding this method, and not only regarding the features of the object. Confidence means that in the long run higher interests shall be claimed within this process developed under rational faculties. Starting from the phenomenological *status quo* about the object, the object of Critical Thinking has to be separated from the judging authority, the subject. This step is the first way to make sure that an objective process of evaluation of information can start with the best result. But basic human areas of thinking must not only concern the mind and intellect, but also can result from sensual and esthetical

experiences and emotions, as long as the critical process is aware of these sources. Critical thinkers may follow their sense of 'intuition'.

Mind *Senses*
Intellect *Emotion*
Basic areas of Critical Thinking

Emotional empathy is an understanding of the need to put oneself in the place of others to understand them and also to avoid bias and to obtain an ethical framework. A fact is what actually happened and what is true can be verified by empirical means:

Autonomy
Empathy
Perseverance
Virtues
Categories of Critical Thinking

Data are the basic information needed to start a Critical Thinking process. A sufficient quantity of data is used to categorize the incidents and produce a relative ranking of importance of facts for evaluation. Data are facts, figures, or information from which conclusions can be deducted, or information, which can be used for interpretations or theories. Primary hard data (facts) are to be distinguished from the secondary data with inferences or conclusions (factivities).

2. The process of proof

First of all one has to develop criteria in order to organize the proofing method of data. In a catalogue of criteria a criterion serves as a standard of measurement or judgement. For example the value of human life is based on criteria of human life distinguishing it from other forms of being. The standards by which we determine, whether a value like human life is achieved should be as objective as possible and should be able to be transferred to all entities of this group, in our case all human beings. According to the definition of the *Foundation for Critical Thinking* in its definition of 'clarify' a clarification is used to make understanding easier, to free from 'confusion' and 'ambiguity', and to remove 'obscurities'. Clarity is a 'fundamental perfection of thought' and clarification a fundamental aim in Critical Thinking. The key to clarification are for example concrete specific examples and an accurate language.

Relevance vs. irrelevance of information
Importance vs. unimportant of information
Correctness vs. falseness of information
Proofed vs. unproved information
Clearness vs. ambiguous information
Classification for the critical quality of information

The evaluation process is the main fields of Critical Thinking itself. We can distinguish between these steps in the process:

Data collection

Data analysis

Data evaluation

Evaluation process: Second step of Critical Thinking

The final step in the evaluation process is the proof as evidence in order to demonstrate a 'truth' of a fact or the acceptability of a conclusion. Rational is what serves as principles of an inter-subjective method claiming an aim; the opposite would be for example a 'rule of thumb' without a method.

Proof of knowledge

Reasoning

Proof process

General methods of proof in Critical Thinking are:

Inquiry

Comprehension

Evaluation

Analysis and synthesis

Comparison

The process of assumption and questioning the object

In the inquiry process in Critical Thinking the subject uses questions regarding the object as the way to collect data. The data collected in the inquiry can be used for the following evaluation of these data by descriptions, interpretations, and comparisons. A final interpretation has the practical function to serve as a way to the judgement regarding the object and/or a solution of the problem.

Observation/inquiry

Description

Comparison

Interpretation

Evaluation process:

First step: Inquiry Process in Critical Thinking

Here we propose a questionnaire of questions regarding Critical Thinking:

What assumptions exist?

What is give as fact? What evidence exist?

What is the purpose of the inquiry?

What is the question?

What viewpoints or perspectives exist?

A Questions regarding the object

What kind of observations or experiences is useful?
What ideas or concepts are useful?
What kind of interpretations can be made?
What are possible implications or consequences?
B Methodical questions

Questionnaire of Critical Thinking

3. *The process of reasoning*

This process is concerned with the application of the criteria of the data in a rational way. A judgment based upon reasoning is any belief or conclusion on the basis of reflexive thinking and able to be practiced by others. An opinion would be the opposite ignoring the inter-subjective responsibility.

Results from such a process of reaching knowledge or justified true beliefs as facts must not rely on unreliable knowledge or improvable beliefs. Questions and inquiry have been discussed in Current issues and enduring questions. A Guide to Critical Thinking and Argument by Sylvan Barnet and Hugo Bedau. Critical Thinking involves knowledge of the science of logic including skills of logical analysis, correct interpretation, and understanding, for example when using statistical material. Therefore we can use data assessment by evaluation of observed data and their interpretation regarding specific questions:

1. Evaluation process of data

Analysis of data
Analysis
Description
Interpretation

2. Assessment of data

Internal assessment regarding authenticity etc.
Comparison of data regarding their coherence
External assessment of data collected with other sources

3. Critical judgement

4. *The process of judgment*

The process of judgment is the first step in decision making by critical thinking; it is related to the main question(s) regarding the object. A presentation of arguments is the previous step in this process, where the arguments serve as criteria for or against something that is the focus of the object and it can be summarized in the judgement process. After this process a conclusion related to the focus can serve as a final judgement. The term 'argumentation' refers to a discussion, in which a disagreement occurs. Judgment as the act of judging or deciding is the practice of understanding. Historically, the judgement and the critique are interrelated forms, and we find for example in the description of the art critic as judge the relation of these fields. Thinking of a not clear situation is solved by making judgments

concerning the status of an affair (for example what is so and what is not so, what is true and what false). An argument consists of propositions. We use the terms 'premise' and 'conclusion' to describe the status before and after the argumentation. The conclusion of an argument means that a proposition is affirmed or not affirmed as true or false as a determination, which is actually made in the judgment.

- | | |
|--|----------------------|
| 1. | 2. |
| <i>Cognition</i> | <i>Argumentation</i> |
| <i>Objectification</i> | |
| <u><i>The process of judgement</i></u> | |

Propositions differ from other types of expressions such as e.g. questions, commands, and exclamations. A proposition can be asserted or denied, and for example in the Platonic dialogues there is a permanent inquiry process regarding prepositions. According to a taken perspective or point of view human thinking is selective. A good selection of prepositions and their inquiry is facing the object not selective, but holistic in order to avoid immanent bias. This scheme shows that a topic or focus, which is part of the judgement process, can be divided into several propositions and the related argumentation:

- Proposition 1
- Argumentation 1
- Proposition 2
- Argumentation 2
- Proposition 3
- Argumentation 3
- Proposition 4
- Argumentation 4

Schema of proposition and argumentation

The propositions/argumentations can fall into the following areas.

Ethical	Is is good / bad	Morals
Esthetical	Is it beautiful / ugly	Esthetics
Phenomenological	Is it / is it not	Existence
	true/false	

Applied categories of Critical Thinking

Improper judging can also bring unclear ambiguity, gives no answer whether an inductive conclusion is to be preferred, or whether statements by authorities are acceptable. The personal correct use of Critical Thinking based upon the correctness of methods of Critical Thinking. This is the ethical side of Critical Thinking, while the terms 'true' and 'false' can only be applied to a judgment of facts. It is possible for a judgment to be presented as an opinion if its state of certainty is in question due to missing features of the process.

1. Data collection:

Observations
Questioning
Assumptions
Doubt / Inference

2. Data evaluation:

Proof
Interpretation

3. Data judgement

Conclusion
Judgment

Steps for the solution of problems

Critical Thinking – a process from observance to the judgement process

3. Application of Critical Thinking

Forms of decision making processes

Any decision making process uses at least some features of Critical Thinking to come to a result. In general decision-making processes can be made in different critical genres as forms of their presentation:

<i>Critical essay</i>	<i>Dialogue</i>
<i>Critic</i>	<i>Critical verbal statements</i>
<i>Comment</i>	<i>Discussions</i>
<i>Literary</i>	<i>Verbal</i>

Critical genres and forms of criticism

Critical Thinking is a process that uses data available to be analysed. But also intellectual processes can use certain forms to present them to an audience. In terms of its application and forms Critical Thinking finds in the following genres and forms of writing and speaking a place:

1. Speech

In speeches such as deliberative speeches, laudatory speeches and legislative speeches Critical Thinking takes part in the argumentation process of one speaker (monologue form).

2. Discussion

In discussions Critical Thinking makes it possible to follow the standpoint of others and figure out the own standpoint. This is a dialectical form and an interplay that needs a moderator to make sure that a step-by-step process is made.

3. Discursive text

Discursive text, but also other forms of texts showing an interest and elements of a judgement/ decision making process can use Critical Thinking as a discourse-immanent structure.

Derivates of applied forms of criticism can be found in any area related to human affairs. Criticism can use for example biographies in order to understand the person's life. Inter-related forms of Critical Thinking can use several tools applying formal categories like the analysis as the examination of the relations of parts or explication as the detailed presentation of meaning. When we look at the humanities, we see a relatively wide field of applications. For example historical criticism is interested in the impact and meaning a work has had in its time. There are different applied fields for critical judgement on certain objects:

Critical philosophy
Critical art
Critical film
Critical social theory
Critical literature
Critical New Media
Applied fields of criticism

Critical reading includes the reflection of ideas presented in the reading. It is also a feature of the analysis of data that enables to evaluate information from written sources. Types of criticism vary in accordance with purpose and field.

Formal criticism
Systematic criticism
Historical criticism
Biographical criticism
Types of criticism

Management strategies of Critical Thinking

When we consider Critical Thinking as a way to think about a topic with the general intention to get a result from our thinking, we now should have a look at the methods of Critical Thinking focussing on its management strategies regarding handling of the information. Management operates in general through the functions planning, organizing, leading/motivating, and controlling. All of these functions can be subject to Critical Thinking; strategies of planning and organisation can be inquired and the controlling can be done by applied critical skills. Especially crisis management has an affinity of Critical thinking. Critical Thinking here starts with the definition of the problem. This can be done e.g. in the description of it. In the next step the analysis of the problem is made. This can be made in dialectical analysis showing different aspects the problem contains. After this step the argumentation concerning the aim, the solution of the problem, e.g. in an ethical topic a comparison of the problem case with ethical guidelines. Finally, the solution is the process when a directions and ways to get the problem solved is the ending of the crisis.

Critical Thinking and communication management

Critical thinking can use different forms and genres for the presentation of the intellectual process in Critical Thinking; in any way the information is communicated. Critical Thinking *per se* is not a form of communication, but it contains strategies and elements to make its results communicable by the use of several steps and procedures we discussed in the former part of this article. Main methods of Critical Thinking are steps of reflection and this process of analysis and synthesis in a certain case can be communicated. The solution in such a process is a final conclusion about the best way to the problem's solution. An interpretation means to give one's own conception of, to place in the context of one's own perspective. So Critical Thinking is a tool towards the communicative access to the topic in a form of socialisation. Curtler and Shiraev have discussed this issue.

However, the forms of criticism that are communicable by means of word and letter are addressed to a recipient. Among them are:

- Review
- Written discourse
- Essays and other documents
- Report
- Dialogues
- Inquiry

Literal/verbal forms of critical practice

The linking of the connections between ideas is one of the rhizomatic structure of Critical Thinking. The solution of problems is the aim of Critical Thinking, but it is not a systematic part of the rhizomatic structure. Critical Thinking is represented through communicative methods that can have different forms. Communicative methods include the media that are used to transfer data between entities.

<i>Critical Forms</i>	<i>Critical Genres</i>	<i>Critical Methods</i>	<i>Critical Media</i>
<i>Verbal</i>	<i>Verbal genres</i>	<i>Acoustic</i>	<i>Speech</i>
<i>Literal</i>	<i>Literal genres</i>	<i>Visual</i>	<i>Text/ literature</i>
<i>Visual</i>	<i>Visual genres</i>	<i>Visual</i>	<i>Visual media</i>
<i>Medial</i>	<i>Medial genres</i>	<i>Vary</i>	<i>New media</i>

Critical forms and their applications

We now look at the relation between Critical thinking and media that serve for the delivery of Critical Thinking. We mentioned above that Critical Thinking is a disciplined thinking type. Critical Thinking is as an abstract method of the formation of a logical superstructure to handle information a rhizome with patterns. Among the medial types of Critical Thinking are next to the practitioners the receivers representatives for communicative Critical Thinking. These representatives can be for example two speakers or just one speaker and a group as the audience. There are many methods to communicate with receiving entities. Which ones will be used depends on preference of the preferred perceptual system. Main communicative

methods are based upon human senses; they are visual, acoustic, or part of a kinesthetic perception. Creel and Ruggiero have worked in this field. Applications of Critical Thinking are listening, speaking and writing. Critical Thinking in a dialectical process can be performed e.g. as rhetorical speech. A statement made by a speaker is delivered to a receiver.

Listening
Speaking
Writing
Other sensual media access
Basic Media for Critical Thinking

Management skills and Critical Thinking in social organizations

Like a language, which has to be usable by persons from a variety of cultures, it is necessary that critical thoughts have a definite use and defined concepts that transcend particular single cultures. Processes of being aware of the cultural implementations can obtain such an interculturally used Critical Thinking. We come now back to our application of Critical Thinking as managing skills. Decision making processes are immanent in management. Decision making can be a process that uses several levels or instances. In an institution or a democratic society the decision making process is shared between several institutions. We can compare it with a Critical Thinking process where the process is divided into several instances in order to achieve the best result by objectifying the concerned material. One of the most important skills in evaluation is the ability to distinguish between what is implied in a given statement or situation and occurring inferences. As a rhizomatic concept Critical Thinking uses combinations of abilities, knowledge, values, attitudes, and skills in a process. While the knowledge required for critical reflection varies from subject to subject, the underlying values and attitudes remain constant across the field of all virtual subjects. Criticism becomes here the examination and test of propositions of any kind that are offered for acceptance, in order to find out whether they correspond to reality or desired values. This critical faculty is a product of education and individual training. Any limits of its institutionalisation result from the limits of its rhizomatic form and the possibilities of its extensions.

Bibliografía

Bahr Bleedorn, Berenice D. *Creative and Critical Thinking. Reflections and Applications*. Thousand Oaks, Calif., Sage Periodical Press 1993.

Biesta, Gert J.J.; Stams, Geert Jan J.M.. "Critical Thinking and the Question of Critique: Some Lessons from Deconstruction". *Studies in Philosophy & Education* 20.1 (2001): 57-74

Creel, Richard E.: *Thinking philosophically. An Introduction to Critical Reflection and Rational Dialogue*. Malden, Mass., Blackwell 2001.

Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction. *The Delphi Report*. Including all Findings, Tables, & Recommendations. Insight Assessment. April 26, 2008.
[Http://www.insightassessment.com/dex.html](http://www.insightassessment.com/dex.html)

The Critical Thinking Community. Glossary of critical thinking. Critical Thinking. April 26, 2008.
<http://www.criticalthinking.org/articles/glossary.cfm>

Current issues and Enduring Questions. A Guide to Critical Thinking and Argument, with Readings. Edited by Sylvan Barnet and Hugo Bedau. Boston, Bedford Books 1999.

Curtler, Hugh Mercer. Ethical Argument. *Critical Thinking in Ethics*. 2. ed. New York 2004.

Doddington, Christine. "Critical Thinking as a Source of Respect for Persons: A Critique". *Educational Philosophy & Theory* 39. 4 (2007): 449-459.

Dolhenty, Jonathan. *Logic and Critical Thinking*. Radical Academy. April 26, 2008.
<http://www.radicalacademy.com/logiccritthinking.htm>

Elder, Linda; Paul, Richard W. "Critical Thinking: Thinking with Concepts." *Journal of Developmental Education* 24.3 (2001): 42-43.

Facione, Peter A. *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*. The California Academic Press. Milbrae, CA 1990. April 26, 2008.
<Http://www.calpress.com/critical.html>.

Facione, Peter A. *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*. Millbrae, CA: The California Academic Press 1990.

Fisher, Alec. *Critical Thinking. An Introduction*. Repr. Cambridge, University Press 2003.

Ganzini, Linda; Volicer, Ladislav; Nelson, William A.; Fox, Ellen; Derse, Arthur R.. "Ten Myths About Decision-Making Capacity". *Journal of the American Medical Directors Association* 6.3 8 (2005): 100-104

Helliwell, Rick. "Keys to Critical Thinking." *Management Auckland*. 47 (2000): 44-46.

Mann, Leon; Radford, Mark; Burnett, Paul; Ford, Steve; Bond, Michael; Leung, Kwok; Nakamura, Hiyoshi; Vaughan, Graham; Yang, Kuo-Shu. "Cross-cultural Differences in Self-reported Decision-making Style and Confidence". *International Journal of Psychology* 33.5 (1998): 325-335

Miller, David. "Developmental Writing: Trust, Challenge, and Critical Thinking". *Journal of Basic Writing* 21.2. (2002): 92-105.

Oliver, Gillian. "Information Culture: Exploration of Differing Values and Attitudes to Information in Organisations." *Journal of Documentation* 64.3 (2008): 363-385

Papastephanou, Marianna. "Educational Critique, Critical Thinking and the Critical Philosophical Traditions". *Journal of Philosophy of Education* 38.3 (2004): 369-378

Paul, R. *Critical Thinking: What Every Student Needs to Survive in A Rapidly Changing World*, Dillon Beach, CA: Foundation For Critical Thinking 1993. Foundation for Critical Thinking April 26, 2008.

[Http://209.85.135.104/search?q=cache:PSeeOA42UDMJ:www.criticalthinking.org/articles/ct-moral-integrity.cfm+Intellectual+perseverance+is+the+willingness+and+consciousness+of+the+need+to+pursue+intellectual+insights+and+truths&hl=de&ct=clnk&cd=1&gl=de](http://209.85.135.104/search?q=cache:PSeeOA42UDMJ:www.criticalthinking.org/articles/ct-moral-integrity.cfm+Intellectual+perseverance+is+the+willingness+and+consciousness+of+the+need+to+pursue+intellectual+insights+and+truths&hl=de&ct=clnk&cd=1&gl=de)

Ruggiero, Vincent Ryan. *The Art of Thinking. A Guide to Critical and Creative Thought*. New York , Longman1998.

Scriven, Michael; Paul, Richard. *A Working Definition of Critical Thinking*. Lonestar. April 26, 2008.

[Http://lonestar.texas.net/~mseifert/crit2.html](http://lonestar.texas.net/~mseifert/crit2.html).

Schafersman, Steven D. *Critical Thinking and its Relation to Science and Humanism*. Free Inquiry. April 26, 2008.

<http://www.freeinquiry.com/critical-notes.html>

Vernon, Vicki. *Critical Thinking across the Curriculum*. COC-SACS Annual Meeting. December 9, 2006. April 26, 2008.

<http://www.sacscoc.org/annmtg/2006%20Annual%20Meeting/2006%20AM%20Handouts/PDF%20files/CS-34%20Critical%20Thinking%20Across%20the%20Curriculum.pdf>.

White, David. A; Robinson, Robin. "Critical Thinking and Artistic Creation." *Journal of Aesthetic Education*_35.2 (2001): 77-86.

Shirae, Eric; Levy, David A. *Cross-cultural Psychology. Critical Thinking and Contemporary Applications*. Boston, Mass., Pearson/Allyn and Bacon: 2004.

Teevan, Jaime; Jones, William. "Personal Information Management". *Communications of the ACM* 49.1 (2006): 40-43

Weil, Danny. *Perspectives in Critical Thinking. Essays by Teachers in Theory and Practice*. New York , Lang 2000.

Wright, Larry. *Critical Thinking. An Introduction to Analytical Reading and Reasoning*. New York, Orford University Press 2001.