“Up to University” EU funded Project (**Up2U**) – “University as a Hub” sub-project (**U-Hub**)

Learning Path: "**Education to Critical Thinking**" (ECT)

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Most texts are inspired by: “Educazione al pensiero critico” (Editoriale Scientifica) by Francesco Piro – Università degli studi di Salerno, Dipartimento di Scienze Umane, Filosofiche e della Formazione.

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# UNIT 1 - Critical thinking in the school

## Introduction

To help you get into the topic, we answer four questions frequently asked by teachers about critical thinking:

- *What is critical thinking?*
- *Why is critical thinking important?*
- *Which skills are essential for critical thinking?*
- *How does developing these skills prepare students for university?*

## What is critical thinking?

There is no single, shared definition of *critical thinking*. "Critical" refers to the ability to discern, from the Greek *crino* ( κρίνω ) = to separate, from which also the word "criterion" derives.

An initial, rather telegraphic definition is contained in the English edition of Wikipedia:

> *Critical thinking is the objective analysis of facts to form a judgment.*

The *ICAT* (*International Center for the Assessment of Higher Order Thinking*) defines critical thinking as

> *Self-directed, self-disciplined, self-monitored and self-correcting thought. It presupposes consent to strict standards and conscious control of their use. It involves high communication skills and problem solving, as well as a commitment to overcome our egocentrism and sociocentrism. [6]*

The Italian Wikipedia gives us this definition:

*Critical thinking is a type of thought that aims to reach a judgment through mental processes of discernment, analysis, evaluation, inference, not separated from explanations of the considerations on which that judgment is based.*

From this definition we can also deduce the importance of explaining all the steps of an argument.

## Why is critical thinking important?

Our students are bombarded with information and 'fake news' every day: on social media, on TV, on the internet. They need to be able to separate reliable sources of information from unreliable ones, form their own opinions and make their choices with the best information available to them.

One useful explanation of why students need to learn critical thinking comes from Kahneman:

### Quick thinking and slow thinking

Kahneman guides us in an exploration of the human mind and explains how it is characterized by two very distinct thought processes: a fast and intuitive one (system 1), and a slower but also more logical and reflective one (system 2).

If the first presides over automatic and involuntary cognitive activity, the second enters into action when we have to perform tasks that require concentration and self-control. Efficient and productive, this organization of thought enables us to develop refined skills and abilities and to carry out complex operations with relative ease. **But the fast and intuitive system can also be a source of systematic errors (*bias*), when intuition lets itself be influenced by stereotypes and our reflective system is too lazy to correct these errors.** [20]

In general, awareness of possible biases in their thinking can help students to: [7] [8]

- analyze political discourse and make better decisions as informed citizens.
- observe data from different points of view, as if an artist made sketches of a model from different angles, observing every detail, discovering new things at each new angle.
- get out of their *comfort zone*, to question their preconceptions on the subject, (or misconceptions, depending on what they have previously learned about it).

## Education for critical thinking in the curriculum

Critical thinking has for decades been a discipline taught in Anglo-American colleges, where it provides general knowledge borrowed from logic, from the scientific method and cognitive psychology, in order to make students:

- more careful in approving or rejecting arguments.
- more able to intervene constructively in discussions and debates.
- more skilled in finding fallacies and rhetorical manipulations in public discussions.

In other words, critical thinking carries out, from a *skill-based* perspective, some of the functions that are attributed - in a *knowledge-based* perspective - to the teaching of philosophy in scholastic and university contexts. [5]

## Which skills are essential for critical thinking?

In [11] Patricia Alexander reviews some lists of skills that are considered essential requirements for Critical Thinking. She compares these lists, highlighting a considerable degree of overlapping and produces a synthesis. Alexander shows and discusses some examples of tests (mostly based on multiple choice questions) that attempt to assess whether or not the student has mastered these skills.

According to Alexander, Critical Thinking can be seen essentially from two points of view:

- as a set of skills that can be taught
- as a personal predisposition to the search for truth, curious, prudent, confident in reasoning, open, analytical, systematic.

But personal predispositions, which are part of a person's character/personality, do not change easily: in childhood these dispositions are influenced by the environment and education, then they tend to crystallize. Consequently, for schools, it is easier to focus on teaching a repertoire of skills.

Here is the brief list of Critical Thinking skills compiled by Patricia Alexander for *Critical Thinking Skills Test* of *LBCC*, also referring to previous tests ( *CCTST* and *WG* ). [11] [12] [13]

1) Analyzing the *arguments* (the theses supported during the arguments), in order to:

a) distinguish between *strong* arguments and *weak* arguments
b) recognize the informal *fallacies*
c) identify the *evidence*
d) recognize *assumptions* - distinguish between opinions, facts and inferences

2) Performing *inductive reasoning*
3) Conducting *deductive reasoning*
4) *Problem-solving*
5) Making *interpretations*

### Analysis skills

To learn more about what analytical skills consist of, we cite a reformulation from [12]:

- examining ideas and identifying the theses supported and the reasoning made to support these theses.
- understand and express the meaning and relevance of a wide variety of experiences, situations, data, opinions, conventions, beliefs, rules, procedures, criteria
- identifying the inferential relations, both the underlying ones and the explicit ones, between affirmations, questions, concepts, descriptions or other forms of representations intended to express beliefs, judgments, experiences, reasons, information or opinions.

## Inference skills (induction and deduction)

Inference skills consist of producing judgments supported by some "good" reasoning.

*Deductive reasoning* is to decide whether a conclusion **necessarily follows** from the premises. The main rules of logic that allow us to make correct deductions have been stated since ancient times and have been formalized several times over the last few centuries.

In everyday language, when we talk about the rules of logic, we refer mostly to the rules of deductive reasoning. The *inductive reasoning process* is to generalize information or experiences: starting from different individual cases, it seeks to establish universal laws that apply to those cases.

It is therefore a less "solid" form of reasoning, but which, starting from “good” bases of statistical and probabilistic skills, can give good results in many practical situations. However, it lends itself more easily to naive mistakes by non-experts.

According to the Watson Glaser test [13] , to make, or recognize and evaluate, inferences, requires:

- identifying and correctly describing the elements necessary to draw reasonable conclusions
- collect evidence
- form conjectures and hypotheses
- consider the relevant information and deduce its consequences starting from data, statements, principles, evidences, judgments, beliefs, opinions, concepts, descriptions, etc.

## Interpretation skills

These abilities seem to be more difficult to define in a formal way (we highlight with capital letters the terms that recall this low level of formalization), because they take us back to the use of the GOOD SENSE in drawing a final conclusion by appropriately weighing a variety of elements, including the results of inductive reasoning and those of different *arguments* in partial conflict between them.

Here are some characterizations of the ability to interpret, extracted from the "skill test" sets mentioned by Alexander:

- In inductive reasoning the conclusion is presumably justified, but not rendered necessary, by the truth of the premises.
- Interpretation includes the skills of categorization, decoding of sentences and explanation of their meaning.
- Weighing the evidence, and deciding whether the generalizations and conclusions based on the available data are PLAUSIBLE
- The ability to judge, for each of a set of proposed conclusions, if it follows logically, beyond any REASONABLE DOUBT, from the information available.

# How does developing these skills prepare students for university?

The above ‘clusters’ of skills – analysis, inference and interpretation skills - mentioned above seem to have strong connections with skill of textual analysis, as well as to some additional themes such as *probabilistic reasoning* and the so-called *modal logics,* which are dealt with in our additional Units.

One of the main objectives of the study of reasoning is to get used to the critical reading students are expected to be able to do at university level: This type of critical reading requires students to be able to extract the information contained in a text and to

distinguish, for example, what information is explicitly given and which is given in implicit form; which inferences the writer is suggesting, and which inferences the reader can draw on his own initiative.

Developing these target skills will therefore help students to assess and evaluate the arguments that form the basis for scientific articles published in their academic disciplines.

## Webography


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