

## CHAPTER 3

### CRITICAL THINKING DEVELOPMENT

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# CRITICAL THINKING DEVELOPMENT

## INTRODUCTION

Do you think that critical thinking is equal to general academic abilities? If so – you are wrong? It is different complex ability. Why thinking critically is so important? Because very often we tend to guessing instead of estimating, preferring instead of evaluating, grouping instead of classifying, supposing instead of hypothesizing, believing instead of assuming etc.

Schneider describes human minds as belief machines. W. James also said: “As a rule we believe as much as we can. We would believe everything if only we could” (quoted from Hogan, 2009). Yes, it can be useful to have some positive illusions for maintain optimism and self-esteem, but sometimes it lead to severe disappointments and our imperfect thinking can be used against us by others.

## OBJECTIVES

When you have completed this workbook you should be able to:

- 1) Give classical or your own definition of critical thinking, know it’s main components;
- 2) Critical reading, evaluating information and effective report writing;
- 3) Recognize techniques of verbal and written persuasion;
- 4) Know and recognize the main logical fallacies;
- 5) Make rational decision making with graphic organizers and visual means;
- 6) Correct interpretation of statistics;
- 7) Discuss and reflect different aspects of critical thinking abilities.

## DEFINITIONS

**Definition 1:** By B. Black (Black, 2012) Critical Thinking is the analytical thinking which underlies all rational discourse and enquiry. It is characterized by meticulous and rigorous approach. As an academic discipline, it is unique in that it explicitly focuses on the processes involved in being rational. These processes include:

- analysing arguments,
- judging the relevance and significance of information,

- evaluating claims, inferences, arguments and explanations,
- constructing clear and coherent arguments,
- forming well-reasoned judgements and decisions.

Being rational also requires an open-minded yet critical approach to one's own thinking as well as that of others.

**Definition 2:** Accordingly to Sanz de Acedo Lizarraga M.L. et al. (Sanz de Acedo Lizarraga, 2012) the activity to think critically is a multidimensional capacity and basically encompasses cognitive, metacognitive and dispositional components. The cognitive components more often include such skills: to discover assumptions, to make inductive and deductive inferences, to evaluate information, to interpret causes, to predict effects, to formulate and test hypotheses, to make decisions and to define and solve problems. Critical thinking also includes creative skills to generate many varied and original ideas.

The metacognitive components include consciousness, knowledge and regulation.

The dispositional components include motivations, orientation to goals, attitudes.

By Sanz de Acedo Lizarraga M.L. et al. it has been stated that the cognitive components of critical thinking are so complex that, for its successful development, other cognitive processes must be involved and supported by large doses of motivational and emotional energy.

## TESTING OF CRITICAL THINKING SKILLS (LOOK ACTIVITY 1)

COMPARISON OF THE FEATURES THE ORDINARY AND CRITICAL THINKING  
(M. LIPMAN)

<i>Ordinary Thinking</i>	<i>Critical Thinking / Reasoning</i>
Guessing	Estimating
Preferring	Evaluating
Grouping	Classifying
Believing	Assuming
Inferring	Inferring logically
Associating concepts	Grasping principles
Noting relationships	Noting relationships among other relationships
Supposing	Hypothesizing
Offering opinions without reasons	Offering opinions with reasons
Making judgments without criteria	Making judgments with criteria

***Table 1. Comparing Ordinary Thinking to Good Thinking***

### RECOMMENDATIONS FOR CRITICAL READING AND EVALUATING INFORMATION

Critical reading technics include the search and selection relevant information, evaluation information in the aspects of its reliability, quality (modernity, deep etc.) and quantity (it means you can define when you should stop to collect it in order not to take excessive information).

You may become information search for some topic from consultation with your tutor – she/he can recommend you the titles of key books and articles. Then you may read the references of these sources to find additional (connected) sources. Use the Library Catalogue and the Internet. In the Internet you should search resources by key words. From the repertoire of key words depends the result of your search. That is why think about how to select them optimally and try to use several variants. Watch over that you have collected the representative sample of the information on your topic. Look that you have not lost main authors who are cited in the majority of the sources.

Using the criteria: Who? Why? What? When? will help to determine the quality of the information. The checklist of the questions can help you to decide if the information is suitable for your needs (some of the information has been taken from Northumbria University Library, February, 2014).

Who? Look at the author's qualifications, background and experience. Are they an expert in their field? Have they published anything else? Are they being sponsored or funded by someone? Have they been cited by other experts in their field? Is the publisher a recognized and reputable organization? Do they provide contact details?

Why? Look at the purpose of the information. Is the information designed to inform, persuade or entertain? Is there appropriate evidence to back-up any claims? Has the research been sponsored? Is it objective or biased? Who is the intended audience? Does it use emotive language?

What? Look at the relevance of the information. Is the information at an appropriate level for your needs? Is it relevant in terms of geographic locations? Is it original or secondary material? What is its focus? How limited is the coverage?

When? Look at the currency of the information. Is the information up-to-date? Is there a publication date? When it was last updated? Are the links still active (website)?

Do the notes, marks or bookmarks in the text at once when you read some source. Else you will need to reread it entirely and you will have difficulties in search the information which has seems to you interesting and important when you had read this source at first.

When you read critically you should grasp main ideas, theories, key themes and arguments.

The critical / academic reading skills: (from Northumbria University Library, September, 2013)

- Academic reading is all about being selective; there is no need to read every text on a subject.
- Reading a text just once is not enough; you will need to read the important bits first, then re-read these sections more slowly.
- Don't read everything at the same speed. Choose a reading strategy to match the type of text and also to match the purpose of your reading.
- Focus on facts and concepts – does it answer your questions?

When you are reading pause every so often and think about what you have read. Do not just accept what the author has written – as you are reading have the following types of question in mind:

- What evidence is used and how credible is it?
- Can you see any bias in the author's work – what is their opinion?
- How has the conclusion been reached?
- Are there any points of view out there?

### ***When to stop***

It is also important to know when you have read enough, if the answer is ‘yes’ to follow questions then you should be ready to stop.

- Are you convinced by all the evidence?
- Have you got a balanced view?
- Have your questions been answered?
- Are the conceptions and ideas begun to repeat?

## RECOMMENDATIONS FOR EFFECTIVE REPORT WRITING

(these recommendations have been partially taken from ‘Northumbria University Library’, November 2013)

### ***Structure characteristics***

Well-structured report should begin from title page, then it can include contents page, then introduction (5-10% of the overall volume), where reasonably to distinguish the purpose, tasks or hypothesis of your report. Main (central) part of report should include key information – base conceptions, facts and arguments, which illustrate and prove your point of view, accenting and explaining revealed contradictions instead of suppression them. Use examples, statistics, tables and illustrations.

Report usually finish by conclusions or summary (5%) where it is generalize the results and discuss if the purpose and tasks were realized and why, if the hypotheses were confirmed. All supplementary information should be taking away to appendix to free the report from the overload by excessive details.

To write well-structured report it need to involve such writing abilities:

- Ability to draft an outline plan.
- Ability to formulate the head of report.
- Skills to write abstract if the report is long.
- Ability to set up the goal and the tasks of your report.
- Skills to structure materials and to design the plan of your report.
- Ability to formulate conclusions, to add necessary appendix.

### ***Content characteristics***

Orientation on reader’s/reviewer’s needs, awareness about qualification level and request of potential or actual reader/reviewer.

Referencing and citation all texts, thoughts, illustrative materials which were have not created by yourself. Responsible citation answers the questions: “who?”, “what?”, “when?” and “where?” Do not copy word for word when making notes. Try reading a paragraph at time and then summarize the main points using your own words. This alternative way of referring to an author’s ideas is called paraphrasing and is a way in which you can avoid plagiarism.

Be aware about you attitudes, expectations and beliefs in the matter which you describe in your essay, assignment, article or other text. Try to be honest with you and ask yourself – “if I really want to examine this matter or I simply seek the ways to confirm my preferences and views”. If something was not solved in your report do not afraid to acknowledge it in the summary and admit that it needs more researches to explain, find out or confirm.

Control natural desire to conduct bright impression to the reader. Be oriented on the goals of your report and think about is all the information relevant. Control also are the all points supported by evidence.

### ***Academic style of writing***

The following characteristics are typical of academic writing:

- Use of correct grammar and punctuation;
- Uses cautious language;
- Avoids subjective and emotive language;
- Uses linking words and phrases;
- Uses correct referencing;
- Clear and concise language;
- Formal writing style.

Do not use slang expressions and always write words out in full.

Define the main concepts and hold them up to finish, don’t change the key terms even to avoid tautology.

Because research and theories are being developed and updated all the time, writers tend to use cautious or tentative language. The language used in academic writing should reflect the amount of strength of evidence to support a topic or claim.

### ***Examples of language that is not cautious:***

*Jennings’ (2010) research shows that smoking tobacco causes lung cancer.*

*Smith’s (2011) evidence says that greenhouse gases have an effect on the climate.*

***Examples of the cautious language:***

Jennings' (2010) research **would appear to show that** smoking tobacco **may** cause lung cancer.

Smith's (2011) evidence **suggests** that greenhouse gases **may** have an effect on the climate.

A well-structured text is important because our working memory and attention volume can include only  $7 \pm 2$  units. That is why we badly perceive information, which is not divided on several similar pieces.

Points to remember for good structure:

- Try and group similar ideas and concepts together.
- Use paragraphs to divide different sections up and ensure that each paragraph has a point.
- Use the first sentence of each paragraph to introduce the theme of the paragraph.
- Ensure that your sections and paragraphs flow in a logical manner.
- By all means reread and edit your report after finishing.

The key characteristics of academic/critical writing is that it is objective and neutral. So avoid exaggerations and emotional epithets, like “beautiful”, “extremely important” etc.

Most academic writing uses the third person, in other words the writer does not use ‘I’. This helps to ensure the writing stays objective. Examples: ‘This essay will discuss the effect of...’, ‘It could be argued that...’, ‘The researcher found that the results seems to indicate...’, ‘The results appeared to show that...’.

It will be useful to build your own phrasebook of phrases for academic writing. Examples of phrases used to report or interpret results: ‘*It is likely that...*’, ‘*It is possible that...*’, ‘*...suggests that ...*’, ‘*...probably means that...*’, ‘*It appears that...*’, ‘*...would appear to show that...*’.

Examples of phrases used to compare and contrast: ‘*Equally...*’, ‘*However...*’, ‘*Likewise...*’, ‘*On the contrary...*’, ‘*It appears that...*’, ‘*Despite being...*’, ‘*Similarly*’, ‘*On the other hand...*’.

Examples of phrases used to show examples and draw conclusions: ‘*For example...*’, ‘*To summarise...*’, ‘*As can be seen...*’, ‘*In conclusion...*’, ‘*This demonstrates...*’, ‘*In other words...*’, ‘*For instance...*’, ‘*Finally...*’.

Examples of phrases used to present an author’s work: ‘*Russell (2011) argued that...*’, ‘*DeMille (1999) concluded that...*’, ‘*McGuirk (2009) estimated...*’, ‘*Evans (2006) believed that...*’, ‘*Roll (2009) stated that...*’, ‘*King (2007) suggested that...*’.

Use linking words such as: *yet; but; however; also; on the other hand; not only.*



## THE MAIN ELEMENTS OF CRITICAL THINKING

- Understanding and use of oratory,
- Prediction and prevention of problems,
- Knowledge of the basic “logical fallacies”,
- Critical reading and writing style,
- Correct goal setting,
- Recognition of manipulating statistics,
- Recognition of manipulating in advertising and propaganda,
- Countering techniques of dishonest dispute.

## EXAMPLE ANALYSIS FOR CRITICAL THINKING DEVELOPING

The leader (teacher) is reading the example from D. Myers (Myers, 1998, p. 329) on developing critical thinking, give the questions for the essay and students write an essay with their opinion at home (look **Activity 3**) – what in this example is resource for critical thinking development. After this on the next 2 contact hours leader initiate group discussion with the results of student’s essays and read the D. Myers opinion (look **Appendix**). This essay will be the part of student’s portfolio.

Example. “Sleeping problem”.

Sleeping stage REM (rapid eye movement), followed by rapid eye movement, returns periodically, and someone sees vivid dreams. Theories about the causes of sleep vary widely, ranging from the theories of Freud, who believed the dream kind of spare valve to release psychic energy to assumptions that sleep plays an important role in information processing, and to representations that dream is simply the product of random neural activity of the brain. Although the causes of sleep are still not clear, sleeping is necessary without any doubts. After the periods when a person is deprived of REM sleep would follow longer REM-periods.

Imagine that your elderly aunt (client, patient, colleague – O. Lutsenko added) is concerned about his insomnia. She argues that she sleeps only 3-4 hours a night, in the morning feels restless, do not sees any dreams. Fearing that the loss of sleep and dreams create psychological problems, she tries to take a nap in the afternoon to “catch” it up, in the middle of the night she engages in aerobics to get tired and fall asleep faster, and even drinks a glass or two of alcohol. And although she claims that insomnia affects the health and mood, you do not notice any changes in it. Moreover, she is quite naturally and easily leads the conversation.

- Whether aunt's (client, patient, colleague) concern about her sleep is justified? Should she worry about her insomnia?
- Which actions should she take to improve her sleep?
- Is it possible that aunt (client, patient, colleague) completely ceased to see the dreams? How can she become sure in this?
- Suppose your aunt (client, patient, colleague) was right when she said that she had ceased to see the dreams. What could be the expected results of such a state in the light of Freud's theory? In the light of physiological psychology? Cognitive psychology?

## TECHNIQUES OF VERBAL AND WRITTEN PERSUASION

These techniques show the reader that the point of view of the author should act as their own point of view.

- Rhetorical question: means that the answer is so obvious that other answer is not required.  
Example: Can we expect that our teachers will maintain a high level of professionalism, if we do not pay them a fair wage?
- The Rule of 'Three': based on the theory that people remember things when they are listed in three. The same idea can be told in 3 different ways.  
Example: "Stop, look, and listen"; "Is your car old? rusting? ready to be replaced?"
- Emotional language: it is using adjectives, so that the reader could feel a certain emotion.  
Example: Management will not stop these cuts, and all of our children will go hungry. Then they close the plant and leave us without work and on the street.
- Hyperbole: The use of exaggeration for extravagant effect; often used humor.  
Examples: "A hundred years have not seen," "I've said it a thousand times."
- Sound model: designed to attract the reader's attention and remember the contents better:
  - Rhyme, - alliteration (repeated one the same sound at the beginning of words), the repetition of the same consonant sound, repetition of vowel sounds.Examples: sweet smell of success; dime a dozen; 'Don't just book it—Thomas Cook it'.

- Comparisons: show a relationship between two unlike items in one of three ways: metaphor (Examples of metaphor: “golden hair”, ‘sunny smile’); simile (uses “like” or “as”) (Examples of simile: the foreman is tough as nails); personification (uses an animal compared to a non-animal) (Examples of personification: she eats like a pig; he’s an ostrich—he won’t face his problems).
- Dishonest dispute techniques: 1) Ad Hominem (“against the person”); 2) Insult; 3) Extraneous circumstances; 4) Blame “And you yourself ...”; 5) Flattery; 6) Scare tactics; 7) Pity.  
Examples of dishonest dispute techniques: 1) How can you claim this if you are still so young and have not the diploma... 2) May be you are absolutely mad if... 3) He/she has given the negative evaluation of our work because... and by the way he/she is a conflict person, for example, yesterday... 4) And you yourself ... 5) So clever and intelligent man/woman understand that... 6) Tomorrow the prices will be much higher... 7) With all my problems...

## LOGICAL FALLACIES

- *Post Hoc* (after this, therefore because of this) – occurs when an assumption is made that, because one event precedes another. Example: I wanted to do well on the test, so I used my lucky pen. It worked again! I got an A.
- *False Dilemma*: presents in its major premise just two options (“either-or”) when in reality there are others. Example: “Stop wasting my time in this store! Either decide you can afford the stereo, or go without music in your room!”
- *Hasty generalization* (jumping to conclusion) – when premises do not contain enough evidence to draw a conclusion. Example: That new police drama is a really well done show. All police dramas are great shows.
- *Unfinished claim* – when it is declared that something is better, but not specified better... than? Example: “Our fruits and vegetables are better and fresher!”
- *Circular Reasoning* – when there is just one premise, and the conclusion simply restates it in a slightly different form. Example: “I told you to clean your room!” “Why?” “Because I said so!”

- «*Slippery Slope*». The argument might have two true premises, and a conclusion that takes them to an extreme. Example: “We have to stop the tuition increase! Today, it’s \$5,000; tomorrow, they will be charging \$40,000 a semester!”
- *Equivocation*: uses a word twice, each time implying a different meaning of that word, or uses one word that could mean at least two different things. Example: “Hot dogs are better than nothing. Nothing is better than steak. Therefore, hot dogs are better than steak.”
- “*Red herring*” – are simply any unrelated topic that is brought into an argument to divert attention from the subject at hand. Example: “Nuclear power is a necessity, even though it has the potential to be dangerous. You know what is really dangerous, though? Bathtubs. More people die in accidents in their bathtubs every year than you can imagine.”
- Composition fallacy – by focusing on parts of a whole and drawing a conclusion based only on those parts. Example: Every player on their team is excellent. So their team must be excellent, too.
- “*Chicken and egg*” fallacy: an error by confusing cause and effect. Example: Last night I had a fever. This morning, I have a cold and a fever. The fever caused the cold.

## ACQUAINTANCE WITH VISUAL MEANS OF RATIONAL DECISION MAKING

Venn diagrams, tables of causes-problems-effects-possible solutions-possible outcomes, tables with possible choices, main criteria and assessment in scores by 5-points scale, tables of assessment costs and benefits for different solutions.

Why graphic organizers of information are better than simple list?

- They are a meaningful display of complex information.
- They help you to see patterns and organization in your thinking.
- They help you gather and compress information.

- They keep you focused on your goal.
- They show what you know and what you still need to find out.
- They help you understand and interpret your thoughts and ideas.

**Concept Maps**

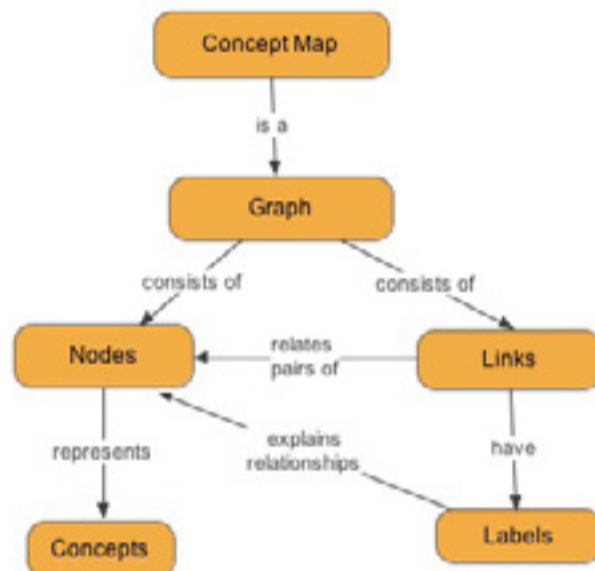
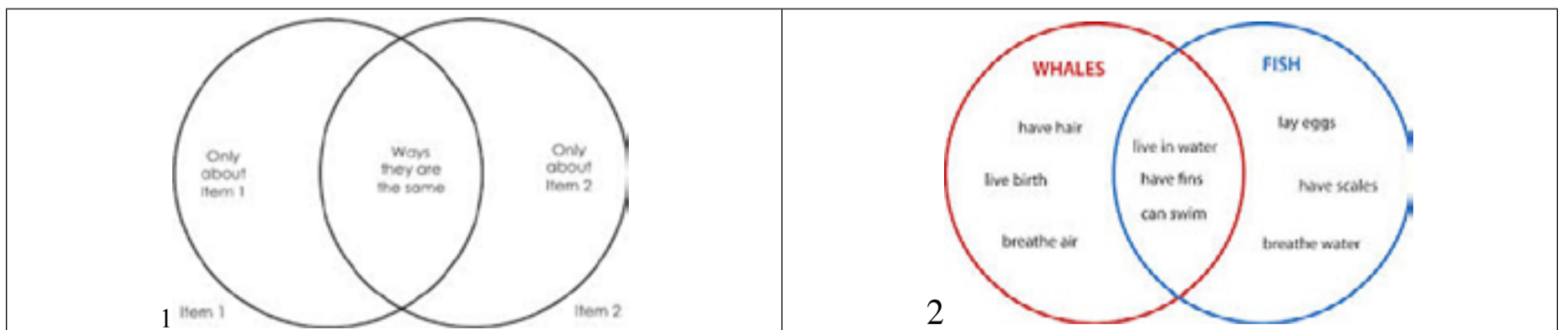


Figure 1. Model of the concept map ([www.milcord.com/milcord-blog/2009/11/25/concept-map-vs-powerpoint-for-briefings](http://www.milcord.com/milcord-blog/2009/11/25/concept-map-vs-powerpoint-for-briefings))

Concept maps, also called target maps, should be used when you are exploring a topic that is not complex. Concept map visually arranges a simple decision and the factors that may be used in making that decision (Starkey, 2004). You can use it to decide if you should change the region of your housing, get yourself a dog, by something cost etc.

**Venn Diagrams**



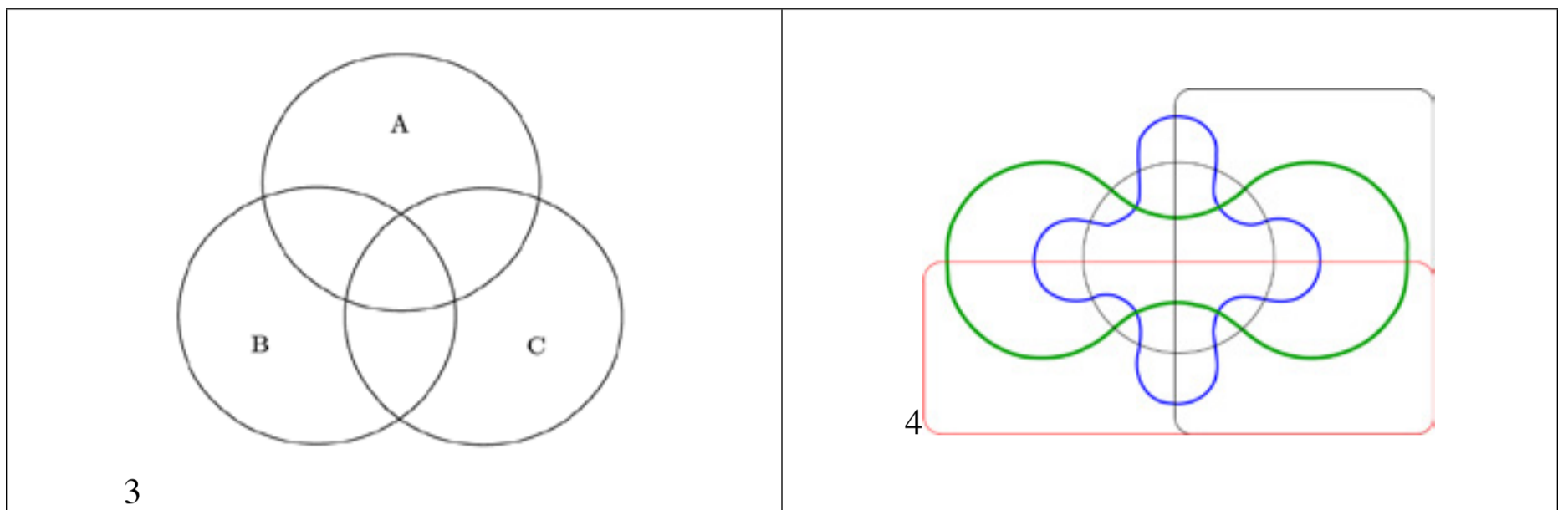


Figure 2. Examples of Venn Diagrams ([www.learnnc.org/lp/pages/2646](http://www.learnnc.org/lp/pages/2646))

**Example:** You have \$ 2,000 in the inheritance from a distant relative. You always wanted to go on a trip to France (or Spain, or...), but also you want to renovate your dilapidated bathroom. Also your friends sell their cottage with 50% discount, and you dreamed of having your own piece of land with a garden. Try to determine with the help of Venn diagram (#3 on the Fig. 2) what to do with the money better, what are the advantages and disadvantages of each of the solutions.

**Results:** A - cottage, B - a journey, C - bathroom. AB – it may no longer to be the opportunity to buy a cottage with such discount; AC - bathroom will improve your daily life more than a cottage; BC - the money was unexpected and so they can be spend at a least practical purpose. ABC - the final decision - a journey.

### Chart

Consider brainstorming with a chart if you have two or more elements that you want to compare and contrast. Charts let you clearly see how each item is similar to the others, and how it differs. In order to make an effective chart, you need to define the elements you wish to compare, and then come up with two or more areas in which to compare them. Then, you may need to conduct some research to accurately fill out your chart. The chart will keep you focused on your purpose, and on relevant information as you conduct your research.

**Example.** You are trying to decide whether to take a job offer in another region or stay where you are. The considerations are salary, housing, schools, and standard of living. While you already have the salary information, you will need to go to the library or Internet to find out the other facts you need to make your comparison. To guide you in your search, you create a chart that looks like this:

Decision	Salary	Housing	Schools	Standard of Living	Total score
Move to east	5	3	4	5	17
Stay in west	1	5	5	2	13

You can add your assessment in scores by 5-points scale and calculate the best decision.

***Problem/Solution Outline***

Regular outlines (the kind that use Roman numerals, capital letters, Arabic numbers, and lower case letters) are highly structured graphic organizers that don't work well for brainstorming. It is too difficult to come up with ideas quickly when you are trying to fit them into a complex pattern, such as a traditional outline, at the same time. The problem/solution outline, however, is more simply structured. This type of graphic organizer is useful because the act of filling it out forces you to:

1. clearly delineate the problem at hand, including causes and effects
2. come up with solutions, and even possible outcomes of those solutions

Problem/Solution Outline Example (Starkey, 2004)

Causes	Problems (fill in as many as applicable)	Effects
rent is going up; neighbors are noisy	<i>Who:</i> me and my family <i>What:</i> should we buy a house or continue to rent a condominium? <i>Where:</i> hometown <i>When:</i> lease is up in two months <i>Why:</i> possibly save money, build equity, improve quality of life <i>How:</i> not applicable for problem	If we buy: monthly payment would decrease, so have more money to save or invest; also would have more privacy and quiet. If we continue to rent: won't have moving expenses; will pay more in rent, so have less money to save or invest; will continue to have little privacy and noisy neighbors

**Possible Solutions**

- establish budget for home purchase, get pre-approved for mortgage, and go house hunting to see if we can find something in next two weeks within budget
- remain in condo for another year while saving more money for a down payment

**Possible Outcomes**

- find suitable house, secure mortgage, purchase house, move in
- live with noisy neighbors for one more year, have bigger down payment and more time to look for house

## THE CORRECT INTERPRETATION OF STATISTICS

Let us consider an example from L. Starkey (Starkey, 2004) for understand possible manipulations with statistics.

Which answer (s) can be a valid conclusion for the following statistical analysis?

The researchers wanted to know, does the use of night-light in the rooms or the light in children's bedrooms to myopia. They conducted a study which showed that while 10% of children who did not use the lamp, have myopia, 34% of children who used the nightlight and 55% of those who slept with top light, too, have myopia.

- (a) The myopia is arise because of the night-light and light in the room.
- (b) Children with myopia greater use the nightlights than children with normal visual acuity.
- (c) Nightlights will help you see better in the dark.
- (d) Children with one or both parents with myopia, greater use of nightlights than children whose parents have normal visual acuity.

There are two possible correct responses to this question.

Second option (b) – it's the best explication of presented statistics.

Nevertheless, the last response (d) is also acceptable, as there is evidence of the hereditary nature of myopia.

When you see the statistics in advertising, political speeches, newspaper articles or other sources, remember that this is not necessarily true. Ask yourself three questions: Is the statistics accurate? Is there any deliberate distortion of the data? Do you receive all the information you need to evaluate?

Now do some practical exercise to more understand which manipulations can be done with statistical data – look *Activity 6*.



## DOES CRITICAL THINKING IS EQUAL TO GENERAL ABILITIES?

Explaining that intelligence and critical thinking are separate constructs. Describing the main critical thinking biases, which are not related to cognitive ability.

Stanovich (2008) argued that critical thinking is what intelligence tests fail to adequately measure. This idea echoes the general consensus among researchers that intelligence and critical thinking are separate constructs and was empirically tested in series of studies that explored the relationship. Stanovich and West (2008) used SAT-scores as an estimate of cognitive ability and numerous well-known thinking biases (e.g. denominator neglect, conjunction effect, framing effects, anchoring effects, base-rate neglect, “less is more” effects, affect bias, omission bias, myside bias, sunk-cost effects, and certainty effects) as an estimate of critical thinking ability. Whereas some critical thinking biases were moderately related to cognitive ability, most critical thinking biases were not related to cognitive ability. Thus, critical thinking and intelligence are separable constructs, but share at least one common attribute – they are difficult to adequately assess.

## ACTIVITIES

### ACTIVITY

*Fulfillment the Test of Critical Thinking of Lauren Starky. Checking the test results and analyze them.*

There are 30 multiple-choice questions in the pretest. Take as much time as you need to answer each one. If this is your book, you may simply circle the correct answer. If the book does not belong to you, use a separate sheet of paper to record your answers, numbering 1 through 30. In many cases, there will be no simple right or wrong choice, because critical thinking skills involve making the most reasonable selection, or the one that best answers the question.

- 1.** You conducted a successful job search, and now have three offers from which to choose. What things can you do to most thoroughly investigate your potential employers? (Fill in all that apply.)

  - a.** check out their websites
  - b.** watch the news to see if the companies are mentioned
  - c.** research their financial situations
  - d.** speak with people who work for them already
- 2.** Every Monday, your teacher gives you a quizon the reading he assigned for the weekend. Since he typically assigns at least 50 pages of textbook reading, the quizzes are difficult and you have not gotten good grades on them so far. Which answer represents the best idea for troubleshooting this problem and improving your grades?

  - a.** ask for the assignment earlier in the week
  - b.** schedule in more time on Saturday and Sunday for reading and studying
  - c.** get up an hour earlier on Monday morning to go over the reading
  - d.** get a good night's sleep and eat a good breakfast before the quiz

3. What is the best conclusion for the argument that begins, “The other eight people in my class . . .”?

- a. like meatballs, so I should too.
- b. live in apartments on the south side of town, so I should live there too.
- c. who studied Jorge’s notes got D’s, so I will get a D too.
- d. who met the new principal like him, so I should too.

4. Which one of the following is NOT an example of a persuasion technique?

- a. Tigress jeans are available at your local Mega Mart store.
- b. The very best mothers serve Longhorn Chili-in-a-can.
- c. “Vote for me, and I promise our schools will improve. My opponent just wants to cut the school budget!”
- d. Our tires not only look better, but they ride better, too.

5. Which is a sound argument?

- a. I had a dream that I got a D on my biology test, and it came true. If I want to do better next time, I need to have a more positive dream.
- b. Beth wanted to become a better driver, so she took a driving class and studied the Motor Vehicles manual. Her driving really improved.
- c. After a strong wind storm last October, all of the leaves were off the trees. That is when I learned that wind is what makes the leaves fall.
- d. When Max realized he was getting a cold, he started taking Cold-Go-Away. In four days, he felt much better, thanks to the Cold-Go-Away.

**6.** You are trying to decide what car to buy. You make a chart that compares a two-seater sports car, a two-door sedan, and a mini-SUV in three categories. What would not be a suitable choice for a category?

- a.** price
- b.** gas mileage
- c.** tire pressure
- d.** storage capacity

**7.** Which answer best represents a situation that has been decided by emotion alone?

- a.** You hate the winter, so even though you can't afford it, you take a vacation to the Bahamas.
- b.** The school shuts down after a bomb threat.
- c.** Your company's third-quarter earnings were much higher than predicted.
- d.** You need a new mixer, so you watch the ads in your newspaper, and buy one when it goes on sale.

**8.** In which case would it be better to do research in the library rather than on the Internet?

- a.** You are writing a report on recent U. S. Supreme Court decisions.
- b.** You want to know the historical performance of a stock you are considering purchasing.
- c.** You need to compare credit card interest rates.
- d.** You want to find out more about the old trails through the forest in your town.

**9.** You read a story in the newspaper about salary negotiations involving public transportation workers. The workers are threatening to go on strike tomorrow if their demands for higher wages and better benefits are not met. What represents an inference made from this scenario?

- a.** Health insurance premiums are very expensive.
- b.** The cost of gas will make ticket prices increase in the next few weeks.
- c.** People who ride the bus should look for possible alternative transportation.
- d.** Employers never like to meet salary demands.

**10.** What is wrong with this argument?

“You think we need a new regulation to control air pollution? I think we have already got too many regulations. Politicians just love to pass new ones, and control us even more than they already do. It is suffocating. We definitely do not need any new regulations.”

- a. The person speaking doesn't care about the environment.
- b. The person speaking has changed the subject.
- c. The person speaking is running for political office.
- d. The person speaking does not understand pollution.

**11.** What should you NOT rely on when making a judgment call?

- a. intuition
- b. common sense
- c. gossip
- d. past experience

**12.** Which is NOT a valid argument?

- a. There are six cans of tomatoes in the pantry, and another fourteen in the basement.  
There are no other cans of tomatoes in his house. Therefore, he has twenty cans of tomatoes in his house.
- b. Everyone who was northbound on the Interstate yesterday was late to work. Faith was on the Interstate. Faith was late to work.
- c. Huang lives in either Kansas City, Kansas, or Kansas City, Missouri. If he lives in Kansas, then he is an American.
- d. No one who eats in the cafeteria likes the pizza. My boss eats in the cafeteria. Therefore, she does not like the pizza.

**13.** What statement represents a judgment instead of a fact?

- a.** My presentation was excellent. I am sure my boss will promote me now.
- b.** My presentation was excellent. The clients all told me they liked it.
- c.** My presentation was excellent. It won an award from management.
- d.** My presentation was excellent. It was cited as such on my peer evaluation.

**14.** Your dream is to spend a summer in Indonesia. After some research, you conclude that you will need \$6,000 for the trip. Which answer represents the best choice for goal setting to make your dream a reality?

- a.** Cut \$200 per month of discretionary spending, and save the money.
- b.** Ask family members and friends for donations.
- c.** Sell your car and use the money to fund the trip.
- d.** Look into a more reasonably priced destination for your summer trip.

**15.** What is wrong with the following argument? America—love it, or leave it!

- a.** There is nothing wrong with the argument.
- b.** It implies that if you leave the country on vacation, you do not love it.
- c.** It does not tell you how to love it.
- d.** It presents only two options, when in fact there are many more.

**16.** Which of these situations does NOT require problem solving?

- a.** After you get your new computer home, you find that there is no mouse in the box.
- b.** When you get your pictures back from being developed, you realize that they are someone else's.
- c.** Everyone on your team wants to celebrate at the Burger Palace, but you just ate there last night.
- d.** Your boss asks you to finish a report for tomorrow morning, but it is your son's birthday and you promised you would take him to the ball game tonight.

**17.** Which type of website most likely provides the most objective information about Abraham Lincoln?

- a.** [www.members.aol.com/LeeV/Lincolnlover.html](http://www.members.aol.com/LeeV/Lincolnlover.html): home page of a history professor who wrote a book on Lincoln's presidency
- b.** [www.southerpower.org/assassinations](http://www.southerpower.org/assassinations): a Confederate group's site on famous assassinations, most pages devoted to Lincoln
- c.** [www.lincolndata.edu](http://www.lincolndata.edu): site of a historical preservation group that archives Lincoln's correspondence
- d.** [www.alincoln-library.com](http://www.alincoln-library.com): from the presidential library in Springfield, Illinois, devoted to telling the life story of the sixteenth president.

**18.** What is the most likely cause of the following: "Our hockey team has been undefeated this season."

- a.** The other teams do not have new uniforms.
- b.** We have a new coach who works the team hard.
- c.** Some of our team members went to hockey camp over the summer.
- d.** I wore my lucky sweater to every home game.

**19.** What is wrong with the "logic" of the following statement? "How can you believe his testimony? He is a convicted felon!"

- a.** The fact that the person testifying was convicted of a crime does not mean he is lying.
- b.** A convicted felon cannot testify in a court of law.
- c.** The person speaking has a bias against criminals.
- d.** The person speaking obviously did not attend law school.

**20.** Evidence shows that the people who live in the Antarctic score higher on happiness surveys than those who live in Florida. Which is the best conclusion that can be drawn from this data?

- a.** Floridians would be happier if they moved to the Antarctic.
- b.** People in colder climates are happier than those in warmer climates.
- c.** There are only happy people in the Antarctic.
- d.** Those in the Antarctic who scored high on a happiness survey probably like snow.

**21.** Which of the following is a sound argument?

- a.** I got an A on the test. I was really tired last night, though, and I barely studied. To keep getting A's, I need to stop studying so hard.
- b.** Your car is not running well. You just tried that new mechanic when you needed an oil change. I bet he is the reason you are having car trouble.
- c.** I have not vacuumed in weeks. There is dust and dirt all over my floors, and my allergies are acting up. If I want a cleaner house, I need to vacuum more frequently.
- d.** The Boston Red Sox have not won a world series in almost one hundred years. They won the American League playoffs in 2003. The Red Sox will lose the series.



***Read the paragraph and answer the following two questions.***

I always knew I wanted to be a marine biologist. When I was six, my parents took me to an aquarium, and I was hooked. But it was in college, when I got to work on an ocean research cruise, that I decided to specialize in oceanography. The trip was sponsored by the Plankton Investigative Service, and our goal was to collect as many different types of the microscopic plants and animals as we could, in order to see what, if any, impact the increased number of fishermen had on the marine ecosystem. Our group was divided into two teams, each responsible for gathering a different type of plankton. Working with the phytoplankton, especially the bluegreen algae, was fascinating. We measured the chlorophyll in the water to determine where, and in what quantity the phytoplankton were. This worked well because the water was so clear, free of sediment and contaminants.

**22.** What is phytoplankton?

- a.** another name for chlorophyll
- b.** a microscopic plant
- c.** a microscopic animal
- d.** a type of fish

**23.** The author says her group was investigating whether more fishermen in the area of study had

- a.** a positive impact on the local economy.
- b.** depleted the supply of fish.
- c.** made more work for marine biologists.
- d.** a negative impact on the health of the surrounding waters.

**24.** You want to sell your three-year-old car and buy a new one. Which website would probably give you the best information on how to sell a used car?

- a.** [www.autotrader.com](http://www.autotrader.com): get the latest pricing and reviews for new and used cars; tips on detailing for a higher price
- b.** [www.betterbusinessbureau.org](http://www.betterbusinessbureau.org): provides free consumer and business education; consult us before you get started in your new business!
- c.** [www.newwheels.com](http://www.newwheels.com): research every make and model of Detroit's latest offerings
- d.** [www.carbuyingtips.com](http://www.carbuyingtips.com): everything you need to know before you shop for your new car

**25.** Which explanation is weakest?

- a.** Gas prices are so high that many people are not going on long trips anymore.
- b.** I can't wear my new shirt tomorrow because it is in the wash.
- c.** Jose's homework was late because it was not turned in on time.
- d.** We do not have new textbooks this year because the school budget was cut.

**26.** Which of these problems is most severe?

- a.** Your professor is sick and misses class on the morning you are supposed to take a big exam.
- b.** You lose track of your schedule and forget to study for a big exam.
- c.** You can't find one of the books you need to study for a big exam.
- d.** The big exam is harder than you thought it would be and includes a section you did not study.

**27.** What is the most important reason for evaluating information found on the Internet?

- a.** Authors who publish on the Internet are typically less skilled than those who publish in print.
- b.** Web writers are usually biased.
- c.** Anyone can publish on the Internet; there is no guarantee that what you are reading is truthful or objective.
- d.** Information found in print is almost always more accurate than that found on the Internet.

**28.** What is wrong with the following argument? “We should not change our grading system to numbers instead of letters. The next thing you know, they will take our names away and refer to us by numbers, too!”

- a.** The conclusion is too extreme.
- b.** There is nothing wrong with the argument.
- c.** Students should not have a say in the type of grading system for their schools.
- d.** It does not explain why they want to get rid of letter grades.

**29.** What is the real problem, as opposed to being the offshoots of that problem?

- a.** Your bank charges a \$40 fee for bounced checks.
- b.** You wrote a check at the grocery store, but did not have the money to cover it.
- c.** Every month, you spend more money than you earn.
- d.** Last month, you paid \$120 in bounced check charges to your bank.

**30.** Which phrase is an example of hyperbole?

- a.** In a perfect world, there would be no war.
- b.** That outfit would scare the skin off a cat.
- c.** You are not the world’s best cook.
- d.** He drives almost as fast as a Nascar driver.

<b>1.</b> a b c d	<b>11.</b> a b c d	<b>21.</b> a b c d
<b>2.</b> a b c d	<b>12.</b> a b c d	<b>22.</b> a b c d
<b>3.</b> a b c d	<b>13.</b> a b c d	<b>23.</b> a b c d
<b>4.</b> a b c d	<b>14.</b> a b c d	<b>24.</b> a b c d
<b>5.</b> a b c d	<b>15.</b> a b c d	<b>25.</b> a b c d
<b>6.</b> a b c d	<b>16.</b> a b c d	<b>26.</b> a b c d
<b>7.</b> a b c d	<b>17.</b> a b c d	<b>27.</b> a b c d
<b>8.</b> a b c d	<b>18.</b> a b c d	<b>28.</b> a b c d
<b>9.</b> a b c d	<b>19.</b> a b c d	<b>29.</b> a b c d
<b>10.</b> a b c d	<b>20.</b> a b c d	<b>30.</b> a b c d

*Table 4. Answer sheet*

<b>1. a, c, d</b> (Lesson 3)	<b>11. c.</b> (Lesson 17)	<b>21. c.</b> (Lesson 15)
<b>2. b.</b> (Lesson 6)	<b>12. c.</b> (Lesson 12)	<b>22. b.</b> (Lesson 19)
<b>3. c.</b> (Lesson 14)	<b>13. a.</b> (Lesson 18)	<b>23. d.</b> (Lesson 19)
<b>4. a.</b> (Lesson 9)	<b>14. a.</b> (Lesson 5)	<b>24. a.</b> (Lesson 7)
<b>5. b.</b> (Lesson 15)	<b>15. d.</b> (Lesson 13)	<b>25. c.</b> (Lesson 18)
<b>6. c.</b> (Lesson 4)	<b>16. c.</b> (Lesson 1)	<b>26. b.</b> (Lesson 1)
<b>7. a.</b> (Lesson 11)	<b>17. d.</b> (Lesson 8)	<b>27. c.</b> (Lesson 8)
<b>8. d.</b> (Lesson 7)	<b>18. b.</b> (Lesson 14)	<b>28. a.</b> (Lesson 13)
<b>9. c.</b> (Lesson 3)	<b>19. a.</b> (Lesson 16)	<b>29. c.</b> (Lesson 2)
<b>10. b.</b> (Lesson 16)	<b>20. d.</b> (Lesson 10)	<b>30. b.</b> (Lesson 9)

*Table 5. Key of correct answers (in table is it indicated the correct answers and numbers of the chapters/ lessons of L. Starkey book where is explained the critical thinking rules testing in every item)*

## ACTIVITY 2

### ***Group reflection: the results of poor critical thinking***

As was found by H. A. Butler et al. (Butler et al., 2012) that high developed critical thinking predicts less quantity of negative life outcomes and vice versa.

Group reflection – write on the board all possible practical consequences if people have weak critical thinking (the lecturers prepared their own list and add their propositions in the time of pause of students' brain storm). The brain storming includes two phases – advance the propositions and their assessment

Examples from teachers: If some people have poor critical thinking...

- they often became the victims of financial machinations;
- they will often change their working place;
- they will often have divorce or live in the destructive marriage;
- they will be the marionettes of political manipulators;
- they can take part in the totalitarian religious sects etc.

## ACTIVITY 3

### ***Homework + Group Discussion***

During first two contact hours leader (teacher) is reading the example from D. Myers (Myers, 1998, p. 329) about “Sleep problem” on developing critical thinking, give the questions for the essay (look 6. Example analysis for critical thinking developing of the main content). Students write an essay with their opinion at home – what in this example is resource for critical thinking development. After this on the next 2 contact hours leader initiate group discussion with the results of student's essays and read the D. Myers opinion (look Annex 3). This essay will be the part of student's portfolio.

## ACTIVITY 4

### *Brainstorming with Venn Diagram*

#### Phase 1: criticism prohibited

1. The problem - you have decided to get married and the issue of housing aroused.
2. Propose the possible solutions (to live with the husband's parents, rent an apartment ...) and fill in basic circles Venn diagram. Draw them on the board.
3. Fill the diagram intersections with advantages and disadvantages of each solution.

#### Phase 2: criticism is allowed

4. Discuss what you might have missed, which is unrealistic.
5. Taking into account the advantages and disadvantages of each solution, select the optimal one.
6. What has happened as a result?

## ACTIVITY 5

### *Making rational decision*

Your company has been selling its hammers to its distributors for €3 a piece. It costs €2.30 to manufacture each hammer. Your boss asks you for ways to decrease manufacturing costs in order to increase profits. Create a problem/solution outline to represent this scenario.

Causes	Problems (fill in as many as applicable)	Effects
	<i>Who:</i> <i>What:</i> <i>Where:</i> <i>When:</i> <i>Why:</i> <i>How:</i>	

### **Possible Solutions**

### **Possible Outcomes**

## ACTIVITY 6

### *Recognition of statistics manipulation*

Students need to divide in two groups for the use of statistics with different purposes.

Situation: The researchers found that 98% of juvenile offenders, who have committed serious crimes, regularly watch TV with scenes of violence.

Situation: The researchers found that 98% of juvenile offenders who have committed serious crimes, regularly watch TV with scenes of violence.

Task for the 1<sup>st</sup> group:

If you are a supporter of reducing violence on TV, how would you use these statistics?

Task for the 2<sup>nd</sup> group:

What would you do if you were a supporter of freedom of speech on television?

All groups will be given 10 minutes for preparation and then representatives of each group should present their point of view and discuss them with opponents.

Possible answers for this task are placed in *Annex 3*.

## ACTIVITY 7

### *The distinction between facts and opinions*

To think critically is to be able see the difference between facts and opinions because the last often are given like facts. Let us do a practical exercise.

Mark each statement as (F) of fact or (O) opinion.

- \_\_\_ 1. World War II began on September 1, 1939
- \_\_\_ 2. Cream Brylle - the most delicious dessert.
- \_\_\_ 3. I went to rest in the Carpathians in the past year.
- \_\_\_ 4. To invest in the stock market – is a bad idea.



## ACTIVITY 8

### ***Recognize rhetorical techniques***

This exercise refer to 7. Techniques of verbal and written persuasion of the main content.

Read this texts and specify to what rhetorical techniques they relate.

1. "In conclusion, let me say that voting for this candidate - is a vote for a perfect world".	Hyperbole _____
2. She is smart, intelligent and successful.	Rhetorical question _____
3. She knows how to get things done. Other candidates want to take us back to a time when jobs are scarce, people were scared and the government intervened in the lives of people. Let's not let that happen.	"The Rule of Three" _____
4. Why turn the clock back, if we can move forward to a brighter future ?	Emotional language _____

## ACTIVITY 9

### ***Dishonest dispute techniques***

This exercise refer to 7. Techniques of verbal and written persuasion of the main content.

There are the most frequently used dishonest dispute techniques:

- Ad Hominem ("against the person")
- Insult
- Extraneous circumstances
- Blame "And you yourself..."
- Flattery
- Scare tactics
- Pity

Group Work: Give examples of encounters with such techniques from your experience. Propose several ways for counteract them.

## ACTIVITY 10

### *Homework*

**Task 1.** After first 2 contact hours students at home record thoughts about today's session in their diary. After the lessons students should show it to the teachers for the formative assessment.

**Task 2.** After first 2 contact hours students at home read *3. Recommendations for critical reading and evaluating information* and *4. Recommendations for effective report writing* from main content, chose some scientific article (which will be interesting for you, each student – different article), find and copy out phrases for own phrasebook of academic / critical writing. This phrasebook will be the part of student's portfolio. After the lessons students should show it to the teachers for the formative assessment.

These assignments will be considering as a part of formative assessment.

**Task 3.** After second 2 contact hours students should write at home some elements of their PDP using their new knowledge about critical thinking. We offer students in theirs PDP to set clear, written goals for theirs future and made plans to accomplish them. They can use visual means and other skills that are the critical thinking competences to do this task effective.

These tasks will be considering like a formative and part of a summative assessment

## FURTHER READING

Myers D.G. PSYCHOLOGY. – 5th ed. – N.Y.: Worth Publishers, 1998.

Novak J. D., Cañas A. J. The Theory Underlying Concept Maps and How to Construct and Use Them Technical. Report IHMC CmapTools 2006-01 Rev 2008-01: [cmap.ihmc.us/docs/theory-of-concept-maps](http://cmap.ihmc.us/docs/theory-of-concept-maps)

Starkey L. Critical thinking skills success. - NY: LearningExpress, LLC, 2004. – 169 p.

Walbert D. (2006) Higher order thinking with Venn diagrams: [www.learnnc.org/lp/pages/2646](http://www.learnnc.org/lp/pages/2646)

## CHAPTER 4

### REFLECTIVE THINKING AND WRITING

[Introduction](#)

[Objectives](#)

[Definitions](#)

[The Models of Reflective Thinking](#)

[Using Reflection: Managing the PDP Process](#)

[Ways of Reflecting](#)

[Reflective Writing: Some Initial Guidance](#)

[Using evidence \(including feedback\)](#)

[Tips to Remember](#)

[Activities](#)

[Further reading](#)