

Thinking and questioning

Site: INASP Moodle

Course: Questioning as we learn: An introduction to critical thinking (AQHEd-SL)

Book: Thinking and questioning

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Introduction and learning outcomes

Welcome to this introductory course on evidence-based *critical thinking*! The course aims to support the development of your skills and attributes to assess problems and the information which would contribute to their solution. You will learn how to evaluate the literature available and determine sources of evidence, which will enable you to make the most of your time at university by giving you tools to question as you learn. For your future, it will help you resolve research and development problems, and make you useful and effective employees in a range of work situations, as well as successful contributors to national development.

Literature reading and evaluation calls for not just strong comprehension skills, but also critical thinking. To this end, this six-units course will show you:

- What critical thinking means and how to develop your questioning skills (Unit 1)
- How to approach different types of non-fiction text and analyse the author's purpose (Unit 2)
- How to recognize and construct arguments (Unit 3)
- How to distinguish facts from opinions, and identify cause–effect relations and fallacies (Unit 4)
- How to recognize biases and assumptions, and reflect on your own biases and assumptions (Unit 5)
- How to analyse and evaluate argumentative text and speech, by applying your learning (Unit 6)

Completing this course on the platform should take you about 5 hours per unit. After this you will be able to clarify ideas and practise the targeted skills in group discussions. Your lecturer or tutor may give you space for that in the classroom. Otherwise, you could also meet up with your fellow students on a more informal basis. We encourage you therefore to make notes of your questions that need clarifying, and prepare to raise them in the group discussion. You will also be asked to contribute your knowledge and answers to help others. Keep this in mind throughout the course: good learning starts with questions – the attribute of an inquisitive mind.

This introductory unit to the course discusses the concept and the importance of critical thinking and questioning, and invites you to practise asking the types of questions a critical thinker would ask. You will be introduced to the concept of critical thinking and find out why it is important to develop this skill, as well as learn about types of questions that trigger deeper thinking.

When you have completed this first unit, you should be able to list some key characteristics of a critical thinker, as well as ask different types of critical thinking questions depending on the purpose of one's inquiry. As is the case throughout this course, you will be supported to reflect on the key concepts you will have grasped in this unit and their relevance for your future learning.

And another way of thinking - outside the box

**HOW TO: fold a piece of paper in half
an indefinite number of times**

It is said that it
is impossible to fold
a piece of paper in half more
than eight times.

Do not listen to these LIES

Step One: Print and cut out this template



Step Two: Fold it in half

Step Three: Unfold it

'Above the fold' (1)

Terminology



Exploratory activity

Before proceeding with the course content, some notes about terminology. During the course you may encounter terms that aren't familiar to you at all or ones you have used in the past with a different meaning.

For example, take the term 'argument', which will be used in this course quite often. What different meanings of this term can you find in the dictionary? Research some online dictionaries such as:

<http://dictionary.cambridge.org/dictionary/english>

www.collinsdictionary.com/dictionary/english

<https://en.oxforddictionaries.com>

www.merriam-webster.com/dictionary

The meaning of a term is related to the context the term is used in. For example, in your daily life you may say "I had an argument with my friend" and you would mean that you had an exchange of diverging opinions, likely in a rather heated way. If a mathematician speaks about an argument he/she may mean an independent variable of a mathematical function. You will learn more about the meaning of 'argument' in the context of critical thinking later in the course. But you can look it up now in one of the online dictionaries if you are interested.

Did you know that the meaning of a term may also depend on the culture or country you live in? Ask someone in the UK to explain what a 'monitor' is and most people would likely say a computer screen. But ask someone in Africa and many people would say that it's a quite large lizard.



Few people in Europe will know this name for a lizard. Check the dictionaries to see which meanings for 'monitor' they list.

And would you have known that the word 'rocket' is also used for a type of green salad which is currently quite popular in Europe? The cartoon below doesn't work if you didn't know that.



Comic taken from LukeSurl.com

(licensed under CC BY-NC-SA 2.0 UK)

As you read on, remember to use the course glossary and a dictionary if you don't understand the meaning of a word in the course context. If you still have questions about the meaning of a word afterwards, note it down and try to discuss its meaning with your fellow students.

Question: Why are chemists good in problem-solving?

Reveal

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Answer: They have all the solutions.

By the way, playing with different meanings of a word is called a 'pun'.

What does critical thinking mean?



Reflective activity

Think about the term 'critical thinking' and promptly write down what comes to your mind in connection with it. What have you heard or read about it? What do you think it means to think critically?

- Write your thoughts down. Use the discussion forum if you'd like to share your thoughts with your fellow students. Communicating with your fellow students through the forum can add to your and your fellow students' learning.

The picture below demonstrates an alternative method of capturing thoughts: Mind mapping. In this example, Jean-Louis Zimmerman captured thoughts around critical thinking. Ideas that came up triggered further thoughts related to the initial idea. Each idea is noted down as a keyword and relations between the ideas are depicted. Mind maps don't need to be created in such a professional way as in this picture in order to be useful. You can try the method yourself and see whether it helps you to capture your thoughts.



Becoming an outstanding critical thinker mind map (1)

Does critical thinking pay off?

Read the following text about critical thinking, and identify any terms that you are not familiar with. Look the terms up in the dictionary. Your lecturer might give some space for discussion after you have completed this unit.

While reading the text, try to answer these questions and make notes:

- Who needs to think critically and in which situations?
- What are the benefits of critical thinking?



Reading activity

Critical thinking has become something of a buzzword in the last two to three decades or so. Not only philosophers and psychologists, but also employers, educators and policymakers are insistently claiming that critical thinking is a **must-have** skill in the 21st century.

How do we know whether what reaches us via the internet can be taken at face value? How do we know that someone is not trying to fool us, let us believe something that we should not believe, get us to do something that we would not do if we knew better? A significant component of the answer to these questions is: because we can think for ourselves, because we can learn critical thinking.

One needs not be very observant to notice that this interest in critical thinking roughly coincides with the sharp increase in access to a wealth of data and information made available to us by the internet, which has had a huge impact on communication, culture and learning.

According to Robert H. Ennis, a professor of philosophy of education at the University of Illinois, US, critical thinking is reasonable reflective thinking focused on deciding what to believe or do. Educator Diane Halper believes: “Critical thinking is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed – the kind of thinking involved in solving problems, reaching conclusions, calculating likelihoods, and making decisions, when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task.” (1)

The Delphi Report entitled ‘Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction’ states: “We understand critical thinking to be purposeful, self-regulatory judgment which results in **interpretation, analysis, evaluation, and inference** ... [Critical thinking] is essential as a tool of inquiry.” (2)

According to promoters of the ‘Reading and Writing for Critical Thinking’ educational project (3), critical thinkers view basic understanding of information as the starting point, rather than the end point, of learning; the term 'critical thinking' implies that students go beyond the active search for information and associate what they have learned with their own experience, compare it to other works, question its **veracity** or authority, examine the logic of its argument, derive implications from it, construct new examples of it, imagine solutions to problems it poses, examine the causes and effects it demonstrates, and so on.



Note your thoughts down. Post your ideas in the discussion forum if you'd like to share them with your fellow students.

How do I think?



Reflective activity

Reflect on your schooling experiences and the things you have learned so far in your life. To what extent have you been thinking critically? What examples would you share with someone as evidence of your answer to the previous question? Try to remember a situation when you either used your critical thinking skills well or you feel in hindsight you should have thought more critically. Jot down your answers for later reference.



Note your thoughts down. Post your ideas in the discussion forum if you'd like to share them with your fellow students.

Who is a critical thinker?

**A man who uses force is
afraid of reasoning
(African Proverb)**

**The one chased away with a club
comes back, but the one chased
away with reason does not.
(South African Proverb)**

These African proverbs express the wisdom that reasoning – or thinking and arguing about something in a logical, sensible way – is a powerful tool but not everyone uses it. Humans are not born critical thinkers but can learn the skills which can make them become critical thinkers.

A study by North Carolina State University researchers found that teaching critical thinking skills in a humanities course significantly reduced student beliefs in 'pseudoscience' that is unsupported by facts. "Given the national discussion of 'fake news', it's clear that critical thinking – and classes that teach critical thinking – are more important than ever," says Anne McLaughlin, an associate professor of psychology at NC State and co-author of the paper describing the work (1).

The 'Consensus statement regarding critical thinking and the ideal critical thinker' in the Delphi Report we quoted earlier lists some characteristics and skills the ideal critical thinker has. The following activity will help you to compare your own thinking with the behaviour of an ideal critical thinker.



Reflective activity

Go back to your notes of the previous activity where you reflected on how you think. Compare the situation you had chosen as an example for critical thinking (or the lack of it) and check whether your behaviour in the situation could be described by the following attributes which the Delphi report lists for an ideal critical thinker.

- Open-minded
- Flexible
- Honest in facing personal biases
- Prudent in making judgments
- Willing to reconsider
- Diligent in seeking relevant information

- Reasonable in the selection of criteria
- Focused in inquiry

Now pause and assess yourself as a critical thinker: on a scale from 1 to 10, where 1 means beginner, and 10 means expert, where would you say you are now in terms of each of the above characteristics of the ideal critical thinker? Based on what evidence do you assess yourself like that?

Has this activity changed your mind about your thinking skills?



Note your thoughts down. Post your ideas in the discussion forum if you'd like to share them with your fellow students.

To conclude, critical thinking has been defined as a set of skills, the process of using those skills, a tool, and an aim of education. At a basic level, critical thinking consists of making informed, evaluative judgments about claims and arguments, the main strands of critical thinking being analysis, interpretation, evaluation, and further argument.

A description of critical thinking

According to Insight Assessment, “Critical thinking is sceptical without being cynical. It is open-minded without being wishy-washy. It is analytical without being nit-picky. Critical thinking can be decisive without being stubborn, evaluative without being judgmental and forceful without being opinionated.” This set of characteristics has been transferred into a table format as shown below.

Critical thinking is ... Critical thinking is not ...

Sceptical	Cynical
Open-minded	Wishy-washy
Analytical	Nit-picky
Decisive	Stubborn
Evaluative	Judgmental
Forceful	Opinionated



Exploratory activity

Download a handout of this table. Use information from your reading above and from the video below to add at least 10 more characteristics and non-characteristics of critical thinking to the table. You may not find consistently such pairings like above, but should try and work out for yourself the opposite of what you do find.

E.g. If critical thinking is a must-have skill, then critical thinking cannot be an unnecessary/ inessential/ unimportant skill. Therefore, write ‘a must-have skill’ in the first column, and ‘an unnecessary/ inessential/ unimportant skill’ in the second column.

Examining the Principles of Critical Thinking



Video 'Examining the Principles of Critical Thinking' (1)

Keep your table; your lecturer may give you some space to discuss the characteristics and non-characteristics with your fellow students.

Thinking about questions



Exploratory activity

Go back to the previous pages and note down at least five questions you can find in the headings, the text and the video.

Once done, you can compare what you found with the sample below.

Reveal

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What does critical thinking mean?

What have you heard or read about critical thinking?

Does critical thinking pay off?

Who needs to think critically and in which situations?

How do we know that someone is not trying to fool us by having us believe something that we should not, or get us to do something that we would not if we knew better?

How do I think?

What examples would you share with someone as evidence that you have been thinking critically?

Who is a critical thinker?

Has this activity changed your mind about your thinking skills?

What would upset evolutionary theory?

What will increase our understanding? Dismissing the value of reason? Or looking honestly at our flaws?



Reflective activity

Note down two further questions **you** would like to ask about critical thinking. What is the purpose of your questions – why would you like to ask these questions? Once done, you can reveal some questions a student from an university in Tanzania was asking when going through this course.

Reveal

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The Tanzanian student posted the following questions during a course in 2018:

Is there any reason to doubt that one of the biggest barriers to critical thinking is unwillingness to see complex issues in anything other than Black and White terms?

What could happen if every person on earth will start to think critically?

We feel that are very interesting questions that could start a good discussion about critical thinking. The first question also made me feel that I would like to know more about why we often tend to think in 'Black and White' terms and how that influences our ability of solving complex problems.

Did you find it easy or hard to find meaningful questions? Please be assured you will get more practice while going through the course.

Questioning

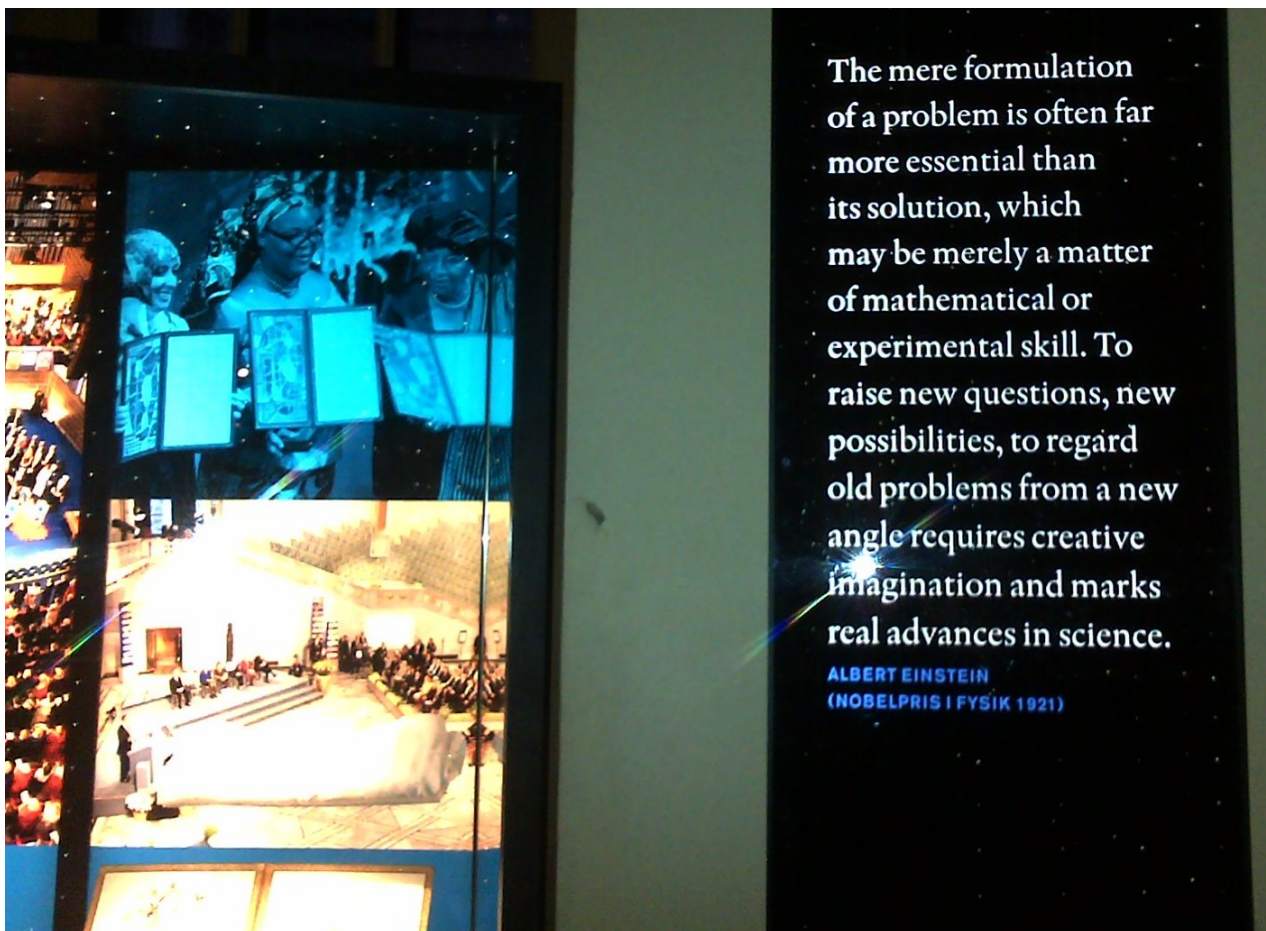


Reading activity

Read the text below and make notes of the most important ideas in it. Take notice of how critical thinkers are encouraged to engage with information and the example questions.

Developing our thinking so that we can critically handle information requires active engagement in exploration, which comes primarily with questioning as we interact with that information, with what we have read or heard. Critical thinking aims to place us firmly in control of information so we can challenge, integrate, reconfigure, adapt, or dismiss it. This occurs when we ask ourselves questions as: What does this information mean to me? Is it helpful? Is it reliable? How can I use it? How does it compare to what I already know? How do I feel about these ideas? What might be the consequences of acting on these ideas for me and for others?

Richard Paul and Linda Elder of the Foundation for Critical Thinking developed 'A Thinker's Guide to The Art of Socratic Questioning' (1), in which they distinguish between different types of questions a critical thinker should ask. **These question types are explained over the next few pages.**



Albert Einstein quote about raising questions as scientist
(Photograph taken in the Nobel museum in Stockholm)

1) Questions of clarification

Clarification questions help you to get a clearer understanding of what is meant by what is stated. Such questions may ask for further explanations or relevant examples so that the intended meaning is not misinterpreted, and so that you understand the main issue and how it relates to what is being discussed. Some examples of such questions are:

- a. What do you mean by this? Could you explain (further)? Could you say it in other words/differently?
- b. What would be a relevant example of this? Is this a relevant example (that I am offering)?
- c. What is the main point here? Do you mean this or do you mean that?
- d. How would you sum up what has been said?



Q&A activity

In this Question and Answer (Q&A) activity you are asked to compose a question to a given answer statement. This means your question which you are building could lead to the answer provided. For example:

The **given answer** is: *By 'reasoning', I mean thinking and arguing about something in a logical, sensible way.*

A suitable question you might compose would be: *What do you mean when you say 'reasoning'? or Could you please explain what you mean by 'reasoning'?*

Pay attention that you compose a question that is a clarification question.

Try composing a clarification question that could lead to the answer below:

Answer: *When I say 'that's not rocket science', I mean the subject is not very complex and actually quite easy to understand.*

You can find a sample question when clicking on reveal.

Reveal

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A possible question which leads to the clarifying answer above could be:

Could you please explain what you mean when you say 'that's not rocket science'?

2) Questions that probe assumptions

Questions that probe assumptions are intended to help you understand what someone takes for granted, without spelling it out, what you are expected to accept without proof. Some examples of such questions are:

- a. What are you assuming? What is the author of this text assuming?
- b. Do I understand you correctly that you are assuming this?
- c. How would you justify your assumption?
- d. What makes you think your assumption holds here?



Q&A activity

Imagine this situation: Your lecturer mentioned in a lesson that she finds it more important than ever that her students become critical thinkers.

What question could you ask your lecturer to lead to the following answer? Compose a question that probes assumptions.

Answer: *Yes, I assume critical thinking skills must be even more important for young people today than in the past as we have access to so much more information and often don't know the source of the information.*

You can find a sample question when clicking on reveal.

Reveal

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A possible question leading to the answer above which probes an assumption could be:

When you are saying that you find it more than ever important that we students become critical thinkers, do you assume that's more important for students today than in the past?

3) Questions that probe reasons and evidence

Questions that probe reasons and evidence are asked to understand the adequacy, the validity of those reasons and the relevance and reliability of the evidence. Some examples of such questions would be:

- a. What are your reasons for saying that? Why did you say that?
- b. Are those reasons adequate? How do we know?
- c. What led you to believe that? Why do you think that is true?
- d. What evidence do you have for that? How is it relevant? Is it reliable?
- e. Is there reason to doubt that evidence? Who is in a position to know if so?
- f. What information would make you change your mind?
- g. What would you say to someone who said the opposite of what you are saying?



Q&A activity

Imagine this situation: You are arguing with your fellow student Aba about the value of critical thinking. Aba says that 'critical thinking' is just a new buzz-word in education and not a skill which helps students to finish their studies successfully and find good employment.

Which question could you ask that leads to the following answer from Aba? Compose a question that probes reasons and evidence.

Answer: *Hm, I was just repeating what other students say. I guess I should ask them why they believe that.*

You can find a sample question when clicking on reveal.

Reveal

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Possible questions leading to the answer above which probe reason and evidence could be:

What led you believe that? What evidence do you have for that?

4) Questions about viewpoints

Questions about viewpoints are asked to clarify the perspective from which someone looks at the issue under discussion. People from different groups may approach the issue differently, given their background and experience. Some examples of such questions are:

- a. What perspective are you approaching this issue from? Why have you chosen this perspective?
- b. Could anyone see this another way? What other approaches could there be? How would someone from a different background approach this issue?
- c. What would someone who disagrees with you say?
- d. How could you answer the objection that someone with a different perspective would make?
- e. How are these viewpoints different / similar?



Q&A activity

Imagine this situation: You are discussing the impact of climate change with the local politician X who happens to have been working as a scientist. When X says that we have the responsibility to take into account the impact of global warming on our environment, you are wondering whether X speaks as politician or scientist.

Compose a question about viewpoints that could lead to the answer below:

Answer: *I don't think scientists and politicians need to come from different points of view. There are many politicians who studied science and I'm actually a scientist who is engaged in politics.*

You can find a sample question when clicking on reveal.

Reveal

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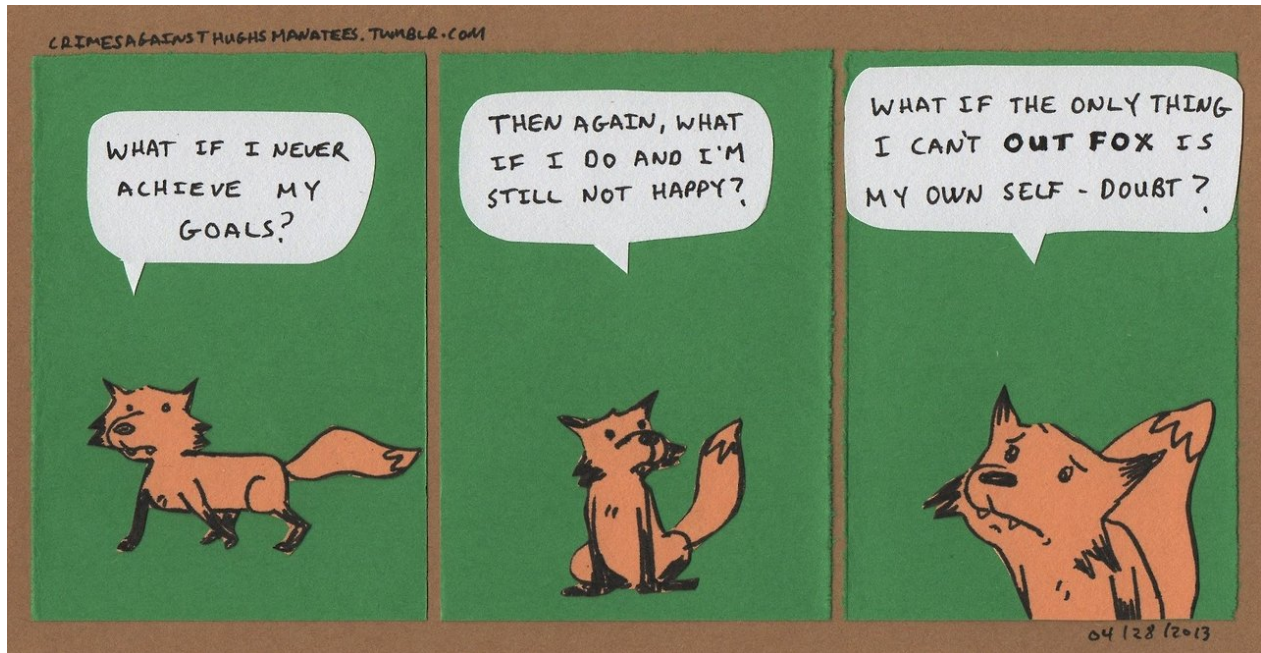
A possible question which leads to the answer above which clarifies the perspective someone discusses an issue from could be:

When you are discussing this issue, are you coming from the viewpoint of a scientist or a politician?

5) Questions that probe implications and consequence

Questions that probe implications and consequence are asked in order to weigh up the conclusion that could be drawn and the effect that could result from something, when these are not made explicit. Some examples of such questions are:

- a. What are you implying by that?
- b. If that happened, what else would happen as a result and why?
- c. What effect would that have? Would that necessarily happen or only probably happen?
- d. If this and this are the case, then what else must also be true?



Comic from Crimes Against Hugh's Manatees by Hugh D. Crawford (1)

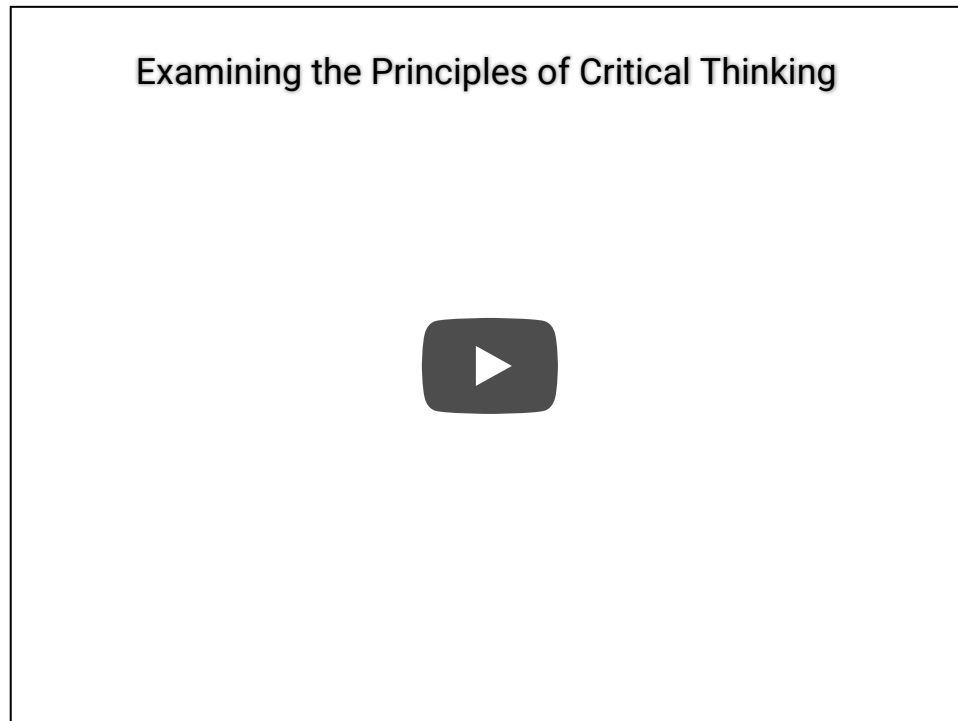
Ask your own questions!



Reading activity

Do you remember the video you watched about critical thinking and what it suggested that critical thinking comprises? Imagine you could interact with the presenter. Ask him at least one relevant and specific question per question type. Can you recall the five question types? If you can't remember all of them, go back to the previous pages.

Then watch the video again to help you recall what the presenter explained.



Once done, you can reveal some examples below. Are your questions similar to the examples, or were you interested in very different things?

Reveal

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Question examples

Questions of clarification

- Could you explain your choice of proverb to introduce your presentation (Give someone a fish ...)?
- Am I correct in understanding that you are saying critical thinking is a learning skill? Could you further explain your point in establishing a relationship between learning skills and critical thinking?

Questions that probe assumptions

- Are you assuming that critical thinking has to do with all aspects of one's life?
- Are you assuming that critical thinking is essential for all learners, regardless of their age?

Questions that probe reasons and evidence

- What led you to say that critical thinkers tend not to cherish beliefs?
- What evidence is there that wanting to be better at thinking requires minimising biases from culture and upbringing? Aren't the proponents of critical thinking themselves influenced by their culture and upbringing? How do we know they managed to minimise those influences before they came to the conclusion that critical thinking is valuable?

Questions about viewpoints

- You seem to be approaching the issue of critical thinking from the perspective of an educator or community developer. What would be the perspective taken by a parent or community leader?
- How would a deeply religious person respond to your statement that critical thinkers tend not to cherish beliefs?

Questions that probe implications and consequence

- Are you implying that if reasoning was always based on sound consistent logic, we would live better? Where does that leave the phrase 'gut feeling', and emotions in general?
- If we accept that critical thinkers tend not to cherish beliefs, should one also doubt their belief in the significance of critical thinking itself?

What have I learned?



Reflective activity & discussion preparation

Reflect on your learning in this unit. Go over your notes, and answer the questions below:

- How would you describe your learning experience?
- Did you find the tasks easy or difficult or just right?
- What do you know now that you did not know at the beginning of this unit? Can you think of at least a couple of things?
- How do you expect your new learning to impact your future approach to learning?



Comic from Crimes Against Hugh's Manatees by Hugh D. Crawford (1)

Write down any questions that haven't been answered so that you can clarify them with your fellow students or in class with your tutor. **They** are surely happy to discuss any issues with you!



Note your thoughts down. Post your ideas in the discussion forum if you'd like to share them with your fellow students.

References and further resources

References by course pages

Introduction and learning outcomes

1. Comic 'Above the fold' by Luke Surl, <http://www.lukesurl.com/archives/comic/302-above-the-fold>, licensed under CC BY-NC-SA 4.0, retrieved 14 March 2018

Terminology

1. Comic 'Rocket in yer pocket' by Luke Surl, <http://www.lukesurl.com/archives/comic/212-rocket-in-yer-pocket>, licensed under CC BY-NC-SA 4.0, retrieved 14 March 2018

What does critical thinking mean?

1. Image 'becoming-an-outstanding-critical-thinker-mind-map_0' by jean-louis Zimmerman, https://www.flickr.com/photos/jeanlouis_zimmermann/3042615083, licensed under CC BY 2.0, retrieved from flickr 14 March 2018

Does critical thinking pay off?

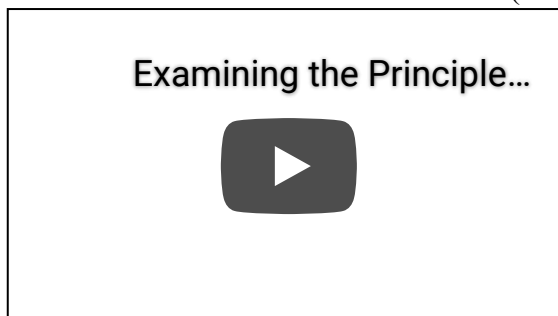
1. Halpern, D. (2003). 'Thought and Knowledge: An Introduction to Critical Thinking', Fourth Edition, Lawrence Erlbaum Associates, New Jersey, p. 6.
2. Facione, P.A. (1990). 'Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. Research findings and recommendations' (Delphi report), available at <https://eric.ed.gov/?id=ED315423>, Table 1, p. 3 (accessed 15 Jan 2017).
3. Steele, J.L, Meredith, K.S., Temple, C. (1998). 'Methods for promoting critical thinking, Guidebook II', prepared for the Reading and Writing for Critical Thinking project (unpublished).

Who is a critical thinker?

1. <https://news.ncsu.edu/2017/03/critical-pseudoscience-2017>

A description of critical thinking

1. Video 'Examining the Principles of Critical Thinking' by LogicinspiresLiberty (2011), licensed under Creative Commons Attribution license (reuse allowed), retrieved 26/01/2018



Questioning

1. Paul, R; Elder, L. (2007). 'The Thinker's Guide to the Art of Socratic Questioning.' The Foundation for Critical Thinking, ISBN-13 978-0944583319.

Questions that probe implications and consequence

1. Comic from Crimes Against Hugh's Manatees by Hugh D. Crawford, <http://crimesagainsthughsmanatees.tumblr.com/image/160103114822>, licensed under CC BY-NC-ND 3.0, retrieved 14 March 2018

What have I learned?

1. Comic from Crimes Against Hugh's Manatees by Hugh D. Crawford, <http://crimesagainsthughsmanatees.tumblr.com/image/781672684>, licensed under CC BY-NC-ND 3.0, retrieved 14 March 2018

Further resources

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2. Ennis, R.H. (2011). 'The nature of critical thinking: An outline of critical thinking dispositions and abilities originally presented at the Sixth International Conference on Thinking at MIT, Cambridge, MA, July 1994, available at http://faculty.education.illinois.edu/rhennis/documents/TheNatureofCriticalThinking_51711_000.pdf (accessed 20 January 2017).
3. Department for Children, Education, Lifelong Learning and Skills, Welsh Assembly Government (2008). Skills framework for 3 to 19-year-olds in Wales
4. www.criticalthinking.org/pages/the-critical-mind-is-a-questioning-mind/481
5. www.edutopia.org/resource/40-student-reflection-questions-download
6. Facione, P.A., 'Critical thinking: What is it and why it counts', Insight Assessment, available at <https://www.insightassessment.com/Resources/Importance-of-Critical-Thinking/Ten-Positive-Examples-of-Critical-Thinking/Critical-Thinking-What-It-Is-and-Why-It-Counts> (accessed 20 January 2018).