Critical thinking: Knowledge, skills and attitudes

Self evaluation

For each of the following statements, rate your responses as outlined below. Note that 'strongly disagree' carries no score.

4 = 'strongly agree' 3 = 'agree', 2 = 'sort of agree', 1 = 'disagree' 0 = 'strongly disagree'

	Rating 4–0
1. I feel comfortable pointing out potential weaknesses in the work of experts	
2. I can remain focused on the exact requirements of an activity	
3. I know the different meanings of the word 'argument' in critical thinking	
4. I can analyse the structure of an argument	
5. I can offer criticism without feeling this makes me a bad person	
6. I know what is meant by a line of reasoning	
7. I am aware of how my current beliefs might prejudice fair consideration of an issue	
8. I am patient in identifying the line of reasoning in an argument	
9. I am good at recognising the signals used to indicate stages in an argument	
10. I find it easy to separate key points from other material	
11. I am very patient in going over the facts in order to reach an accurate view	
12. I am good at identifying unfair techniques used to persuade readers	
13. I am good at reading between the lines	
14. I find it easy to evaluate the evidence to support a point of view	
15. I usually pay attention to small details	
16. I find it easy to weigh up different points of view fairly	
17. If I am not sure about something, I will research to find out more	
18. I can present my own arguments clearly	
19. I understand how to structure an argument	
20. I can tell descriptive writing from analytical writing	
21. I can spot inconsistencies in an argument easily	
22. I am good at identifying patterns	
23. I am aware of how my own up-bringing might prejudice fair consideration of an issue	
24. I know how to evaluate source materials	
25. I understand why ambiguous language is often used in research papers	
Score out of 100	

Interpreting your score

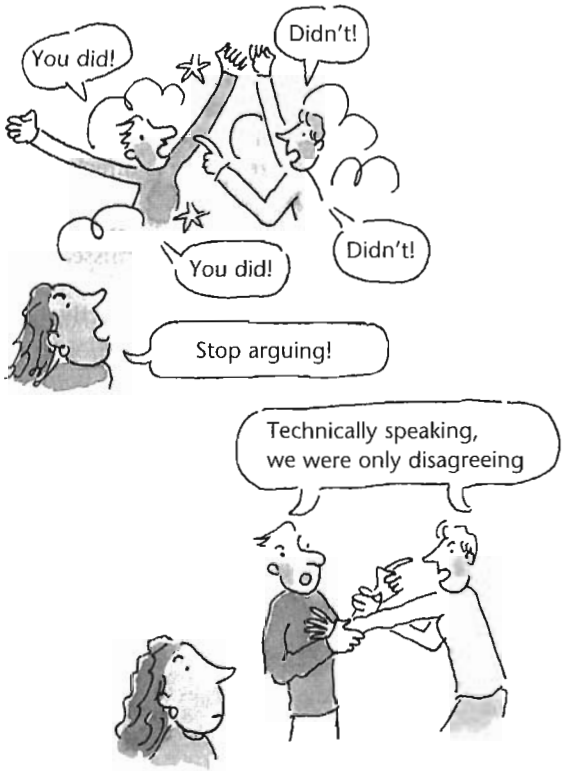
Going through the questionnaire may have raised some questions about what you know or don't know about critical thinking. The lower the score, the more likely you are to need to develop your critical thinking skills. A score over 75 suggests you are very confident about your critical thinking ability. It is worth checking this against objective feedback such as from your tutors or colleagues. If your score is less than 100, there is still room for improvement! If your score is under 45 and remains so after completing the book, you may find it helpful to speak to an academic counsellor, your tutor or a supervisor to root out the difficulty.

Argument and disagreement

Argument is not the same as disagreement. You can disagree with someone else's position without pointing out why you disagree or persuading them to think differently. In critical thinking, there is a distinction between a position, an agreement, a disagreement, and an argument.

Key terms

- **Position** A point of view.
- **Agreement** To concur with some-one else's point of view.
- **Disagreement** To hold a different point of view from someone else.
- **Argument** Using reasons to support a point of view, so that known or unknown audiences may be persuaded to agree. An argument may include disagreement, but is more than simply disagreement if it is based on reasons.



Example

- *Position*: Genetic engineering really worries me. I don't think it should be allowed. [No reasons are given so this is simply a position.]

- *Agreement 1*: I don't know much about genetic engineering but I agree with you.

Or

- *Agreement 2*: I know a lot about this subject and I agree with you. [No reasons are given so these are simply agreements.]

- *Disagreement*: That doesn't convince me. I think genetic engineering is really exciting. [No reasons are given so this is simply a disagreement.]

- *Argument 1*: Genetic engineering should be curtailed because there hasn't been sufficient research into what happens when new varieties are created without natural predators to hold them in check.

Or

- *Argument 2*: The possibilities for improving health and longevity through genetic engineering offer hope to sufferers of many conditions that currently don't have an effective cure. We should be pushing ahead to help these people as quickly as we can.

The arguments above use reasons for the position held, to persuade others to the point of view. Note that these are simple arguments: they don't have extended lines of reasoning and they don't present any evidence to support their case. Without these, the power of the argument would have to depend on other factors such as tone of voice, body language, or insider knowledge about the listener, such as that they had a vested interest in the outcome.

Activity: Argument and disagreement

Identify for each whether the author is presenting:

A an argument, and if so, say why;
B a disagreement.

Passage 4.1

Bilingualism and multilingualism confer many benefits. Speakers of more than one language have a better understanding of how languages are structured because they can compare across two different systems. People who speak only one language lack this essential point of reference. In many cases, a second language can help people to have a better understanding and appreciation of their first language.

A **B**

Passage 4.2

Complementary therapies are an increasingly popular supplement to other forms of treatment. Those who use these therapies argue that treatments such as reflexology, homeopathy and shiatsu complement the care provided by the medical profession. Indeed, some people claim that these therapies are more effective than traditional medicines. Anecdotal cases of miraculous cures abound and there are those who believe such methods can compete on equal terms with medical approaches. This just isn't convincing.

A **B**

Passage 4.3

Several young people die each year training for the construction trades. Legislation is in place to cover health and safety at work, but some employers argue that this is too expensive to implement and onerous to monitor. They say that young people are not responsible enough at work and that there is nothing further they can do to prevent their deaths. That cannot be a good argument.

A **B**

Passage 4.4

People are less politically aware now than they have been at any time in the past. For hundreds of years, people took great personal risks to fight for causes that would benefit other people more than themselves. This rarely happens today. As late as the 1980s, there were frequent rallies with people in one country demonstrating to show solidarity with people elsewhere. Now, rallies are more likely to be for personal gain such as better salaries or student grants rather than for political issues of wider application. Even low risk activities such as voting in elections attract low turn-outs.

A **B**

Passage 4.5

Sea-levels have risen and fallen for generations, as have temperatures. Research suggests that global warming, if it is indeed occurring, is primarily the result of natural changes in the earth's temperature and the effects of solar winds. It is now claimed that industrialisation and the burning of hydro-carbons have little effect upon climatic change. My contention is that arguments against global warming are dangerous.

A **B**

Passage 4.6

I cannot agree with people who say that smacking children does them no harm. Of course it harms them, both physically and emotionally. Hitting another person is assault and it would not be tolerated against an adult. Many adults have no sense of the cruelty of smacking precisely because they were smacked themselves as children and erroneously regard this as normal. They then go on to assault other vulnerable people, perpetuating a vicious cycle.

A **B**

Answers on p. 62.

Non-arguments: Description

Descriptions

Descriptions give an account of *how* something is done, or *what* something is like. They do not give reasoned accounts of how or why something occurred nor do they evaluate outcomes. In reports and academic writing, description should be factual, accurate and free of value judgements. Description is sometimes confused with critical analysis as both can investigate an issue in detail. Descriptive detail is not intended to persuade to a point of view but aims, rather, to give the audience a more thorough impression of the item or issue being described.

Example

The solution was placed in a test-tube and heated to 35° centigrade. Small amounts of yellow vapour were emitted. These were odourless. Forty millilitres of water were added to the solution, which was then heated until it began to boil. This time, grey steam was emitted. Water droplets gathered on the side of the test-tube.

This describes the steps taken in an experiment. Careful description of methodological procedures is an important part of writing up any kind of experimental research. No reasons are given for what happened. That critical analysis of the results would be in a separate part of the report.

Example

The painting depicts several figures gathered around a cottage and in the fields. These figures are dressed in peasant dress. All of them are located in the shadows either of the house or of the trees. It is not possible to make out any individual features on their faces or in their clothing. By contrast, the figures of the noblemen who commissioned the painting are dressed in fine and individualised apparel. These figures are all located in the foreground of the painting, in full sunshine, and their facial features are clearly distinguishable.

This passage describes some salient features of a landscape painting. The details that the author has chosen to select suggest a point of view. However, this is not made explicit. If a conclusion was added, these details might provide useful propositions to support an argument about the way rich and poor people are depicted differently in art at a particular time and place. However, the passage does not contain a conclusion and so is a description rather than an argument.

Example

Usually, when people see an object that is familiar to them, such as an elephant, a tree, a bowl, a computer, they grasp immediately what it is. They recognise the overall pattern that the object makes and don't need to work out from other sensory information such as sounds, smell and colour, what the whole object might be. However, people with a condition known as visual agnosia cannot see a whole pattern in this way: they cannot recognise objects visually. If they traced the outline of the object with their hand, they might recognise an elephant, but they can't see an elephant. They can see, and they know they are seeing something, but they can't see an elephant.

In this instance, the author is describing what the condition of visual agnosia is like. The passage is a report of the facts, as far as they were known at the time of writing. The author is not trying to persuade the audience to a point of view. You can check this by looking through the passage for an argument and reasons to support it. The word 'however', which is often associated with a change in the direction of an argument, is used here to indicate a change in the direction of the description of how vision works.

Non-arguments: Explanations and summaries

Non-arguments can look like arguments, especially if they:

- result in a final conclusion;
- use the same signal words as an argument in order to help the flow of the writing.

Explanations

Explanations can appear to have the structure of an argument. They may include statements and reasons, leading to a final conclusion, and be introduced by signal words similar to those used for arguments. However, explanations do not attempt to persuade the audience to a point of view. They are used to:

- account for why or how something occurs;
- draw out the meaning of a theory, argument or other message.

Example

It was found that many drivers become drowsy when travelling and that long hours at the wheel were a major cause of accidents. As a result, more stopping places were set up along motorways to enable drivers to take a break.

The above example explains why more stopping places were set up along motorways.

Example

The children ate the mushrooms because they looked similar to those found in supermarkets and on the dinner table. They hadn't been taught to discriminate between safe and dangerous fungi and hadn't been told not to eat mushrooms found in hedgerows.

The above example explains why children ate dangerous mushrooms. If there were an additional sentence, such as 'therefore we need to educate children about fungi', this would become an argument, and the explanation would become a reason.

Summaries

Summaries are reduced versions of longer messages or texts. Typically, a summary repeats the key points as a reminder of what has been said already, drawing attention to the most important aspects. A conclusion may include a summary of what has been said already. New material is not usually introduced in a summary.

In the example below, the text is a list of instructions for making a cake. It does not constitute an argument. The final sentence is merely a summary of what has already been stated. The word 'therefore', which often indicates the conclusion of an argument, here simply introduces the final summary.

Example

For this cake, you need equal weights of self-raising flour, margarine and sugar. Add one egg for approximately each 50 grams of flour. Place all the ingredients in a bowl and beat furiously for three minutes. Blend the ingredients well. Pour into a greased tin and cook in the oven at 190°C for 20 mins until it is risen, golden brown and coming away from the sides of the tin. Different ovens may require different timings. Leave to cool before adding decoration such as jam and cream. Therefore, to make the cake, simply buy the ingredients, mix well, cook at 190°C, leave to cool and decorate to taste.

The passage below is a summary of Passage 3.18 on p. 45.

Example

Csikszentmihalyi argues that there is unhappiness around because we do not focus enough on how we want the world to be. Because of this, we act selfishly and focus on short-term gains, ignoring the longer-term consequences for other people and the environment. His answer is to live more in harmony with the wider world around us.

Activity: What type of message?

Read the passages below, and identify whether each is an example of an argument, a summary, an explanation or a description. How do you know?

Passage 4.7

The solar system is an inhospitable place not just for humans but also for machines. Despite this, over 8000 satellites and spacecraft were launched into space from more than 30 countries between 1957 and 2004. Over 350 people have hurtled through space, not all returning to earth. Launch sites based near the equator, such as that at Kourou in Guyana, enable rockets to make best use of the earth's rotation.

Passage 4.8

New-born babies may lack the capacity to monitor their own breathing and body-temperature during the first three months of life. Babies who sleep alongside their mothers could benefit from learning to regulate their breathing and sleeping, following the rhythm of the parent. These babies wake more frequently than those who sleep alone. Moreover, mothers who sleep next to their babies are better able to monitor their child for movement during the night. Consequently, it may be safer for new-born babies to sleep with their parents.

Passage 4.9

The article outlined the difference between individual yawns and infectious yawning. It referred particularly to research by Professor Platek which suggests that only humans and great apes yawn sympathetically. The article went on to say that people who yawn more easily in response to other people's yawns are also more likely to be good at inferring other people's states of mind. Finally, the article indicates some social benefits of yawning, suggesting that contagious yawning might have helped groups to synchronise their behaviour.

Passage 4.10

The village was located near the outer reaches of the city. The city was starting to encroach upon it, swallowing it up, road by road. It would not be long before the village disappeared altogether, to become part of the huge conurbation forming on the Eastern seaboard. To the west, hills enclosed the village, trapping it between the city and the mountains beyond. A single road led out from the city, through the village and into the mountains.

Passage 4.11

Both of the toy mice were the same size and shape so the dog was confused. Although one mouse was red and one was blue, Misty was unable to tell which mouse was his toy simply by looking. Like other dogs, he needed to sniff them both, using his sense of smell to tell them apart, because he couldn't discriminate between different colours.

Passage 4.12

Shakespeare's *Romeo and Juliet* is set in Verona in Italy. At the beginning of the play, Romeo is pining for another young woman, but quickly falls for Juliet at a ball. Although their two families are hostile to each other, Romeo and Juliet enlist the services of their friends and a friar to bring about their marriage. Unfortunately, in a tragic turn of events, they each kill themselves, believing the other to be already dead.

Answers on p. 62.

Passage 4.13

There were many reasons why the student was an hour late for the seminar. First of all, a pan caught fire, causing a minor disaster in his kitchen. It took twenty minutes to restore order. Then, he couldn't find his housekeys. That wasted another ten minutes of his time. Then, just as he closed the door behind him, the postwoman arrived, saying there was a parcel to be signed for. Her pen didn't work which held them up further. Finally, of course, he had to find his keys, which had once more slipped to the bottom of his bag, in order to re-open the door and place the letter on the table.

Passage 4.14

It was not until 2003 that the first Ice Age engravings of horses, red deer and bison were discovered at Cresswell Crags in Nottinghamshire, England. However, the oversight occurred partly because it was assumed that such work was not to be found in Britain. Indeed, in the initial survey of the cave, the experts did not notice the art that surrounded them.

Passage 4.15

The bas relief images of horses, bisons and red deer found in Cresswell Crags, England, bear remarkable similarities to those found in Germany. It is unlikely that two separate cultures would have produced drawing of such similarity if there were not links between them. This suggests that there were greater cultural links between continental Europe and Britain during the Ice Age than was formerly believed.

Passage 4.16

Recently, Ice Age specialists were excited to find evidence of some cultural links between Ice Age peoples across Europe. On a return visit to Cresswell Crags in England, they found images of horses, bison, and red deer similar to those already found in Germany. There is much controversy about other figures found on cave walls, which some experts believe to be images of dancing women, whereas others remain unconvinced.

Answers on page 62.

Distinguishing argument from other material

Extraneous material

Usually, arguments are not provided separately from other material. They may be surrounded by:

- introductions
- descriptions
- explanations
- background information
- summaries
- other extraneous materials.

Example

Satellite imaging has been used to match water temperature swirls drawn on a map of ocean currents made as long ago as 1539. The map was produced by a Swedish cartographer, Olaus Magnus. It had been thought that the rounded swirls, located between pictures of serpents and sea monsters, were there for purely artistic reasons. However, the size, shape and location of the swirls matches changes in water temperature too closely for this to be a coincidence. The map is likely to be an accurate representation of the ocean eddy current found to the south and east of Iceland. It is believed that the map-maker collected his information from German mariners of the Hanseatic League.

Analysis of the example

The overall argument in the example above is that an old sea map is likely to be an accurate chart of part of the ocean.

Description The passage opens with a description of the method used to test the map: *Satellite imaging has been used to match water temperature swirls drawn on a map of ocean currents . . .*

Background information *a map of ocean currents . . . made as long ago as 1539. The map was produced by a Swedish cartographer, Olaus Magnus. It had been thought that the rounded swirls, located between pictures of serpents and sea monsters, were there for purely artistic reasons.*

Reason given to support the conclusion Note that the reason follows logically from the description of the swirls and is well-placed to refute the idea that the swirls were primarily there for artistic reasons: *the size, shape and location of the swirls matches changes in water temperature too closely for this to be a coincidence.*

Conclusion The conclusion follows on logically from the reason: *The map is likely to be an accurate representation of the ocean eddy current found to the south and east of Iceland.*

Explanatory detail The passage finishes with information that helps to explain how the map-maker gained information to make the map: *It is believed that the map-maker collected his information from German mariners of the Hanseatic League.*

Developing the skill

When you can identify different kinds of material, you will find that you can categorise parts of the text quickly as you read. You may be able to scan a text and pick out the argument. If not, it can be useful to keep a pencil or a highlighter near you when you read your own books. Use these to underline or mark the conclusion and the reasons. Extract these and note them down in your own words.

Activity: Selecting out the argument (1)

Activity

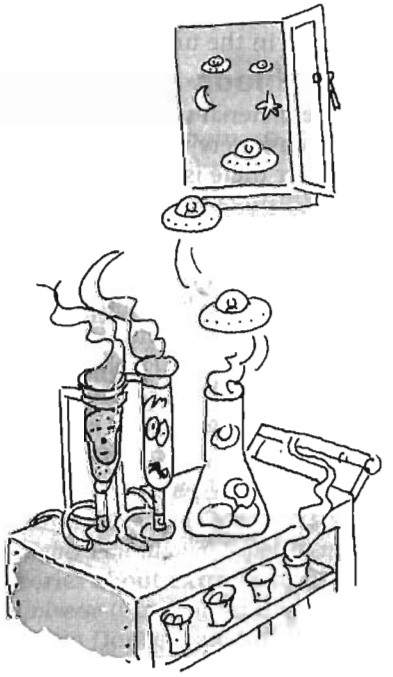
Read Passage 4.17 and identify:

(1) the conclusion
(2) reasons given to support this
(3) the author's consideration of opposing arguments

and other types of message such as:

(4) the introduction
(5) description
(6) explanation
(7) summary
(8) background information and other extraneous material

An analysis of the passage is given on the following page.



Passage 4.17

Is there anyone out there?

In some countries, the idea that there is life on other planets would make people laugh or sneer. In others, the inhabitants not only believe in life elsewhere in the universe but make efforts to communicate with it. There are certainly doubters and believers on this issue. One traditional argument for the existence of extraterrestrial life, known as the plenitude theory, is that there are so many star systems in the universe that it is unlikely that only earth would bear intelligent life. Indeed, it could be considered the folly of human arrogance to think that we are the only intelligent life in all of space. Not so, argue those who subscribe to contingency theory. Their argument, and it is a compelling one, is that life is a happy accident, a serendipity. They claim that the processes which led to the evolution of life are so complicated that it is extraordinary they occurred even once. They consider it extremely unlikely that the same set of processes could ever occur again. Thus, we have very divergent theories on whether there is life out there or not. It is unlikely that there is extraterrestrial life. For over 100 years, radio waves have been used to track space for signs of life and so far have uncovered nothing. If there was intelligent life out there, it is probable that we would have identified some sign of it by now. The most convincing current argument for extraterrestrial life comes from convergence theory. Convergence theory refers to situations when two different species are faced with a problem and independently arrive at the same solution. For example, both bats and birds evolved wings in order to fly. Similarly, octopus and squid have camera-like eyes. The species evolved separately, arriving at these adaptations independently. This suggests that although there may be infinite possibilities in the universe, nature tends to repeat itself. Morris (2004) has argued that where nature has produced something once, it is likely to produce it again. However, Morris himself recognises that even the basic conditions for life may be rare in the universe. Nature may be willing but the conditions might not be right. It is probable that the exacting conditions required for life are unlikely to be found more than once. It is unlikely that other planets will be exactly the right distance from their sun, with the right gravity, the right combination of chemicals and physics, with water and atmosphere. Although convergence theory indicates that nature tends to reproduce the same outcomes, and plenitude theory argues that the multiplicity of star systems increases the likelihood of extraterrestrial life, the arguments are not convincing. The conditions for life itself are so fragile and complex that it is remarkable that life occurred even once, much less that it could be repeated elsewhere.