Thinking Critically

Resource material

VCE Extended Investigation 2019–2024

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This material has been prepared by Dr Doug McCurry
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What is critical thinking?

The word ‘critical’ comes from the Greek word *kritikos*, which means ‘to question and to analyse’.

The goal of critical thinking is to make reasonable decisions about what to believe and what to do.

The fundamental characteristic of critical thinking is examining both sides of an issue where there are arguments for and against a decision or conclusion. Critical thinking involves assessing the strengths and weaknesses of the arguments for and against a view or proposition.

Critical thinking also involves examining our own thinking and the thinking of others.

This resource suggests ways students can focus on and analyse issues, and to consider what it means to think critically. It presents a set of stimulus material and issues collected from internet sources. It uses the kind of material to be found if we use a search engine to research an issue, and it is about selecting material from an internet search and how we might draw on such material to analyse an issue.

A critical thinking process is offered below as a way of understanding and learning how to think critically about the kind of material that students might find about issues on the internet.

A process for critical thinking

There are three processes that are useful for critically analysing ideas and issues that may be used in the following sequence:

* brainstorming
* concept mapping
* creating a ProCon table.

A brainstorm of the key concepts

Brainstorming involves noting as many ideas as possible on an issue. The ideas in a brainstorm are recorded as they occur. These ideas can be of all kinds, dealing with all aspects of the issue.

When brainstorming, it is best to summarise issues in as few words as possible.

* What words or phrases summarise the key concepts of this issue?
* Make a list of these key words and phrases.

Do not try to analyse the ideas at this stage. The ideas should be collected and recorded as they come to you.

A map of the key concepts

The ideas arising from a brainstorm can be analysed and organised in a concept map. A concept map aims to analyse the key ideas about a topic in order to show the relationships between them.

A concept map is usually organised on a blank page. The proposition to be analysed about an issue is placed at the top of the page and the key concepts related to the proposition or contention are organised on the page in order to show the relationship between them.

* How do different key concepts in the brainstorm list relate to each other?
* Cluster the key concepts in groups.
* Draw a diagram showing the relationship between the key concepts.
* Place related concepts close to each other.
* Use arrows to show the relationship between different key concepts.

Different kinds of structures can be used for a concept map, but good concept maps often have unique structures. (See ‘Concept mapping’ on [pages 20–22](#ConceptMapping) for some common structures of concept maps.)

The ProCon table

Critical thinking can be usefully represented in what is called a ProCon table.

A ProCon table is a structure for developing and analysing the arguments for and against a proposition. The proposition is placed at the top of the table and each argument for or against the proposition is given a row in the table. (Kinds of claims and arguments that can be used in ProCon tables are discussed on [pages 12–16](#ProConTable).) An attempt is made to rebut each argument with a counterargument. Ideally, a ProCon table should fit on one page so that all the arguments can be reviewed together.

The following is the structure of a ProCon table. The arguments for or against are given a numbered row and presented in plain type. A rebuttal of an argument is presented in italics and an arrow indicates that it responds to a particular argument.

|  |
| --- |
| The proposition to be analysed |
|  | **Pro** |  | **Con** |
| 1 | pro argument 1 | 🡸 | *rebuttal of pro argument 1* |
| 2 | *rebuttal of con argument 2* | 🡺 | con argument 2 |
| 3 | pro argument 3 | 🡸 | *rebuttal of pro argument 3* |
| 4 | *rebuttal of con argument 4* | 🡺 | con argument 4 |

An example of the critical thinking process

Let us look at an example of the critical thinking process using a ProCon table.

Suppose we want to think about the value of space exploration. In particular we want to think about the arguments for and against human space travel. To think precisely we need to focus on a specific issue such as the following:

**Sending humans into space is a waste of time and money.**

We have framed the issue as a clear statement of a view and we are going to analyse the arguments for and against this proposition or contention.

When thinking about the value of human space travel the following ideas come to mind.

technological development

adventure

frontier

poverty

danger

war

costs

challenge

exploration

civil rights

conservation

knowledge of the universe

These brainstorming notes can be organised into a concept map so that the arguments for the proposition are to the left and the arguments against the proposition are to the right.

|  |  |  |
| --- | --- | --- |
| Space travel is very costly.Protecting civil rights, reducing poverty, preventing war and promoting conservation are much more important than space exploration.Space travel is dangerous.Space travel is often militaristic in purpose. | **Sending humans into space is a waste of time and money.** | Space travel is a challenge to human abilities. Space travel offers humans the opportunity to embark on a great adventure.Space travel encourages global cooperation.Space exploration leads to new knowledge of the universe.Technology developed for space travel is useful on Earth too. |

After preparing this initial concept map, others’ views about the issue may be sought, at the library to research the issue, or through a search of the internet (see ‘Critical thinking with the internet’ on [page 11](#CriticalThinking)).

We might set out to find answers to the following questions.

* How much money is spent on space travel?
* How much money is spent on military forces?
* What technologies have been developed through space travel?

While researching the issue, it is important to keep looking at it from different angles. Eventually, we would be able to analyse the issue in a ProCon table. In particular, this enables us to look at how to counter or rebut each argument for and against the proposition. Having researched and analysed the issue, the following ProCon table is developed.

|  |
| --- |
| **Sending humans into space is a waste of time and money.** |
|  | **Pro****Yes – Space travel is a waste of time and money.** |  | **Con****No – Space travel is not a waste of time and money.** |
| 1 | There are many more worthwhile uses for money than space travel, e.g. poverty reduction, eradication of war, conservation, encouraging democracy and protecting civil rights. | 🡸 | *There are many worse things than space travel that we currently spend money on. Money that is not spent on space travel will not necessarily be spent on some better cause*. |
| 2 | *The technological advances that come with space flight could be more economically obtained through focused research.* | 🡺 | Space travel has been the source of many important technological discoveries and developments |
| 3 | *Space travel is yet another race between ‘them’ and ‘us’. Much of the motivation for space travel is militaristic*. | 🡺 | Space travel may help us to view humanity as one group of people sharing the same planet. |
| 4 | *The great challenges to human beings are here on Earth. Space travel is a distraction from these real challenges and worthwhile goals.* | 🡺 | Human beings are curious and thrive on challenges. Space is a great frontier to be explored and space travel is heroic. |

In this ProCon table, each argument has been summarised in as few words as possible and there is an attempt to counter or rebut each argument.

* Are there reasonable arguments that are not included here?
* Are there better rebuttals than those presented here?
* Are there counters to the rebuttals?

The value of the ProCon table is that it encourages us to see both sides of the issue and that many arguments can be countered, or rebutted.

One of the ways of judging the quality of a ProCon table is to critically assess how balanced and
even-handed it is. Can a particular view be gauged from the table above? It is hoped that what the writer thinks cannot be gleaned from the ProCon table.

Drawing a conclusion

How might we make decisions about this issue? There seem to be three factual matters that are important.

* How much money is spent on space travel?
* What technological gains have grown out of space travel?
* Would those technological gains have been made without space travel?

The first two of these questions are more or less factual issues that can be researched in order to arrive at an answer. The third question is open to interpretation and argument.

What is my view of the issue?

If a comparatively small amount of money is spent on space travel (this would need to be verified), perhaps there is little reason for opposing it. Whether there would have been the technological progress we have seen develop from space exploration without human space travel is a difficult question that would have to be researched and carefully considered. We would want to know what informed experts have said about the issue. We would want to find out what has been said by experts who are critical of space travel and by those who support it. We might need to be sceptical about the opinions of experts who are involved in space research – are they enthusiasts who have a professional commitment and a personal passion for space travel?

But leaving these issues for research aside, we may have personal views about the topic. We may not find the exploration of space and the idea of space travel inspiring, and may think that space travel is a ‘space race’, and that it does not promote global unity. We may also suspect that much of the inspiration for space research is militaristic.

The counter claim that not spending money on space travel does not mean that money will be spent on better things, is logical and effective. But, on the other hand, it may be that a campaign to stop wasting money on space travel might be successful were it presented as a matter of spending that money on other more worthwhile causes.

No doubt those who find space travel inspiring would try to rebut these views. We would hope to be open-minded enough to fairly consider their arguments and perhaps accept them.

A critical thinking exercise

We all need to try to think as well as we can. We need to be able to think critically as individuals and as a society. The process of critical thinking sketched above is used in the following exercise.

The next two pages show some material that would be readily found from an internet search about the topic ‘animal liberation’. Some prompts for analysing these items are at the bottom of [page 9](#page9). On [page 8](#ProCon), there is a ProCon table based on the items on [pages 6 and 7](#Items). These pages show a process that can be used to develop a ProCon table.

1. **ANIMAL LIBERATION**

Animal Liberation (AL) is an Australian animal rights organisation dedicated to ending speciesist attitudes and all human activity that harms non-human animals. AL is a voice for exploited and vulnerable creatures. It aims to:

* foster the rights of animals
* outlaw factory farming
* ban circuses with animals and rodeos
* stop the fur trade
* ban duck shooting
* end animal experimentation
* stop the testing of drugs and products on animals
* encourage vegetarianism
* change the uncaring attitude of many people towards animals.
1. **SPECIESISM**

Australian philosopher Peter Singer’s book, *Animal Liberation*, first published in 1975, is becoming the bible of the animal rights movement.

‘Speciesism’, according to Singer, ‘is a prejudice or attitude of bias toward the interests of members of one’s own species and against those of members of other species’. Speciesism, racism and sexism each share the same basic trait – ignoring the similar interests of members of different groups.

Singer argues that a variety of common industries are speciesist, including:

* agriculture: veal and poultry industries, other slaughter industries, dairy industry
* science: testing cosmetics and other products for safety, education, pure research, medical research
* recreation and entertainment: circuses and rodeos, pet overpopulation, keeping of pets
* wildlife: sport hunting, therapeutic hunting, subsistence hunting.
1. **ANIMALS HAVE FEELINGS**

Christiaan Barnard, the South African pioneer of heart transplants, told of how he bought two male chimpanzees to be used in experimental heart operations. While one of the chimpanzees was prepared for an operation, the other became increasingly disturbed. When one chimpanzee was taken, unconscious, to the operating theatre, the other wept bitterly and was inconsolable for days. As a result of this experience, Barnard vowed never again to experiment with such sensitive creatures.

1. **VALUING ALL KINDS OF LIFE**

The Indian statesman and philosopher, Mahatma Gandhi, said that ‘the life of a lamb is no less precious than that of a human being’. He claimed to be unwilling to take the life of a lamb for the sake of a human.

1. **HUMANE TREATMENT**

The Royal Society for the Prevention of Cruelty to Animals (RSPCA) Australia recognises that animals of all species must be killed from time to time but demands that, when this is necessary, it is performed humanely. RSPCA Australia believes that humans must treat animals humanely. Where humans makes use of animals or interfere with their habitat, humans should bestow a level of care befitting their own dignity as rational, intelligent, compassionate beings, and a level of care merited by the nature of the animals as sentient creatures capable of responding to human care and attention. Such care should be marked by sympathy, consideration, compassion and tenderness towards animals.

1. **KANGAROO CULLING**

Professional hunters claim that culling kangaroos is essential, especially after a couple of years of good rain, when kangaroo numbers may double and they may devastate crops and grazing land. Kangaroo hunters claim that the instant killing of kangaroos in the wild is more humane than the slaughter of domestic animals in an abattoir.

It can be argued that it is better to make use of native animals for food than to graze cloven-hoofed animals, such as cattle and sheep, that damage our sensitive ecology.

1. **LIVE ANIMAL EXPORTS**

It has been claimed that live animal exports are inevitably cruel. Others have argued that although there have been some unfortunate incidents that should be prevented in the future, animals can be shipped overseas in safe and suitable conditions.

1. **ARE CIRCUSES CRUEL AND DEMEANING?**

It has been argued that circuses with trained animal acts are cruel and demeaning for the animals involved.

On the other hand, it has been argued that the bond between humans and animals in a circus is close, and that circuses encourage affection and admiration of animals in audiences.

1. **HUNTING AS A SPORT**

Sporting shooters claim that hunting protects large tracts of wilderness for the benefit of all. According to this view, hunters are practical conservationists, and the culling of game improves the animal population as a whole and supports the whole ecosystem. It is a kind of managed harvesting that removes less fit game and reduces competition for space between the survivors.

1. **VIEWPOINTS**
* Peter Singer compares the hunter who shoots a deer for venison with people who buy ham in the supermarket and concludes that it is probably the intensively reared pig who has suffered more.
* Hunting is a basic human activity, as natural to humans as speech and walking on two legs. In fact, the natural world is full of creatures that hunt and eat each other. This is simply survival of the fittest.
* Hunting for the pleasure of killing, for the pleasure of tracking an animal and stalking it so that you may kill it and hang it on your wall is disgusting. Most hunters do not hunt because they are hungry, they simply hunt for fun.
1. **ANIMAL EXPERIMENTS ARE IMPORTANT FOR MEDICAL RESEARCH**

Some medical researchers see experiments using animals as vital role in the development of modern medical treatments, and these experiments will continue to be necessary as researchers seek to relieve existing illnesses and respond to the emergence of new diseases. Animal experiments have led to the development of all kind of medicines and medical treatments, including antibiotics and organ transplantation.

It is claimed that some kinds of medical research questions can be answered only through animal research and that restricting research with animals would prevent discoveries that could benefit humankind.

1. **THE SCIENTIFIC CASE AGAINST ANIMAL EXPERIMENTATION**

It is claimed by critics that animal experimentation is generally less efficient and reliable than other research methods that look at individuals or at statistical data for whole populations. It is also claimed that human trials, autopsies, biopsies and laboratory research can produce the knowledge needed to advance medical science.

Millions of laboratory animals are generally confined in unpleasant conditions and killed every year. Critics claim that the morality of animal experimentation is rarely questioned by medical researchers and that the support for medical experimentation on animals is superficial and self-serving.

1. **SPECIES DIFFERENCES**

There are many examples of drugs and other chemicals that react differently in people and animals. These differences can mean that testing treatments for humans on animals can be either worthless or positively dangerous in that they provide a false sense of security

1. **COMMON MISCONCEPTIONS ABOUT ANIMAL EXPERIMENTATION**
* There are no basic differences between the physiology of laboratory animals and humans.
* There would huge hole in our knowledge if there had been no medical research carried out on animals.
* It is difficult to envision how progress in biological and medical science can be achieved in the future without animal experiments.
* Animal experiments will continue to be necessary to resolve medical problems in the future.
1. **FROM THE CODE OF PRACTICE**

**General principles for the care and use of animals for scientific purposes**

For the guidance of investigators, institutions and animal experimentation ethics committees and all involved in the care and use of animals for scientific purposes

‘Experiments on animals may be performed only when they are essential to obtain and establish significant information relevant to the understanding of humans or animals, to the maintenance and improvement of animal management or production, or to the achievement of educational objectives. People who use animals for scientific purposes
have an obligation to treat the animals with respect and to consider their welfare as an essential factor
when planning and conducting experiments. Investigators have direct and ultimate responsibility for all matters relating to the welfare of the animals they use in experiments. Techniques which replace
or complement animal experiments must be used wherever possible.’

Source: National Health and Medical Research Council; www.nhmrc.gov.au/guidelines/publications/ea16

**Prompts**

What is the line of reasoning suggested by each piece of material?

What might each piece contribute to a ProCon table?

The following ProCon table is distilled from the ideas found in the 15 items about animal liberation on [pages 6 and 7](#Items). The table presents a detailed analysis of ideas about the liberation of, and use of, animals by humans. A proposition about the issue is formulated around which arguments can be assembled.

|  |  |
| --- | --- |
|  | Should animals be liberated? |
|  | **Pro** | **Con** |
| 1 | Animals need to and should be liberated from human exploitation. | Humans using animals humanely to assist and sustain themselves is not exploitation. |
| 2 | Animals have rights because they are sentient creatures and can suffer as we do. | We cannot be sure of how animals feel and we cannot assume that animals feel as we do. Rights are a human creation or fiction. Animals have only the rights that humans choose to recognise. |
| 3 | The superiority of humans should be shown by not exploiting animals. | All creatures are dependent on each other. It is natural for all creatures to take life from other creatures in order to sustain themselves. |
| 4 | It debases humans to be cruel to animals. | Cruelty is degrading and should not be tolerated. Humans should use animals with care and respect. |
| 5 | In its very nature, the farming and slaughtering of animals is cruel. | Farmers can and should treat their animals humanely. |
| 6 | Animals should not be imprisoned and tortured for scientific experiments. | Scientific animal experiments are important as they benefit humans. Such experiments can and should be undertaken in ways that cause the least suffering to animals. |
| 7 | Zoos, circuses and rodeos are cruel. | When zoos, circuses and rodeos are cruel to animals, they should be prosecuted with laws designed to protect animals from such cruelty. |
| 8 | Many great human beings have recognised the need to respect the rights of animals. They have refused, in all sorts of ways, to exploit animals. | It is natural for humans to use other creatures, but animals must be used without cruelty, in the spirit of the cattle or sheepherders who depend on and are grateful to their animals. |

Using a ProCon table to make a spoken or written argument

A ProCon table can be used as the basis for making a judgment about an issue. It can also be used as the basis for a speech or a written argument about an issue.

The following piece of writing was developed from the ProCon table on [page 8](#ProCon). The writer had to choose a specific focus for the piece and did so by turning the following into a question.

‘To my mind, the life of a lamb is no less precious than that of a human being.
I should be unwilling to take the life of a lamb for the sake of the human body.’

Mahatma Gandhi, Indian religious and political leader

The points in the ProCon table are not organised and the writer had to make decisions about how the different ideas would be organised and sequenced.

* Which argument might go first?
* Which arguments might follow from which?

By answering these questions, the writer is planning and organising the piece of writing. This planning and organising might be no more than marking the point that should be made first in the ProCon table as A, the second point as B, and so on.

The ProCon table encourages the writer to look at both sides of the issue and organise the counterarguments. As a result, the piece of writing that follows has a clear sequence and structure.

**Is the life of a lamb no less precious than that of a human being?**

It has been argued that animals have the same rights as humans. This view seems to be based on the idea that animals feel and can suffer as we humans do, and so they can be said to have the same rights as we humans do. This line of reasoning is not strong.

Human rights are lovable, human fictions. We are prepared to argue that we should not treat other humans in a way that we would not wish to be treated ourselves, and we have moulded this argument into what we call human rights. I can sympathise with and accept this line of reasoning, but I cannot agree with extending this reasoning to cover other species. It is not clear that a cow or a pig feels and suffers as you and I do.

Those who claim animals have the same rights as humans project their own feelings onto those of animals. One might reasonably ask animal rights advocates whether all living creatures have rights. Do flies and mosquitoes have the same rights as humans?

Although I believe the claim that animals have the same rights as humans is absurd, I think that treating animals humanely is very important. It degrades humans to treat animals cruelly. We become more human when we treat each other and animals with tenderness and compassion. However, this should not blur or collapse the distinction between humans and animals.

I am opposed to animal cruelty not because animals have the same rights as humans and not because they suffer as we do. I am opposed to animal cruelty because they do suffer and because we, humans, have to constantly exercise our humanity by not causing each other and animals any suffering.

Animal rights advocates often justly identify acts of human cruelty to animals. I have my doubts as to whether animal experimentation can take place humanely, but I do not think we have to conclude that using animals in medical research, or farming or hunting animals, for that matter, are unacceptably cruel. To recognise that animals suffer and that cruelty to animals is unacceptable is not to conclude that vegetarianism is a necessity, or that zoos and circuses are cruel, or that hunting (even hunting for sport) is unacceptable.

If animals have any rights, it is the right to be treated humanely and with care, and to not be made to suffer for no reason. But this does not give animals the same rights as humans and it does not mean that what should not be done to humans cannot be done to animals.

Critical thinking with the internet

The information and views offered about animal liberation on [pages 6 and 7](#Items) were gathered from internet searches. A Google search on the phrase 'animal liberation' results in more than 7 million hits. We need to be careful about how we use the flood of ideas that can be produced by search engines.

Suppose we were to search for material on graffiti. The word 'graffiti' alone would result in 40 million hits. Clearly the search term is too general and much of the material was about graffiti removal services. Refining the search to “graffiti art” (using double quotation marks to require the specific phrase) reduces the search to a million hits.

The first step when performing an internet search is to think about a controversial proposition that has a number of sides to the argument.

* Is graffiti art?
* When is graffiti art?
* When is graffiti vandalism?

The second step is to think of a word (or, better yet, a specific phrase) that will pick up web pages that deal with the issue.

The third and crucial step when performing an internet search is to select material that is relevant and worthy of close study.

* What proposition does this material address?
* What perspective does this material add to the issue?
* Which part of the site might I quote as a key statement or passage?
* How might I summarise this material in a ProCon table?

A Google search for the following phrase ‘is graffiti art or vandalism debate’ produces approximately 150 000 hits.

Material can be selected for detailed consideration if it covers a significant aspect of the issue in a clear and precise way. Selecting the right material and examining it carefully can be the basis of a ProCon table.

Determining an issue and making a judgment

A ProCon table should be a balanced and unbiased presentation of the different arguments about an issue. When we have a fair and even-handed presentation of an issue, we can make reasonable judgment about it. Using a ProCon table to make an overall judgment should involve a review of each argument and each counterargument to see which ones are the most important and substantial.

A ProCon calculation

You could make a judgment about the weight of each argument using the following scale.

|  |  |
| --- | --- |
| **Score** |  |
| 4321 | a very strong argument or rebuttala strong argument or rebuttalan argument or rebuttal of some strengthan argument or rebuttal of little strength |

An argument or rebuttal that has no strength should not be included in a ProCon table, which is why the scale shown above does not include zero. Arguments or rebuttals included in a ProCon table should have at least some substance.

The scores for each side of the argument could be totalled to provide a guide to an overall judgment about the issue.

Making a judgment

In some ways, scoring each argument or rebuttal and then calculating an outcome is artificial. Making a real judgment about an issue often comes down to one argument being decisive and tipping the balance to one side.

It is not easy to generalise about how and why an argument might be decisive. Perhaps every judgment that an argument is decisive comes down to a matter of opinion. But in another sense we are always trying to get to the facts or to ground our opinions with facts and being clear about the basis and justification for our opinions.

There are some important matters we need to consider when making decisions.

What is the truth?

There has been a great deal of philosophic debate about what is true and whether we can find the truth. For our purposes, some useful distinctions can be made.

According to the *Macquarie Dictionary*, the truth is ‘the true or actual facts of a case … a verified and indisputable fact, proposition, principle or the like’.

Facts and values

In thinking about the truth, an important distinction has been made between facts and value judgments. The *Macquarie Dictionary* defines a value as that for which something is ‘esteemed, desirable, useful’, or the degree to which it has ‘worth, merit or importance’.

A fact is real or verifiable, but a value judgment is an opinion of some individual or group.

We can determine the height and weight of people in a way that is more or less beyond dispute. That is a matter of fact. But we cannot determine whether freedom is more important than duty, or if green eyes are more beautiful than blue eyes, as a matter of fact. We might try to determine whether a group of people think freedom is more important than duty or whether green or blue eyes are preferred by most people in a group, but that does not make the preferences of the majority objective, real or true.

We might argue that being free is more important than doing one’s duty and being accepted as part of a group or we might hold the opposite view. These are value judgments. They are neither correct nor incorrect, neither true nor false. The distinction between facts and value judgments is important because it helps us to analyse issues, and ask some appropriate and useful questions.

Four kinds of issues

The distinction between facts and value judgments can be used as the basis of four categories of issues and propositions.

1. **Empirical** issues can be explored as matters of fact.
2. **Logical** issues can be used to draw more or less valid conclusions based on valid premises.
3. **Public** or **political** issues are ones where decisions are made on the basis of arguments about values and consequences.
4. **Personal** issues are ones where decisions are made on the basis of individual preferences and values.

Asking questions

Categorising different kinds of issues helps determine the kinds of questions that can be asked about an open issue.

The diagram on page 16 offers a way of categorising kinds of issues and questions about them. These issues to be examined are in the box at the centre of the diagram.

At the top of the diagram are **logical** and **empirical issues**, and at the bottom are **public** and **personal issues**. Each of the four boxes at the corners contains general questions that are most appropriate to that kind of issue (or aspect of an issue).

* With an **empirical issue**, we are looking at the extent to which something can be proved and whether there is data to prove it.
* With a **logical issue**, we are looking for a line of reasoning that can support a sound and valid conclusion.
* With a **public issue**, we are looking at the values and the strength of the arguments used to support a decision.
* With a **personal issue**, we are looking for the explanations offered to support or justify a view or decision, and the values behind the view or decision.

The *four corners model* for analysing open issues

The fact–value distinction as a process of analysis

What kind of issue are we thinking about?

Is it a matter of fact or logic?

Is it a matter of values and views?

|  |  |  |
| --- | --- | --- |
| **Is it a logical issue?****Can we look for logical conclusions?**Is there a line of reasoning?Is the reasoning logical?What generalisations can be made from these claims?Are these claims reasonable or true?What can be deduced from these claims?Is this a logical issue? |  | **Is it an empirical issue?****Can we look for factual evidence or answers?**What does the data show?How conclusive is this data?What are the strengths and weaknesses of the data?What conclusion might be drawn from the data?What data is missing?What other data is needed?Is this an empirical issue? |
| Logical thinking typical ofscience and mathematics  |
|  | **The open issue**What is the issue?How can we describe and analyse it?What do we know about it?What is happening? Why? |  |
| **Is it a public issue?****What views and values should we give priority to when making decisions?**What view is presented in the text?What is the purpose of the creator?What is the basis for such a view?What values are explicit or implicit here?How does the text position the interpreter?How convincing and persuasive is the text? |  Interpretive thinkingtypical ofsocial sciences, humanities and the arts | **Is it a personal Issue?****How do my preferences and values shape my views?**What is my view of the issue?What is the basis of my view?What values shape my view?How do my views and values compare with those of others?How would I explain and justify my views and values? |

Characteristics of the *four corners model* of critical thinking

The four corners model has two halves. The top half is objective and the bottom half is subjective.

The two halves of the model represent different kinds of thinking. Let us call the top half ‘logical reasoning’ and the bottom half ‘interpretive reasoning’. Issues in the top half of the model predominate in the sciences and mathematics, and issues in the bottom half predominate in the social sciences, humanities and the arts. An issue can be determined more clearly and definitely in the top half. Substantiated propositions in the top half of the model can be particularly powerful and decisive.

We should always look for opportunities to explore an issue logically and empirically because of the objectivity of such considerations, but we should also recognise that it is difficult to determine issues logically and empirically, and that many issues are public and personal, and cannot be determined logically and empirically.

The *four corners model* will help us to analyse and draw conclusions from a ProCon table. Let us look at the issue of ‘compulsory voting’ to draw some conclusions.

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| **Should voting be compulsory?** |
|  | **Pro****Yes – Voting should be compulsory.** |  | **Con****No – Voting should not be compulsory.** |
| 1 | Voting is a democratic duty and responsibility. | ⬄ | Voting is a right, not a responsibility. We should not be forced to vote. We vote if we want to. |
| 2 | Voting is too important to be optional. | 🡸 | *Voting is important, but people should be encouraged rather than compelled to vote.* |
| 3 | Voting should be compulsory, just like jury duty and paying tax. | 🡸 | *You can get out of jury duty. The contribution to society that comes from paying tax is not compromised by being compulsory and paid reluctantly.* |
| 4 | *Some sections of society are made apathetic and kept ill-informed by those in control. The privileged and powerful do not like forced voting.* | 🡺 | We do not want the votes of the ill-informed and apathetic to influence important decisions. Their votes lower the quality of political decisions. |
|  | *What evidence is there that systems with compulsory voting have political debate and decision-making of poor quality?* | 🡽 |  |
| 5 | The disadvantaged and the disempowered are those least likely to vote. They need to participate and promote their own interests. | 🡸 | *We do not want the votes of the ill-informed and apathetic to influence important decisions*. |
| 6 | Voting is not compulsory, but going to the polling booth is. | 🡸 | *Claiming that compelling people to go to a polling booth is different from compelling them to vote is not a valid argument.* |
|  |  | 🡼 | *Making people go to a polling booth leads to half-hearted and uninterested people voting*. |
| 7 | *Political parties should not have to spend their energy getting people to vote. Election should be about policies.* | 🡺🡿 | The government should have to earn the votes of the people. |
| 8 | Some government systems have small percentages of people voting and the governments in these systems are not respected by the people. | 🡸 | *It is better that small a percentage of engaged people vote than that those who do not want to vote are forced to vote.* |

One of the advantages of a ProCon table is that requires us to think about both sides of an issue. If the table is prepared well, it should not be easy to tell which side of the argument the creator of the ProCon table believes has the most substance. Can you tell the author’s opinion from the ProCon table on compulsory voting? Is the ProCon table unbalanced or biased?

Critical thinking involves seeing different sides of an issue and good critical thinking can see and present the different sides of an issue in a fair and impartial way.

Having reviewed the different sides of an issue, we are better able to assess the strengths and weaknesses of the different arguments.

How might we make up our minds about this issue? To begin with, we might do some logical and empirical research.

* What is meant by ‘compulsory voting’?
* What matters of fact should I take into account about compulsory voting?
* What does expert argument suggest?
* Which of my values are going to shape my opinion?

Some empirical questions

Among the empirical questions we could ask on the issue of compulsory voting are the following:

* What information would shed light on the issue?
* Which of the arguments is empirical?
* What data would help our thinking?

There are empirical aspects to arguments 4, 6 and 8 in the ProCon table.

Argument 4: We might find out what sections of society do not vote when voting is optional. Is it the comparatively educated and privileged or the comparatively uneducated, poor and disadvantaged who do not vote? If it is the latter who do not vote in optional voting systems, we might argue that the low voting rate is a result of being uneducated, poor and disadvantaged, and we might conclude that the uneducated, poor and disadvantaged should not be further marginalised by choosing not to vote.

Argument 6: We might find out whether and how political campaigns differ in systems with compulsory and optional voting. Do political parties in optional voting systems spend a lot of time and energy just getting people to vote? Does having to spend time getting people to vote distort or strengthen a political system?

Pro argument 8: We might find out if most optional systems have low percentages of people voting and if there is a difference in the way people in optional and compulsory voting systems view the government.

There is not much empirical research on the comparative results of compulsory or optional voting, and there are no clear conclusions about the issues in the research literature. As the consequences of compulsory voting are not clear, arguments for and against compulsory voting tend to be based on value positions and arguments from principles.

How might we think through and assess these arguments about compulsory voting?

An assessment

Argument 1 states that voting is a duty and responsibility that can and should be imposed on people. The opposite is asserted by the Con side.

These opposing statements are kinds of principles from which conclusions are drawn. The strength of arguments from principles depends on the substance of the reasons and arguments used to justify the principles.

Whether one gives more weight to duty or freedom is a personal preference or a value position. One might try to resolve a conflict of principles by deciding whether duty is more significant in this issue than the freedom to choose.

Pro argument 2 asserts the importance of voting. The rebuttal to Pro argument 2 agrees that voting is important, but also states that the importance of voting should be recognised by political parties putting time and energy into encouraging voting.

(It should be noted that Pro argument 6 is a basis for countering Con argument 2. On the basis of Pro argument 6, it can be said that voting is not really compulsory and that having to go to a polling booth is encouragement to vote rather than compulsion to vote. Do you think this is a strong counter argument?)

Argument 3 compares jury duty and taxation with voting to conclude that voting should also be compulsory. The first part of the Con rebuttal 3 is reasonable and quite accurate (teachers, for example, do not have to do jury duty). The second part of that rebuttal is strong because the value of the money paid in taxation is not compromised by whether we want or do not want to pay tax. At a superficial level, most people do not want to pay tax, but this does not badly affect the contribution they actually make to the goods and services provided by our society. Voting is different in that not wanting to vote could lead to a situation in which the vote might be contaminated and in conflict with good decision-making.

This idea is implicit in Con argument 4, and it seems to be the strongest argument for the Con case. Con argument 4 states that compulsory voting contaminates political decisions with the votes of the ill-informed and uninterested. Given the importance of political decisions, it is not easy to rebut this argument. Pro argument 4 seems to be the best available counterargument and it is supported by Pro argument 5. Do you think Pro argument 4 is a good counter?

We can see the importance of Con argument 4 in the way that it is used to rebut Pro arguments 5 and 6.

Pro argument 5 is the most important of the Pro arguments. It claims that a part of society is less likely to vote (the disadvantaged) and implies that compulsory voting protects the interests of the disadvantaged.

The claim that the disadvantaged are less likely to vote than the privileged is an empirical claim that can be examined as a matter of fact. Are the disadvantaged, in general, less likely to vote than the privileged? If this is the case, it is hard to think of a good reason why this should be so. Is it a result of being comparatively uneducated and disempowered, and thus not seeing much point in voting?

Argument 5 is related to Pro rebuttal 4 in that it implies that not voting can be a symptom of poor education and disempowerment rather than a genuinely free choice.

Pro argument 6 is a fundamental challenge to the terms of the proposition. It says that voting itself is not compulsory and suggests that those who really do not want to vote do not have to.

The first rebuttal of Pro argument 6 says the point is trivial. The second rebuttal of Pro argument 6 says those who do not care to vote will still have to vote anyway.

Con argument 7 can be examined empirically. What does the research literature say about optional and compulsory voting? (Does optional voting mean that political parties spend a lot of time and energy persuading people to vote? Do some kinds of political parties have to spend more time and energy getting their voters to vote than others, as suggested in pro argument 5? Is there reason for thinking that a lot of time and energy is spent getting people to vote in optional voting systems? Are political campaigns different in compulsory voting systems from those in optional voting systems?)

Pro argument 8 states that having a low percentage of voters can undermine respect for governments. Whether there is more respect for governments in compulsory voting systems is a matter for empirical research. One could also find out if the lower the percentage of voters is, the lower the respect for a government.

What does it all add up to?

An overall judgment might go something like this.

I cannot decide if this issue is a matter of a principle (a democratic duty) or if comes down to freedom of choice. I have no particular preference for freedom or duty in this issue.

It seems to me that Pro argument 5 (and perhaps Pro argument 8?) and Con argument 4 are the key arguments. In each case, there are empirical issues to be researched. However, the result of researching political questions such as these is that there is often conflicting evidence and opinions among experts. In such situations, we have to weigh up the evidence and arguments of the experts, and decide what seems most convincing.

In making such decisions, we should also recognise how our values might shape our decisions. We should think about what kind of argument seems most important for the issue as a result of a value position.

I am less persuaded by the claim in Con argument 4 (that compulsory voting contaminates political decisions) than by Pro argument 5 (that the disadvantaged are less likely to vote in optional voting systems). I place a high value on supporting the disadvantaged and disempowered, and unless there is good evidence that compulsory voting contaminates political decisions, I would give priority to compulsory voting.

Someone might argue the opposite. They might argue that political debate is generally of a very low standard and that optional voting might help to raise the bar in the way politicians engage with and appeal to voters.

We do not have a clear decision on this issue, but we have clarified the basis on which we might make our decision.

Concept mapping

A concept map is a diagram showing the key concepts related to an issue. It can be developed from a brainstorm. A concept map organises the ideas of the brainstorm into a diagram that shows relationships between the different ideas.

Drawing a precise concept map is not easy because there is something unique about every issue. However, there are some standard patterns for concept maps. The following six concept map patterns can be produced using the ‘SmartArt' function in Microsoft Word.

A flow chart is the simplest form of concept map. A flow chart shows how one thing leads to another.

A cycle diagram shows a continuous process.

A radial diagram shows relationships to a core element.

A pyramid diagram shows foundation-based relationships.

A Venn diagram shows the overlap between elements.

A target diagram shows steps towards a goal.

Some key terms in argument analysis

Analysis of arguments is made easier if one is familiar with certain terms.

| **Term** | **Explanation** |
| --- | --- |
| analogy | an agreement, likeness or similarity between things |
| analyse | to break down into and describe components and elements; sometimes used to mean ‘assess’ or ‘evaluate’, but usefully distinguished from these activities |
| argument | a claim made to support a conclusion |
| assertion | a claim that something is true or false |
| assumption | something supposed or taken for granted |
| assess | to make a judgment of value and quality; to evaluate |
| bias | unfairness or prejudice in collecting evidence and reviewing arguments |
| contention | a point asserted as part of an argument |
| critic | a person who offers a value judgment or an interpretation |
| criticise, critique | to analyse and make a judgment of value and quality |
| describe | to give a report in words that aims to be impartial or objective |
| empiricism | a school of thought that proposes all theory and knowledge should be based on observation; a basic approach in science |
| evaluate | to make a judgment of value and quality; to assess |
| evidence | facts offered to support a conclusion |
| fact | a statement or assertion of verified information about something that is the case or that has happened  |
| generalisation | a conclusion drawn from specific instances |
| hypothesis | a conjecture or tentative theory about the natural world; a proposal intended to explain certain facts or observations  |
| induction | the process of discovering a general principle from detailed facts  |
| implication | an inference or deduction that can be made about one thing, based on another thing |
| logic | a way of thinking that allows one to distinguish good arguments from bad ones; a process of formal deduction and inference; the study of valid and reasonable arguments |
| objective | undistorted by emotion or personal bias, impartial, fair, not subjective |
| opinion | a personal belief or judgment that is not founded on proof or certainty |
| persuasive | intended to convince |
| plausible | reasonable although not necessarily convincing |
| premise | basis, stated or assumed, from which reasoning proceeds |
| principle | a fundamental rule or standard  |
| proposition | a proposal offered for acceptance or rejection |
| public affairs | issues of public policy or politics; matters of general or community concern; not private or personal |
| reason | the thinking faculty; a process for drawing conclusions |
| reasonable | based on good arguments and evidence, and therefore fair |
| rebuttal | to challenge or refute a claim |
| refute | to challenge or rebut a claim |
| theory | a general principle that explains or predicts facts or events |
| science | an organised body of knowledge gained via the scientific method of observation and experiment |
| subjective | relating to experience or knowledge resulting from personal views and values; based on personal feeling or interpretation; influenced by personal opinion; not claiming to be objective |
| values | what people think is right and wrong, good and bad, desirable and undesirable |
| value judgment | a judgment of how right or wrong something is based on a particular set of values or on a particular value system |