

Thinking Skills

Thinking as a skill

There is common misconception that thinking is a part of an intelligence that you are born with. However, just like any action, we get better at thinking with practice. We use our thinking skills to make sense of information and, as you are exposed to so much information at college, it is essential that you develop strong thinking skills alongside your course of study. The information that you receive in your classes is only valuable if you know what to do with it. You have to use information in a meaningful way to achieve good marks in your assignments. For instance, you could learn lots of detail on the Second World War but if you cannot use that information to answer an essay question then it is not valuable knowledge. If you learn to think in effective ways, you are likely to be able to understand and use information to better effect. As a student you need to develop your thinking skills in four broad areas:

- Information processing
- Problem solving
- Analytic thinking
- Critical thinking

Information processing

Information processing is considered to be a cognitive process. That means it is related to your brain and memory. There are many methods of assessment used in education that require skilled use of memory such as exams, presentations, group discussions etc. so it is important to employ techniques that allow you to use your memory to good effect.

People process information in a variety of ways but mostly through reading, listening or observing. You can only pay attention to a few things at a time, so it is always going to be difficult to retain information when we are only half paying attention. It is necessary to try and pay full attention to the pieces of information that are the most important in class. Whilst you may be very interested in a particular anecdote your lecturer is telling or what your friend is planning to do at the weekend, if this information is not directly related to your studies you have to try and focus your mind on the more important information that is being shared. Making sure you have good concentration skills is a very important part of the learning process. You can improve your concentration levels by doing any of the following:

- Drink less caffeine, it is a stimulant which means it can increase your anxiety levels leading to distracted behaviour
- Switch off your mobile devices while studying
- Exercise regularly; increased blood flow to the brain helps to aid concentration

- Try the 5 more technique! Whenever you feel like giving up, try five more of whatever you are doing – five more minutes of reading, answer five more questions, spend five minutes longer writing etc.
- Set a specific time of the day aside to let your mind wander. Specific breaks where you do not need to concentrate will feel valuable and this will strengthen your resolve to concentrate throughout the rest of the day

Sometimes you will find that you are exposed to large amounts of new information in short spaces of time. This can make it even more difficult to remember as our memory is finite and we are only able to process a certain amount of information at a time. Where this is the case, you should try to employ techniques that will allow you to retain that information more easily. Techniques that allow you to improve your memory are called mnemonic devices and one such technique is called chunking.

Chunking

Chunking is just what it sounds like, breaking down information into smaller chunks. This works best when you are dealing with words or numbers. When you have a long list of information to remember, for instance a telephone number, it is easier to remember it as shorter pieces of information which you recall in sequence, rather than as separate numbers. For example:

0-7-8-9-5-1-2-3-4-5-6

is more difficult to remember than

0789-512-3456

This is because your brain only has to recall three chunks of information rather than eleven. The average human brain can store around 7 different pieces of information in the short term memory at any point in time. So by creating chunks of information rather than individual pieces, you can increase your capacity to recall.

Acronyms

Acronyms are another kind of chunking that work very well as a recall tool. By limiting the number of letters you have to remember, you are able to store more information in your short term memory. A good example is remembering the colours of the rainbow:

Red Orange Yellow Green Blue Indigo Violet

is more difficult to remember than the acronym

ROY G. BIV

Chunking is even more effective when the chunks are meaningful. In the previous example the acronym appears like a name, because you will have seen this format many times it is very easy to remember. Once you have broken down information into meaningful chunks you can then rehearse or practice recalling that information. This will allow you to recall the information even longer!

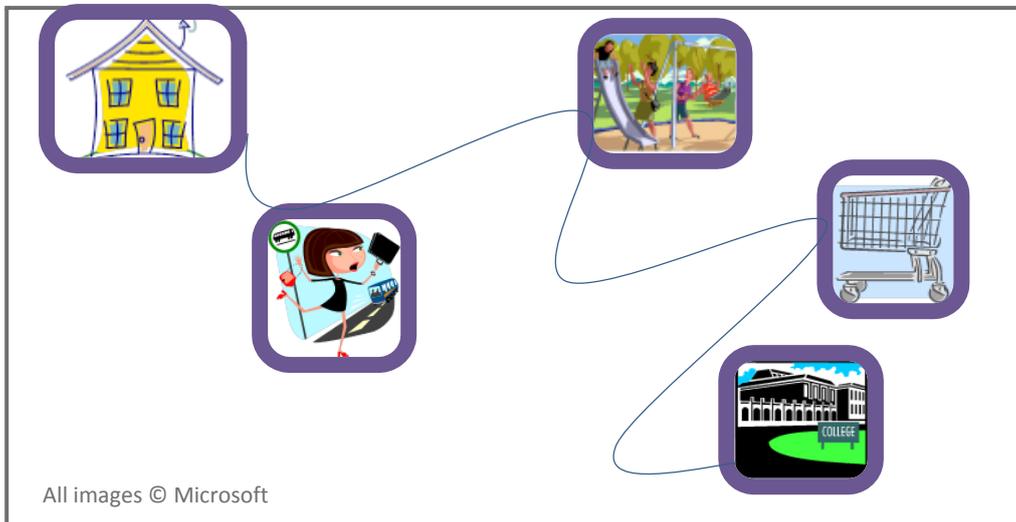
Method of Loci

Another great mnemonic device is called the Method of Loci. This is a technique that works well for visual or physical learners. Dating back to the Ancient Greeks, this is one of the oldest known methods of improving memory and recall:

1. First you have to imagine a place you are very familiar with, maybe your house or a your route to college
2. Visualise each part of that place or journey in a logical order
3. At each part of the journey, or room of the house, visualise one separate piece of information that you need to memorise
4. As you walk around your house or your route into college, you will see each of the ideas or objects placed in a different room or at a different landmark
5. The more often you visualise this route, the more closely associated with that familiar place the objects will become. The familiarity will make it much easier to remember!

For example, if you needed to remember all of the British Prime Ministers since 1980 in order you might see each one in a different room. You begin by entering the house and you see Margaret Thatcher in the hallway. You then walk into the living room to see John Major sitting on the sofa. This leads you into the dining room where Tony Blair is eating dinner. Gordon Brown is washing dishes in your kitchen. You finally reach the garden, where David Cameron is mowing the lawn.

The following visual aid uses a journey to College as a useful example of the method:



Memorise a shopping list on your journey to college.

1. Leave the house + Teabags = Your house with a teabag on the roof
2. Bus stop + Crisps = Eating a packet of crisps at the bus stop
3. Park + Bread = Feeding the ducks with the bread at the park
4. Shop + Sugar = Bags of sugar blocking the door of the small shop
5. College + Fruit = The college with large bananas on the roof

Visualisation

The Method of Loci relies strongly on visualisation to aid your learning. Visualisation is a very important part of the learning process; it allows you to engage with information in a way that is engaging. By creating a picture of the information you are receiving in your mind, you are not only receiving the information but you are actively processing it. You have to think about what you are reading or being told so that you can create a picture of it in your mind. As such, visualisation, or mapping out information (as part of a mind map, brainstorm or picture), is a very good way to strengthen your knowledge and improve how you process information.

Active learning

Visualising information is not the only way you can become a more active learner but learning actively is proven to be the best way to process and retain information. Active learning means you are processing information by engaging with it. You are not simply receiving the knowledge, you are doing something with it. There are various techniques and strategies you can use to become more active in your learning processes:

- When reviewing your notes or research, identify what you do know and what you don't know. This will allow you to seek out the most relevant information and fill in the gaps in your knowledge
- When working in a group, actively listen. Summarise what has been said to ensure that you have a full understanding of what has been covered

- Think about your learning in context; don't just accept information at face value. Try to think of the positives/negatives or strengths/weaknesses. This will allow you to identify wider arguments and ideas to gain a broader understanding of the topic being studied
- Rather than writing extensive notes in class, try stopping to listen to your lecturer. You will learn information more quickly if you listen and then summarise periodically because you will be more aware of the detail being provided by your lecturer
- Try writing a definition or explanation for key concepts, objects and ideas. This will help you to clarify whether you fully understand or if you need to find out more about that topic
- Try going back over notes and underlining selectively. This will allow you to pick out the most relevant points from them
- Studying with others is a great way to learn actively. It allows you to discuss ideas and see them from different perspectives, and also helps to identify any gaps in your knowledge
- Be reflective in your learning practices! The more you think about how you learn and how well you are learning, the better able you will be to find suitable strategies to improve your learning behaviours

By engaging in your learning and being active in your practices, you will become a more effective learner. This will allow you to improve upon the skills which are required for your assignments – analysis, critical thinking and problem solving!

Problem Solving

Any assignment that you are given will involve problem solving. In order to explore a topic there will be problems to address. This could range from the straightforward – figuring out which resources are the most relevant – to the complex – working out a mathematical formula. There are various stages to go through when problem solving but research suggests that people who spend more time at the beginning, working out exactly what is involved in the task, are more successful problem solvers. This is called 'elaborating the problem' and allows you to gain a full understanding of all aspects involved in reaching a solution. The better and more complex your understanding of the problem, the more likely you are to solve it. If you launch in too quickly and don't prepare properly you may miss vital aspects of the process. To define the problem clearly you should, consider all of the following:

- Is there a particular system or concept that underlines the problem you need to solve? What is it? How is it defined by experts?
- Identify what background knowledge you have
- Identify any areas of knowledge that you need to gain to solve the problem
- Identify any constraints or limitations on your ability to solve the problem

- Begin devising potential strategies for solving the problem
- Collect any information you need to fill in the gaps in your knowledge
- Spend some time thinking about the problem. Don't attempt to find the best solution immediately because ideas may come to you after your initial brainstorm, once you've had time to consider alternatives
- Decide which is the best approach to use – some may be more beneficial or easier to achieve than others

Once you have established what approach you are going to take, you need to devise a plan to carry it out:

1. Define the task clearly and establish exactly what you need to achieve
2. Use your previous experience to assist your progress
3. Make sure that you prioritise the most important parts of the task
4. Set yourself targets, this will help you to make sure you meet your deadlines
5. Monitor your performance as you progress through the task; you need to stay on target to reach your goal
6. Reflect on your progress – how well did you achieve the tasks? What could you improve on for next time?

Problem solving involves a particular way of thinking about or seeing a situation. There are activities you can undertake in your personal life which will also help you develop strong problem solving skills:

- Gaming can help as it involves thinking strategically. Chess and RPGs (role-playing games) are particularly good for this
- Project-based or team activities, such as orienteering or event planning
- Even working out the logistics of backpacking trips or extended holidays, as it is a task that requires solution-based thinking!

Whilst these activities may seem unrelated to solving problems from your assignments, the skills involved are transferable. The more you engage in activities which require you to be strategic or devise solutions, the stronger your problem solving skills will become. One of the key elements of activities like those listed above, is that they allow you to be creative and creative thinking is a really important part of problem solving.

Creative thinking

Many courses require you to think creatively about a particular problem and this is a skill that employers are increasingly looking for. Creativity is often less ordered or structured than other ways of thinking but it is just as valuable. It usually involves generating lots of ideas. The value of creative thinking is that, when combined with more logical methods, it allows you to find many potential solutions to problems. It does not matter if the ideas you generate are wrong, as long as you recognise the limitations when considering whether you

should use them or not. This allows you a lot more freedom in your thought processes. Not everyone finds it easy to think in a creative way, but there are techniques you can use to help build on your ability to think creatively:

Restrict yourself: Research suggests that by trying to use all of the resources available to you, you are more likely to generate ideas which are similar to those you have previously used. By restricting the ways in which you can create ideas, you might just come up with new ones.

Daydream: Allowing your mind to wander may help you to hit upon ideas that are further from those you would normally encounter.

Embrace the unusual: By doing something that is surreal, unusual or strange you can boost your brain's ability to recognise patterns that you don't encounter in your everyday life. Examples could be reading surreal literature such as Alice in Wonderland, or going to a modern art gallery. Other people's creativity can help trigger your own.

Allow yourself to feel: Creativity is usually increased when you are in a heightened emotional state. Try generating ideas when you feel particularly happy or moved by something.

Brainstorm: It doesn't matter how unrealistic your ideas may seem, if you generate lots of them you will start to see more logical or realistic links between them.

Creative thinking will really help you to generate solutions to problems. However, it is not enough on its own. It is also important to make sure you develop logical, analytical thinking skills too.

Analytical thinking

Analytical thinking, at its most simplistic, is about thinking in context. If you are required to analyse a situation, you need to understand how each constituent part of the whole fits together. By gaining a broad view of a particular topic or idea, you will be better able to identify its strengths and limitations. To analyse well, it is important to examine the relationships between different pieces of information. By doing this you will be able to see patterns, organise separate sets of information together and explain ideas fully. Thinking analytically allows you to compare sets of data or ideas from different sources; recognise cause and effect relationships; identify potential problems with a particular viewpoint or argument, and draw appropriate conclusions from your findings. This means going further than simply describing the information. You should be assessing if a particular argument or piece of information is relevant/sound/biased etc.

To think in an analytical way you need to be methodical. It is very difficult to analyse a complex problem quickly, so you must take logical steps to reach your conclusions. This will

involve asking yourself specific questions to get to the root of the topic you are studying. Ask yourself:

- What are the most important issues?
- What forces influence the topic?
- What are the key relationships or patterns in the data/research?
- What are the main strengths/weaknesses of each viewpoint or data set?
- How does the information fit together as a whole?
- What conclusions can I draw from this?

Analytical thinking may mean you have to fight against your intuition or instinct. We all make assumptions about information, ideas or evidence your understanding of any topic studied. To do this you will need to explore all of the points of view or approaches available, not just the ones that appeal to you most. You may need to make arguments or use methods you do not believe to be correct to illustrate a particular point. The ability to make an unbiased assessment of your study materials is a critical thinking skill.

Critical thinking

Being critical does not mean being negative, it is about judging the value of information. When critically assessing resources you can be supportive or unsupportive, but you must ensure that you are objective. This means not allowing your opinion to influence your understanding. We often take information at face value; when thinking critically you have to step back from your initial impressions and personal views to evaluate. It is human nature to make judgements and we do it in various ways:

Prejudice: This means making assumptions about a whole group on the basis of a stereotype.

Partisanship: This is about having a more positive view of people who belong to the same groups as us than others. We often feel that they are more correct in their views because they are similar to our own.

Provincialism: This is closely related to partisanship and is about thinking the issues that affect us are more important or urgent than those of other people or groups.

Herd instinct: This means ignoring, or not admitting to, things we think/like/do if they are not popular amongst the groups we belong to.

Your personal views have the potential to cloud your judgement of the topics you study at college and this can bias the content of your assignments. Critical thinkers ask questions of the information they process: why is it important? How can it be used to support a particular point? Are there better alternatives? There is a close relationship between analysis and critical thinking; they are both 'higher level thinking skills'. This means they go beyond assumption and opinion to evaluate ideas in a wider context. This helps you to get

as near as possible to the truth. There are strategies you can use to help yourself think more critically:

1. Begin by processing the information – what have you just seen/read/heard?
2. Next try to define and summarise the key points to check your understanding
3. After this you should analyse, seeing how the parts individual of the argument/data fit together
4. Follow on by exploring relationships, patterns, strengths and weaknesses
5. Bring together all of your ideas to make a coherent structure for your assignment
6. Evaluate the findings you are going to use
7. Now you should apply the arguments you have made to the assignment title or questions
8. Finally, you should draw conclusions from the arguments you have made

As discussed in previous sections, it is very important to analyse the information you learn in college and through your independent study. Not only does this allow you to improve your grades, it also helps to make you a more independent learner. Ultimately, if you can be critical and analytical, you will need less guidance from your lecturers.

solutions which we believe are true, but this does not mean that we can evidence that instinctive understanding. Your lecturers will always be looking for you to

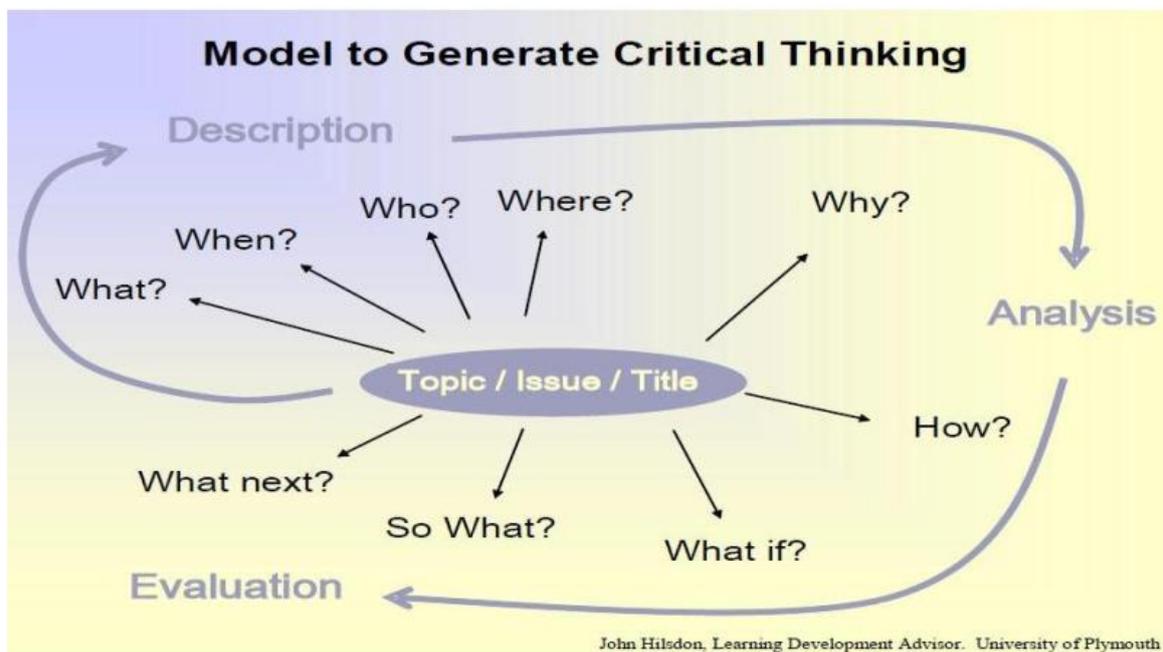
Writing critically

When writing your assignments there are three stages you can go through to take your work from descriptive to critical:

Description: At this point in your assignment you are providing your reader with background information. You should be asking yourself: Where? What? When? Who?

Analysis: The analysis in your assignments will deal with comparing arguments, establishing relationships and identifying important theme and patterns. You should be asking yourself: Why? How?

Evaluation – when evaluating you are deciding how important certain information is. Does it provide the conclusion you are looking for? Does it answer the questions you need answered? Does it result in more questions being raised? You should be asking yourself: What if? So what? What next?



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Following these steps will allow you to organise your thoughts and research in a way that is both critical and coherent.

Evaluation

The previous section highlights the importance of evaluation in the critical thinking process. Evaluation is a process through which you can decide how valuable information is. The first evaluative question you should ask yourself is **'what if?'** This allows you to consider what the potential results or implications might be, giving you a broader perspective of the outcomes.

A second valuable question to consider in your evaluation is **'so what?'** This is a really key question to ask yourself; this is the point at which you decide if a piece of information is important or not. If you cannot justify why you are using a particular argument or finding, then it is not truly relevant. By asking yourself 'so what?' you can assess if your point is significant or not. Does it have a real-world impact? Is it essential in reference to your assignment title? This question should allow you to develop your conclusions.

Finally, try to ask **'what next?'** Any assignment you write will have limitations: word count, time constraints, access issue etc. This means you will never be able to cover all of the information surrounding a particular topic or question in a single document. As this is the case, you will always be left with unanswered questions. These questions may allow you to make suggestions for further research, demonstrate how your conclusions can be applied in other contexts or identify points for further exploration in other assignments. Whatever the

outcome, answering the 'what if?' question will allow your reader to see that you understand the topic in a broad context.

Finally...

This guide should provide you with an introduction to some of the important thinking skills you will need to use and develop at college. This is a very broad area of study and there is much more that can be learned on each of the four key thinking skills included in this guide.

The libraries at all three main campuses contain resources on Thinking Skills. These resources detail how they can be applied to your studies and also how they can be applied in other contexts, such as the workplace. Please consult them for further information or, alternatively, ask your lecturers or a member of the Learning Resources team for advice.