

- Text messaging on a smartphone is good for quick and frequent contact with family and friends, and can include images.
- Video-conferencing software such as Facetime, Zoom and Skype, are good for more intimate and in-depth contact with family and friends.
- Email is good for detailed contact with family and friends when there is space and time for the inclusion of stories and reasons for decisions and actions.
- Phone calls with communications apps cost practically nothing as they can be part of the overall mobile internet package or broadband connection package.

Negative impacts (counterclaims/disadvantages/costs):

- These forms of communication are very useful, but they cannot replace the depth and intimacy of face-to-face communication. Written text can often be misunderstood, and video conferencing does not allow for the same amount of non-verbal communication that face to face can provide.
- There will be a tendency to make too much use of the digital devices and not make physical visits for face-to-face time with elderly friends and relatives, which is what they actually need and want.
- The technology chosen will need to be simple and easy to use so that the complexities of the technology do not overwhelm elderly people. For example, video conferencing can be difficult to set up and use all the features; email apps can be complex to use; and the integration of images, links, text can be very complex.
- Technical help to set up the digital technologies, train elderly people and maintain digital technologies needs to be quickly and easily available. A member of the family or a friend can often supply the expertise, but probably not quickly enough so, at times, leaving elderly people 'stranded'.

#### Step 4: Evaluation and synthesis – the overall answer with recommendations

Your response requires **evaluation and synthesis** as well as a consideration of counter-claims, so the list in step 3 needs to be developed into sections that discuss the claims, and then the counterclaims. It is also a good idea to include **recommendations** about how to resolve the issues, explaining how this could be done.

In this discussion, you should highlight and explain links between the impacts and also the extent of the effects of the impacts. A useful technique is to highlight the best and worst impacts, evaluating (explaining) why they are the best and worst for the scenario.

Finally, the names and situations of people you have knowledge about from personal contacts or through news items should be included. These should have been included in the initial justification of your starting point.

*Generally, the three forms of communication cover the needs of elderly people. The digital technology will cover many of the regular needs of elderly people for communications, and also the urgent and irregular needs when something happens or something needs to be done, often in a medical situation.*

*However, the negative impacts are very real for many elderly people, and will only get worse over time if their mental and physical health declines. Clearly, digital technologies need to be suitable to the individual situation of the elderly person. Eventually, the use of digital assistants such as Apple's Siri and Google's Alexa will need to be included, and may even become the main means of communication over time.*

The issue of keeping up face-to-face contact needs to be addressed by family and friends, otherwise they can easily get into the routine of digital communications rather than personal communications.

The question raises the issue that 'the overall impact has been questioned by some people'. Clearly, the analysis and evaluation of the impacts above highlights that all is not perfect, and the negative impacts need to be considered comprehensively rather than addressing them when the needs arise. This would mean a much better result for elderly people.

### ATL ACTIVITY

#### Thinking

For each of the starting points given in step 1 above, develop and analyse a list of positive and negative impacts and implications, explain them, and then write an overall evaluation and synthesis.

### Mark scheme

The top markband for this question is 10–12 marks.

10–12 marks

- The response is focused and shows an in-depth understanding of the demands of the question.
- Response demonstrates evaluation and synthesis that is effectively and consistently supported with relevant and accurate knowledge.
- Counter-claims are effectively addressed in the response.
- The response is well-structured and effectively organized.

Although the sample student response could be improved by direct reference to real people, such as 'my grandfather or grandmother', given the time limit and pressure of an examination it has achieved the top markband and would be awarded a perfect 12.



### ATL ACTIVITY

#### Thinking

Choose a sample Paper 1 Section B question from one of the HL challenge topics in Section 5.

- Use the cloud planning worksheet to plan out your answer.
- In small groups, compare the planning documents that you have developed.
- Challenge each group to write an overall evaluation and synthesis conclusion based on the plans of the other groups, using the PEEL worksheet to help construct it.

### Reflection



Now that you have read this chapter, reflect on these questions:

- Do you know how to approach the different command terms in examination questions?
- Can you match up the command terms with the different assessment objectives (AOs)?
- Do you know how to plan answers to extended-response questions?
- Do you know the differences between SL Paper 1 and HL Paper 1?

# 7.2

# Approaches to Paper 2

## UNDERSTANDINGS

By the end of the chapter, you will have:

- ▶ gained an understanding of how to prepare for Paper 2
- ▶ looked at sample Paper 2 questions and been guided on how to approach them
- ▶ understood how the mark scheme is applied to a Paper 2.

## Introduction

Paper 2 is a source-based examination paper that addresses the common SL and HL topics in an integrated way. There will be four sources on a common topic and four compulsory questions.

The main purpose of Paper 2 is to assess your ability to interpret and analyse new information and relate this to the concepts, content and contexts you have learned in the course.

### ■ Overview SL/HL Paper 2

<b>Weighting</b>	SL 30%, HL 20%
<b>Duration</b>	1 hour 15 minutes
<b>Total marks</b>	24 marks
<b>Paper details</b>	Four questions: 2 marks, 4 marks, 6 marks and 12 marks

## Preparing for Paper 2

You can practise Paper 2-style questions at any point in the course. When learning about the content of the course, you can practice questions similar to questions 1 and 2. When you are studying a specific context, attempt extended-response questions similar to Questions 3 and 4, making links to different concepts.

You will use the steps below at different points in your learning.



## ATL ACTIVITY

### Social

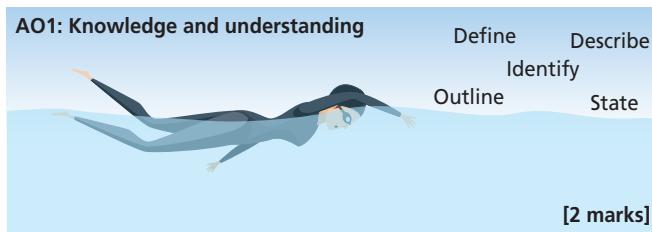
Select a topic that you'd like to explore further with a partner.

- Identify a recent news article for one of the topics studied in class.
- Find four additional sources related to the topic from the following list, considering different perspectives:
  - one text source (such as a news article or research article)
  - one social media post (for example on Twitter or Instagram)
  - one visual (an image, diagram or infographic)
  - one set of data (for example graphs, tables, statistics)
  - one multimedia post (for example an excerpt from video or podcast).
- Explain to your partner why you chose each source and how it relates to the topic and the other sources.

# Approaching each question

## Question 1 (2 marks)

You will be required to demonstrate your knowledge relating to one of the sources. This could include interpreting the data presented in the source, identifying a claim or perspective, or linking it to a digital society topic.



## Top tips

Use the reading time to become familiar with the four sources and which source is referred to in each question. When the question asks you to 'identify' or 'state', it is acceptable to use bullet points in your answer.

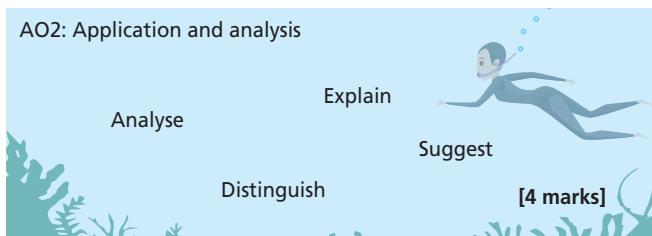
## Question 2 (4 marks)

### Top tips

Use elements of PEEL when answering any AO2 or AO3 questions.



You will be required to apply or analyse information from one or more of the sources. This could be identifying the differences between the claims made in two of the sources, or giving reasons from a particular perspective.



### Top tips

Make sure you know how to approach the command term in the question, use your knowledge from the course, and make specific reference to the sources when writing your response.

Using transition words and phrases can help you signal to the examiner that you are demonstrating critical thinking. Practise using these words within your answers.

#### ■ Using transition words and phrases in your responses

Command term	Transition words and phrases
Analyse	Furthermore ... In addition ... On the other hand ...
Distinguish	One difference is ... (focus on first item), and a second one is ... (focus on second item)
Explain	Because ... Due to ... One factor causing this is ...
Suggest	One solution could be ... One proposal is ...

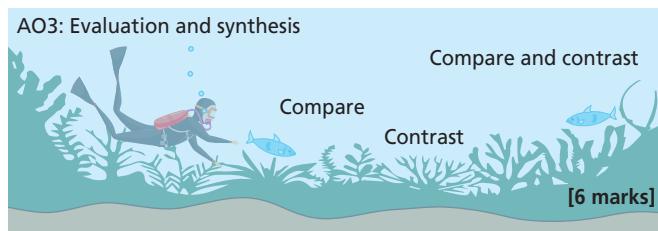
### ■ Question 3 (6 marks)

Question 3 requires more insight into the information provided by two of the sources. Comparing ('source X is similar to source Y ...') or contrasting ('source X is different to source Y ...') the information provided in the sources is the main focus of this question.

You may be asked to do both, **compare and contrast**, where you will be required to provide both similarities and differences of the two sources in order to earn full marks.

When writing your responses, you should use keywords such as 'whereas', 'in contrast', 'likewise', 'similarly' and 'however'.

Note that the command terms 'distinguish' and 'contrast' both require you to identify the differences, but in Question 3 you will be required to give a more detailed account of the differences.

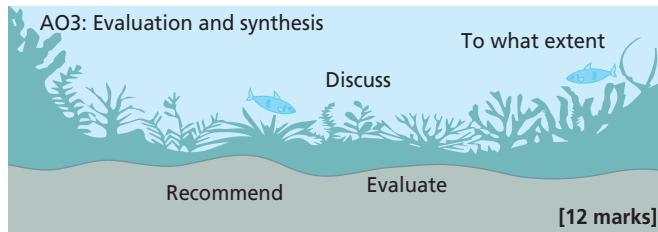


#### Top tips

This question is worth more marks than Question 2. Make sure that you refer to both sources in your answer, giving enough detail and making enough valid arguments.

### ■ Question 4 (12 marks)

Question 4 is an extended response and is worth 50% of the marks on this paper. Therefore, you should aim to spend at least 35 minutes writing this essay. This question will integrate the 3Cs: concepts, content and contexts.



When evaluating, responses may be signposted with keywords such as 'overall', 'therefore', 'in my opinion' and 'weighing up'. You should use the points made previously to support your evaluation, otherwise it is only an opinion.

## Mark scheme

In addition to a list of paper-specific analytic mark scheme points, marks for Question 4 are also allocated using markbands. While level descriptors are written in the form of individual bullet points, markbands are applied holistically using a best-fit approach.



### Before starting to write

- Spend several minutes planning out the essay so that your response is well structured and organized. Use the ‘cloud’ worksheet from Chapter 7.0 to help you plan.
- Take specific note of the command term used and what the question is asking. Make sure that you are answering the question asked, not the question that you wanted. Is it referring to one of the concepts?
- To show in-depth, accurate knowledge, you must use what you have learned during the course about the information in the sources and apply it to the question.
- Throughout your response, use information and examples from the sources, so that there is explicit reference to support your narrative.

## Practice Paper 2

Now that you have some understanding about Paper 2, here is a sample Paper 2 including sources, questions, mark scheme and sample answers. Try to approach this as if you were in examination conditions. Read the sources and questions, and use the tips and guidelines to write your answer. Once you have finished, refer to the mark scheme to see how well you did.

### Top tips

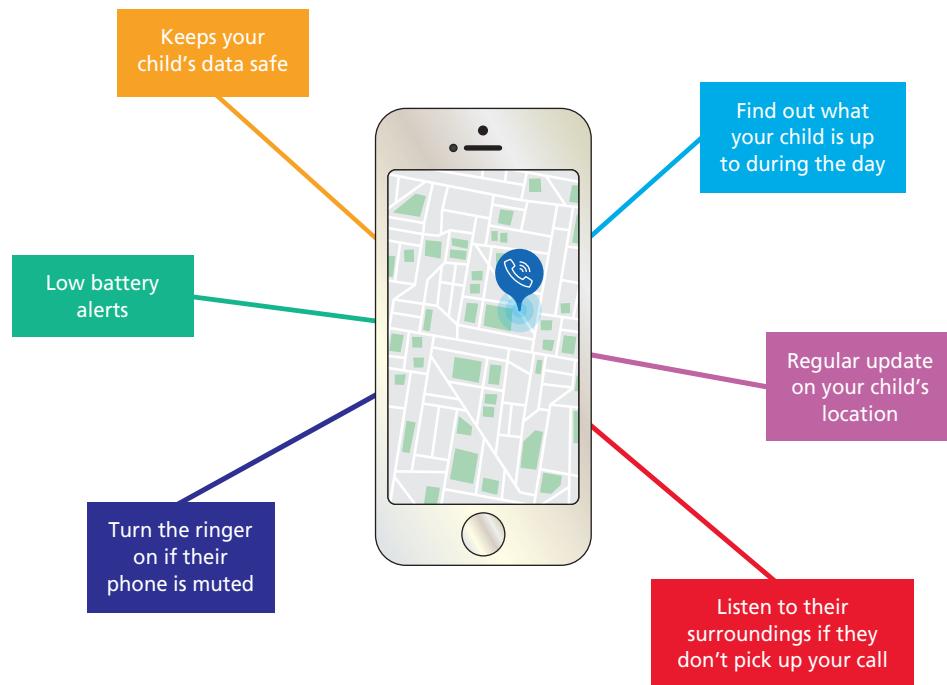
When writing an extended response, be sure to develop your answers. For example, when you make a claim, support it with details and examples, and connect it to the overarching question. Evaluate the significance of the points being made compared to other points and the implications of your arguments.

### EXAM PRACTICE QUESTIONS

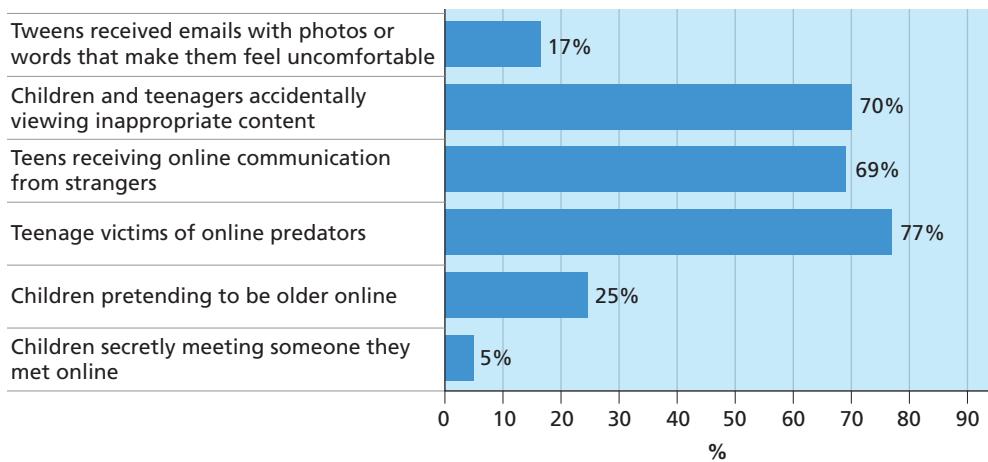


#### Paper 2

##### Source A



### Source B



■ Online behaviour of teenagers

Adapted from [www.guardchild.com/statistics](http://www.guardchild.com/statistics) and [www.mmguardian.com/blog/should-parents-monitor-their-childrens-texts-and-phone-activity](http://www.mmguardian.com/blog/should-parents-monitor-their-childrens-texts-and-phone-activity)

### Source C

#### Parents monitoring of children

There are a number of reasons why monitoring a child's phone makes sense.

These can include seeing if they are cheating in their school work, texting undesirable people or to protect them from being cyberbullied or being groomed by child predators.

A 2016 study published by Pew Research Center found that parents feel compelled to take a wide range of steps to oversee their teenagers' online activities and convince their children to use mobile phones in an appropriate and conscientious manner. These include:

- checking the websites that their teenagers visited
- befriending or following their children on social media
- knowing the password of their child's cell phone
- going through their child's call records and text messages
- holding talks with their children about suitable behaviour when using mobile phones
- introducing rules or 'digital punishments', such as taking away their children's mobile phones as a reprimand
- using technology to supervise the cell phone habits of children or track their child's location.

However, parents are aware that their children may be taking additional steps to circumvent the measures their parents are putting in place, and as a result hiding certain aspects of their online presence.

*Adapted from [www.mmguardian.com/blog/should-parents-monitor-their-childrens-texts-and-phone-activity](http://www.mmguardian.com/blog/should-parents-monitor-their-childrens-texts-and-phone-activity) and [www.wired.com/story/parents-should-monitor-teens-electronics](http://www.wired.com/story/parents-should-monitor-teens-electronics)*

#### Source D

### The ethical dilemma

Parents are responsible for their children until they reach adulthood, and they are most likely paying for their phones, but is it ethical to spy on your children without their knowledge? Could this lead to a lack of trust in the relationship between teenagers and parents? Will the use of tracking technologies create a culture of surveillance parenting? Some important aspects to consider include:

- 1 Some companies are tracking for profit. Tracking apps typically collect data that can be sold to third parties such as advertising agencies. The apps use push notifications to gain as much data as possible.
- 2 Risks of leaking private data. Should the data become de-anonymized, there is the potential for serious breaches of privacy. Information related to children's whereabouts can reveal valuable data about them.
- 3 It can break the trust that is central to a healthy parent and child relationship. Tracking apps diminish this trust and could potentially push the child towards rebellion.

*Adapted from <https://theconversation.com/why-parents-should-think-twice-about-tracking-apps-for-their-kids-114350>*

#### Questions

- 1 With reference to Source A, identify two uses of the mobile tracking app by parents. [2 marks]
- 2 With reference to Source B and knowledge from the course, explain two ways a child may be at risk when using their mobile phone. [4 marks]
- 3 Compare and contrast what Sources C and D reveal about the impacts of mobile phone monitoring on parents and teenagers. [6 marks]
- 4 From parents tracking their child's phone to the use of location services in apps and the nationwide monitoring of citizens to control the spread of infection during the pandemic, mobile phone users are being tracked in many aspects of life. With reference to the sources and your own knowledge, discuss whether the use of mobile phone monitoring and tracking has enabled the abuse of power. [12 marks]



## Top tips

For Question 1, view the image of what the app can do and make a link to how a parent may use it.

Consider using the following writing framework:

*A parent may use the tracker to:*

- *Use 1: ...*
- *Use 2: ...*



## Top tips

Question 2 is worth four marks, so provide two reasons. The information in the source presents statistics related to online behaviour of students. Use your knowledge of digital citizenship and the statistics to explain how children may be at risk when using their phones.

Consider using the following writing framework:

*One risk is ... This may be because ....*

*Another risk is ... because....*



## Top tips

Question 3 is worth six marks. Review the mark scheme for guidance on how to structure your answer. For example, topics from the articles could include trust, privacy and protecting the child. Once you have the ideas, make reference to both sources when making your arguments.

Consider using the following writing framework:

*In Source C ... parents ... trust ... which can be seen in ...*

*In contrast ... in Source D ...*

When writing your responses, you should use keywords such as 'whereas', 'in contrast', 'likewise', 'similarly' and 'however' to clearly identify the connection between the two sources.



## Top tips

For Question 4, plan your essay so that your response is well structured and organized.

- Take specific note of the command term used and what the question is asking. 'Discuss' means to provide a balanced argument, with opinions and conclusions based on the arguments being made.
- Make sure your essay includes a final paragraph where you are able to provide your opinions and conclusions based on the arguments developed in the body of the essay.
- To show in-depth, accurate knowledge, you must use what you have learned on the course about the information in the sources and apply it to the question.
- Use what you have learned in the course to add more detail to the points made in your plan, developing each point made.
- Throughout your response, use information and examples from the sources, so that there is explicit reference to support your narrative.
- From the sources, identify examples of when mobile phone monitoring has been used to give someone more or less power. Relate this question to specific contexts that you have studied on this topic. Use these as specific examples in your narrative.

# Mark schemes and sample student responses

## Sample student response

- 1 Source A shows that parents can use this app to check their child's location when they go out with their friends. They can also use it to make the phone ring if their child has muted it.

### Mark scheme

- 1 Answers may include, but are not limited to the following points.

A parent may use the tracker to:

- check on their child's location when going out with friends
- alert the child if they are trying to contact them and their sound is off
- check that their child is where they say they are
- allow their child to go out independently, because parents have a way to check that they are safe
- check on their child if they are not answering their phone.

## Sample student response

- 2 Source B shows a child may be at risk because the internet hosts a range of inappropriate content, or content intended for mature audiences, a child may be at risk of accessing content related to drugs, alcohol, pornography or violence. Another risk is that teenagers may be approached by online predators. Catfishing is when people pretend to be someone else online and this may result in inappropriate relationships between young users and adult users. This could result in the transmission of inappropriate photos or even unsafe meet-ups in real life.

### Mark scheme

- 2 Answers may include, but are not limited to the following points.

A child might be at risk due to the following:

- a child pretending to be older to register for sites that have content designed for adults, which may cause psychological harm
- a child accidentally accessing inappropriate content, which they might copy, that may cause them physical or mental harm
- a child may meet with a stranger who may cause them physical or emotional harm.

One mark for each point, up to a maximum of two marks; and one mark for each development of the point up to two marks.

## Sample student response

- 3 Both sources discuss parents tracking their children's cell phone use. While Source C presents different methods of how parents can monitor their children's device activity, Source D focuses on the risks that this monitoring creates for children.

Regarding data, Source C focuses on a range of ways that parents access data and usage information from their children. It does not discuss the privacy risks of that data being further accessed by other stakeholders. Two of the key claims in Source C focus on third parties accessing the data, either through resale or leaking of data from tracking apps.

Both sources indicate that building a strong relationship is one way of fostering safe and responsible mobile phone use. Source C encourages discussing suitable behaviour, or even enforcing consequences by taking the phone away, while Source D demonstrates that sometimes fostering a safe and responsible way can be unethical, especially if the teenager is unaware of their parents' actions.

## Mark scheme

- 3 Answers may include, but are not limited to the following points:

■ **Trust:** Source C includes activities performed by adults that suggest a lack of trust of their children, including the checking of websites visited, going through their child's call record and installing apps. In comparison, Source D highlights that parents who monitor their children do not build a trusting relationship.

This could have a negative impact on parents' relationship with their teenagers, and teenagers may rebel against these actions as a result.

■ **Privacy:** Source C describes ways that adults breach the privacy of their children, for example having access to the pin code of their phones, in particular if it is without their knowledge or consent.

In comparison, Source D also describes breaches of privacy, specifically when parents who have installed the tracking apps have not read the terms and conditions about what data is collected by the company and who it is shared with, for example advertising agencies. There is also the risk that data can be de-anonymized and reveal information about the child including their online behaviour and communications.

Both sources demonstrate a loss of privacy, whether it is from their own family members or third parties. How this data is used will determine the impact it has on the child.

■ **Protecting the child:** Source C, states that parents feel compelled to protect their teenagers when using their mobile phones to go online.

They use a range of methods from education to monitoring.

In contrast, however, Source D claims that, instead of protecting the child, these activities can have the opposite effect and could ultimately lead to rebellion.

In comparison, the idea of children rebelling in Source D is supported in Source C which says that children will bypass measures put in place by their parents.

Overall, parents need to find a balance between protecting their teenagers from exposure to undesirable content and people, and overprotecting them, which could leave them unprepared for adulthood or force them to rebel and potentially be exposed to more undesirable impacts.

■ **Ethics:** Source C observes that it is the parent's moral obligation to protect their children, which is supported by the opening statement in Source D. However, Source D highlights that the measures taken by parents can lead to unethical surveillance parenting.

Overall, a parent may have a differing opinion and will justify their actions to be ethical.

Do not expect all of the points above, and allow other valid points. Award marks for each effective point of comparison up to a maximum of six marks. If the view of only one source is discussed, award a maximum of three marks. For responses that discuss the sources separately, rather than in a continuous comparison, award a maximum of four marks.

## Sample student response

The sample below is an example of a conclusion based on the argument points that you need to have explained previously in your response.

4 Overall, parents can use mobile phone monitoring to retain power or control over their children as they navigate their way from childhood to adulthood. As Source C suggests parents can use a range of tools to monitor their child, whether it is through unlocking their phone to read their text messages or installing software so that they can see what they are looking at, who they are chatting with and how much they are using their phone. Perhaps their children do not talk to their parents as much as they used to and so, in this way, parents will have more knowledge. Knowledge can lead to power; so, for example, a parent knowing more about their child by using apps such as those in Source A can help them feel as if they still know them and make parenting decisions based on this. The power can also be in the form of control, for example, a parent may feel that their child is spending too much time on the phone, which is not good for their well-being, or can be victims of online predators or view inappropriate content as shown in Source B and so can intervene using technologies to impose screen time limits, for example. Overall, as parents are ultimately responsible for guiding their children to becoming good digital citizens, such technologies can help them take back some control of their children, which they are doing for their own good.

As well as monitoring mobile phone usage of children, the same issues of power and control are also very real in a number of other situations. For example, an abusive person may track their partner's phone, often without their knowing about it. Location services use tracking to determine if locations around the city are busy or not, and this is very useful for drivers to determine the quickest way to go; as Source D states, companies are tracking for profit and but they also have the potential to provide some form of advertising to passengers in the car as they browse their social media and news apps. Track and trace of citizens is very useful during emergencies, such as during the Covid-19 crisis, but many people were worried that it could become another form of government control, which has happened in some countries. So, overall the situation is the same for all types of tracking – there are benefits but the negatives need to be addressed explicitly and effectively, otherwise people might start to take action with their mobile phones to limit the tracking.

## Mark scheme

4 Question 4 is assessed using markbands in conjunction with these marking notes.

Arguments may include, but are not limited to:

- Mobile phone monitoring to enable power
  - From Source C: parents can use mobile phone monitoring to retain power or control over their children as they navigate their way from childhood to adulthood.
  - Parents who monitor their children may empower their children to have more freedom and independence.
  - Location services in apps give companies more data about a subscriber's location and activities; this empowers the companies to provide more targeted advertising.
  - Governments have used track and trace apps to monitor citizens, which has given them the power to identify citizens who have been in close proximity to a virus.
- Mobile phone monitoring to abuse power
  - Source D identifies the misuse of power, with the tracking apps selling data to third parties.
  - Parents using tracking apps without their child's knowledge is unethical and could be considered an abuse of power by adults.
  - Likewise, location services can provide location data to companies that might misuse the data and sell it to third parties or the government.
  - Mobile phone monitoring apps have the potential to be hacked and put power into the hands of the hackers.
  - Governments have used track and trace apps to monitor people's movements in order to track the spread of a virus in a pandemic; however, some countries have used location data for other purposes, for example the tracking of criminals.

### Markband

The top markband for this question is 10–12 marks.

10–12 marks

- The response is focused and shows an in-depth understanding of the demands of the question.
- Relevant and accurate knowledge is demonstrated throughout, adding insight to the response.
- There is consistent and effective integration of evidence from the sources.
- The response is well-structured and effectively organized.

## Reflection



Now that you have read this chapter, reflect on these questions:

- Do you know how to select sources on a topic so that you can practise Paper 2?
- Do you know how to approach each question in Paper 2?
- Have you tried a practice Paper 2?
- Can you use the mark scheme to guide you on how to write extended responses?

# 7.3

## Approaches to the HL pre-release and Paper 3

### UNDERSTANDINGS

By the end of the chapter, you will have:

- ▶ gained an understanding of the HL pre-release and its relationship to Paper 3
- ▶ gained an understanding of how to prepare for Paper 3 using the HL pre-release and your work on challenges and interventions
- ▶ looked at a sample pre-release and associated Paper 3 with answers
- ▶ seen how the mark schemes and markband level descriptors in the study guide are applied to a practice Paper 3.

### Overview of the pre-release and Paper 3

This chapter covers how to approach the HL Paper 3 and contains a practice pre-release and Paper 3, with a mark scheme and sample answers. Before continuing, you need to read the example below, and look at the specimen papers and mark schemes.

#### ■ Overview of HL Paper 3

<b>Weighting</b>	25%
<b>Duration</b>	1 hour 15 minutes
<b>Total marks</b>	30 marks
<b>Paper details</b>	Based on pre-release material Four questions: 4 marks, 6 marks, 8 marks and 12 marks

The paper contains four questions designed to assess your knowledge and understanding of interventions for a particular HL extension challenge topic and your ability to evaluate them and to recommend steps for further action.

A pre-release will be published prior to the examination that specifies the real-world context of the particular challenge topic that is the focus of the questions. The pre-release will contain specified interventions that are applied to the issues of the challenge topic. You will need to investigate these interventions using extended inquiries.

The results of your extended inquiries into the specified interventions will most likely be needed to respond to Question 4.

Paper 3 will include additional material linked to the specified real-world digital interventions in the pre-release. In addition to the information contained in the pre-release, you will need to consider connections to the digital society concepts, content and contexts in order to respond to the questions, to understand the issues of the challenge, to evaluate the interventions and to recommend steps for future action.

It is recommended that a significant amount of the 90 hours for the HL extension be devoted to the study of the challenge topics and the related interventions that are researched and analysed. The rest of the time should be devoted to the study of the interventions in the pre-release, and practising for HL Paper 1 Section B and HL Paper 3.

# Preparing for Paper 3

Before you read further, go to the sample Paper 3 on page 405, read it and then return to this page and continue.

The most important factor in your preparation for Paper 3 is the requirement of Question 4: the need to include material from ‘your own inquiries’. Question 4 is worth 12 marks (40% of the mark for Paper 3). If your response to Question 4 does not contain significant direct detail (who, when, where, what) from your own extended intervention inquiries, it is likely to be marked in the 4–6 markband, while good use of your own inquiries would be marked in the, 7–9 markband.

The pre-release will specify the real-world context from part of a selected challenge from the digital society HL extension. You must use the pre-release statement to plan and conduct extended inquiries into the digital interventions mentioned and others associated with the context. This is to be done in the time between the publication of the pre-release and the date you will sit the Paper 3 examination. The information in the pre-release may include possible resources, terms and approaches to help you with your extended inquiries. If you are lucky, you might conduct an inquiry into a context and intervention that is used in the actual Paper 3.

Paper 3 will include a stimulus about a specific real-world digital intervention to the challenge outlined in the pre-release, and your extended intervention inquiries should provide you with extra material to compare and contrast with this intervention and to make recommendations about which intervention/s should be used.

In your extended intervention inquiries, you need to also include connections to the digital society concepts, content and contexts:

- The appropriate concepts need to be applied to your own inquiries.
- Content details of the digital technologies used need to be researched.
- Different contexts, as well as the one presented in the pre-release, need to be a focus of your own inquiries.

You also need to make use of the various types of interventions: mitigates, intercedes, enhances and resolves. You need to be able to categorize the interventions in the pre-release, and those in your own inquiries, using one or more of these categories. You should also consider explaining why the intervention does *not* fit a particular category.

All the intervention evaluation criteria – equity, acceptability, cost, feasibility, innovation and ethics – need to be used on the pre-release intervention(s) and your own interventions; if they cannot be used, say why. Remember, there is more than one way of applying these criteria, apart from the obvious way.

## ■ Notes preparation

In the days before the Paper 3 examination, you need to summarize all your notes from your own inquiries based on the pre-release material in the format of the example intervention inquiry in Chapter 6.2.

## ■ Using your notes – evaluations and recommendations

You need to develop comprehensive and well-supported evaluations of the interventions focusing on how they *are* and *are not* successful in addressing the specific challenge in the pre-release, in as many aspects as possible. Classify them into strong and weak levels of success and not being successful.

You need to make a number of detailed recommendations on how to improve the success of the interventions in addressing the specific challenge in as many aspects as possible. For each one, you

need to explain how they will improve the response to the challenge, and how the improvement may be limited in its success because of trade-offs and negative implications if implemented. No recommendation will completely address a particular challenge as they are complex.

## ■ Practice questions

In order to understand the focus of each type of question and the various command terms used in each question, practise designing and answering questions. You can see how this can be done in the sample questions for the practice pre-release that follows.

Ensure that you have understood the various command terms, and how to answer the questions that include them by revisiting the explanations and descriptions in Chapter 7.0.

# Practice pre-release

The pre-release statement below contains the real-world nature of a selected challenge from the digital society HL extension. The information presented in it includes possible resources, terms and approaches to consider for an extended inquiry.

The pre-release statement should be used to plan and conduct extended inquiries into relevant digital interventions to prepare for Paper 3, and possibly use in the responses. The length of the pre-release is about 400 words maximum.

## PRACTICE PRE-RELEASE

- **Topic:** Global well-being challenge
- **Area for Inquiry:** The future of work
- **Focus:** The gig economy

The image is a word cloud centered around the concept of the gig economy. The most prominent word is 'GIG ECONOMY' in large blue letters. Surrounding it are various other terms related to the topic, such as 'CONTRACTOR', 'SELF EMPLOYED', 'FREELANCER', 'WORKFORCE', 'LABOR', 'INCOME', 'HIRE', 'SUPPLEMENTAL', 'PART TIME', 'TEMPORARY', 'SHORT TERM', 'CONTRACT', 'PAY', 'FUTURE', 'REMOTELY', 'ONLINE', 'HOME', 'MONEY', 'LABOR', 'WORKERS', 'PEOPLE', 'LABOR MARKET', 'Contract', and 'Labor Market'. The words are in different colors (blue, green, yellow, red) and sizes, creating a dynamic visual representation of the complex nature of the gig economy.

The development of smartphones and apps has facilitated a new form of service and product delivery called the gig economy. The gig economy has become popular with workers as it provides flexible access to paid work. Businesses also enjoy the benefits of being able to hire workers in a flexible manner.

An example of a gig worker is Paul, who works at a local furniture manufacturing company. He increases his income by doing gig work during the evenings and at weekends. He has worked as a ride-share driver for companies such as Uber, and uses apps such as Airtasker to find small jobs in his local area.

### ***Challenges***

- Businesses need to develop a way of maintaining contact with gig workers so that they can organize the work that needs to be done.
- Gig workers need job security and rewarding work so that they can continue this type of work.

### ***Interventions***

Businesses, especially larger ones, have developed specialised apps, while others, usually smaller businesses and individuals, rely on community-based marketplace apps to gain the benefits of the gig economy. The focus of the investigation will be on two different models for organising the gig economy:

- ride-share apps developed by a specific business, such as Uber
- gig work apps developed for use by members of the community in an open marketplace, such as Airtasker.

### ***Issues***

Creating an easy-to-use app for gig workers is challenging. It needs to provide all the information required in an appropriate and clear format, and must have intuitive features that businesses and workers will find useful, such as access to payment records.

The gig economy has raised a number of practical, legal and ethical issues for workers that need to be addressed by businesses and government regulators. These include:

- consideration of the role of trade unions
- lack of recognition of laws and regulations relating to work
- the use of ratings systems
- working conditions
- safety considerations.

Another issue for the companies is that some ride-share and delivery services have accumulated financial losses, then tried to make a profit by passing costs on to their workers and the people and companies they serve.

Are these interventions incremental or disruptive innovations? It can be argued that ride-share companies are taking business away from established transportation services and companies, even though they are using innovative digital technologies. It can also be argued that small job apps are very efficient and effective in connecting people who want jobs done with those who can do them, which seems to be truly innovative.

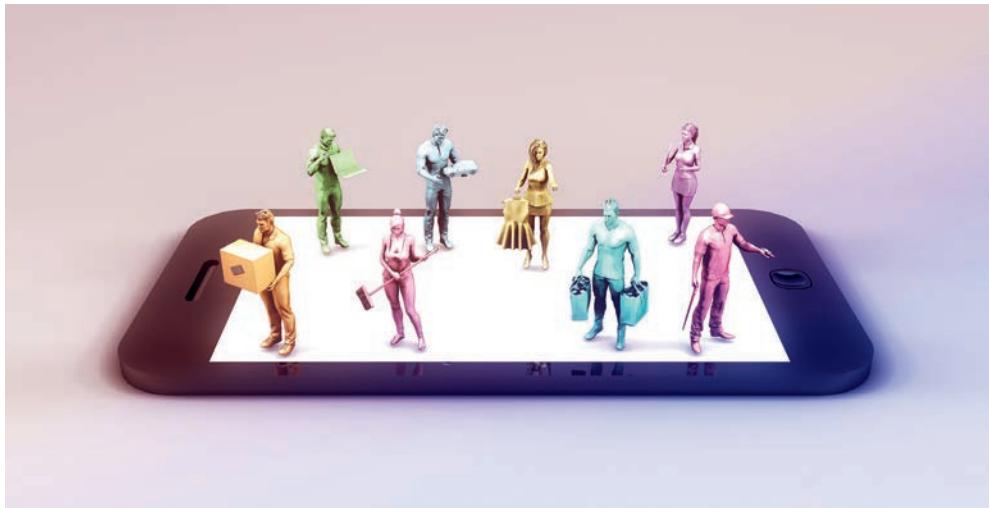
### ***Investigation***

Conduct extended inquiries into the real-world contexts of these interventions, and the impacts and implications for real-world businesses, workers, people and communities, especially in your local cities and regions.

Investigating a variety of sources about the impacts and implications is an appropriate starting point. Interviewing actual gig workers, gig employers and other people associated with them should also be done if possible; reviewing comments on social media and elsewhere about gig work is a useful substitute if not.

You also need to:

- use the concepts as lenses to explore the issues involved to help develop questions about the gig economy
- use the content topics to explore the range of technologies involved in the interface between businesses and workers, as well as the underlying technologies, such as backend business database systems and networks.



■ Gig economy workers

## Practice Paper 3

Paper 3 includes stimulus material about a specific real-world digital intervention implemented to address these challenges. Your responses to the questions that follow need to reference your extended inquiries into specific examples of these interventions. You should also consider relevant connections to the concepts, content and contexts.

### EXAM PRACTICE QUESTIONS



#### Paper 3

The stimulus material below provides information about a digital intervention to the challenge described in the pre-release statement. After carefully considering the material, answer all the questions that follow using the stimulus and your own knowledge from the course.

#### Source 1

##### Intervention feasibility

Paul is a gig worker who works at a local furniture manufacturing company. He increases his income by doing gig work during the evenings and at weekends. He has worked as a ride-share driver for companies such as Uber, and uses apps such as Airtasker to find small jobs in his local area.

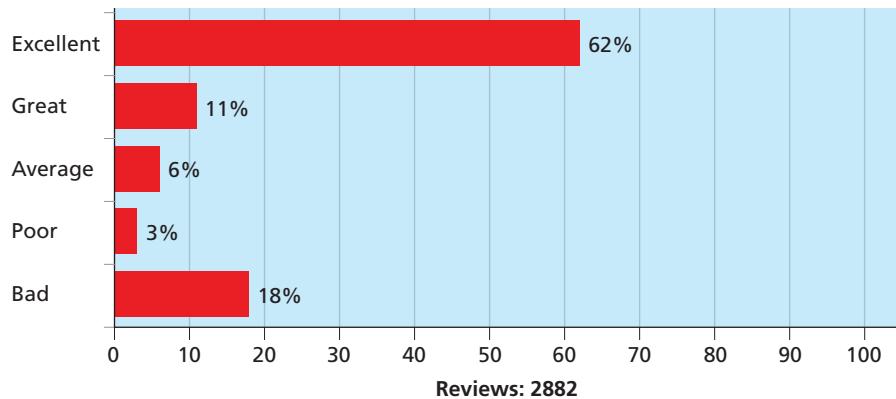
Before becoming a gig worker Paul investigated these two ways of increasing his income by looking at reviews of both Uber and Airtasker. He then contacted friends, relatives and local people who used the apps to obtain gig work. He also found online reviews from ride-share drivers and passengers, as well as from gig worker job posters and taskers.

After this research, he felt that gig work could provide secure and meaningful employment.

## Source 2

### Intervention acceptability

The following chart gives a summary of some gig work app reviews:



Mostly they were very good, but there were clearly issues for a significant number of people who worked as gig workers, or people who used the ride-share and job task apps.

## Source 3

### Intervention cost and equity

#### Taken for a ride!

Hundreds of drivers for ride-sharing apps used in New York claim they have been deceived with false promises of big earnings, according to court papers. The drivers claim the company wrongly classified them as independent contractors in a bid to deny them appropriate pay and job security.

In a lawsuit, a driver claimed he earned less than US\$5 an hour after taxes and expenses, well below the US\$15 an hour minimum wage in New York City. This led to negative impacts on him and his family from the extra hours he had to work to take home a reasonable wage.

Adapted from the New York Post: <https://nypost.com/2021/03/13/like-uber-ride-sharing-app-via-accused-of-mistreating-drivers>

#### Source 4

### Interventions as innovations

Unions have produced reports looking at the implications for workers in the gig economy, especially those that provide online-facilitated, task-based work. These reports explore the risks associated with the breakdown of traditional jobs into short-term tasks. The reports say that gig economies have used the cloak of innovation to pursue unethical and outdated labour practices.

*Adapted from <https://apo.org.au/node/68082>*

#### Questions

- 1 Knowledge and understanding questions (identify and describe command terms).
  - a **Identify** two ways/methods that Paul could be notified by gig work apps, such as Airtasker, of a job that has been posted that he might be interested in responding to. [2 marks]
  - b **Identify** two features of a gig work app, such as the Airtasker app, that help Paul to organize his gig work. [2 marks]
- 2 Application and analysis questions (explain and distinguish)  
**Explain** how an app's backend digital technology, such as that used by the Uber app, facilitates the payment of workers in a reliable way. [6 marks]
- 3 Evaluation and synthesis questions (evaluate and discuss)  
With reference to your inquiries into gig work apps and the gig economy, **discuss** the ethical issues that have emerged for Paul. (Ethics criterion) [8 marks]
- 4 Evaluation and synthesis questions (recommend and evaluate)  
The success of ride-share apps such as Uber is based on the assumption that they should be able to address the challenges of providing secure and rewarding work for gig workers as well as meeting the requirements of the ride-share companies.  
Based on an evaluation of the current working conditions for gig workers, **recommend** improvements to ride-share apps that would enable them to satisfy the requirements of both Paul and the ride-share companies.  
Your response should include your inquiries into how the gig economy operates as well as the implications for workers such as Paul. [12 marks]

### Top tips

Question 3 may focus on one or more of the criteria for evaluation of interventions and recommendations.

### Top tips

The actual Paper 3 will contain stimulus material based on a specific scenario, as above. You will be expected to incorporate this information with the research carried out in the time allocated to the study of the pre-release statement.

When answering Question 4, do not be tempted to 'regurgitate' a standardized response. These types of responses do not address the specific requirements of the question well enough and are unlikely to move you beyond the 'adequate' markband.

# Mark schemes and sample student responses

Note that some of the sample student responses given below are more detailed and comprehensive than you could provide in the limited time of the actual exam.

## Mark scheme

- 1 a** Award one mark for a way or method identified if the way/method is a specific type. The name of an app is not to be awarded marks unless it is combined with the type of method.
- b** Award one mark for each feature if it enables Paul to select tasks that have specific characteristics.

**1 a** Answers may include but are not limited to: Email, text message (SMS/MMS), messaging apps (such as WeChat, Messenger), messages or alerts section of the gig worker app, alerts from the gig worker app that appear on his smartphone.

- b** Answers may include but are not limited to:
- a browse tasks feature with various filters for type of work and location
  - Paul can specify his skills and experience, which can be matched with the tasks offered and then displayed
  - Paul can specify the time and location that he is prepared to work
  - Paul can specify the amount of money to be paid for the task.

## Mark scheme

- 2** Award up to four marks for the description of the steps used to record the task details, and calculate and pay the driver the correct amount. At least four different steps are required covering data collection, processing of the data and how the payment is made.

Award up to two marks for an explanation of two reasons why the reliability of payment is achieved.

- 2** Answers may include but are not limited to the following descriptions and explanations:

### Description of steps

- Using the app, the driver sets up a direct deposit process by supplying their bank account details to the ride-share app company.
- The driver accepts a driving task and performs the task.
- When a task has been finished, the ride-share app's backend digital systems will calculate the payment to be made to the driver. The amount depends on the distance of the journey, the time it took and the time of day, as the rate charged to the passenger varies according to how high the demand is and other factors such as cancellations and road tolls. The details of the task are stored in the backend database.
- Once each week, on the same day, the total payment for the work done is made to the driver's specified account.
- The driver is notified of the transfer, the total amount and the full details of each trip by email, or by using a statement feature of the ride-share app or website.

## Explanation of reliability

- The transfer of the payment is done through a secure payment transfer method to the account of the driver.
- The amount of the payment is determined reliably by a standard process using the data and programs in the backend digital systems.
- The details of the payments are available for the driver to check easily.
- If there is a problem with the payment, the driver can resolve the issue by checking the data stored in the systems and by supplying other evidence.

## Mark scheme

3 The top markband for this question is 7–8 marks.

7–8 marks	<ul style="list-style-type: none"><li>● The response is focused and shows an in-depth understanding of the demands of the question.</li><li>● Response demonstrates sustained evaluation that is relevant and well-supported throughout.</li><li>● The response is well-structured and effectively organized.</li></ul>
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3 Answers may include but are not limited to the following ethical issues:

- The gig work app is a new way of organizing tasks to be done, and it is partially outside the legal and ethical requirements put in place by existing business regulations and union control. This means that there are few regulations, policies and laws to govern it and prevent harm to posters and taskers. This can lead to unethical actions and harmful outcomes.
- The review system in the gig work app allows for reviews from both taskers and posters, but they are not reviewed for truthfulness unless a complaint is made or if the review does not meet their guidelines. This may adversely affect Paul as well as posters, who may not be allowed to post or perform tasks. This is unethical.
- The standard of skills of the workers on the app may be incorrectly described. A tasker may be deceiving the poster if they do not have the required skills to do the work. This is unethical.
- It may be possible to post unethical tasks, for example, students may post a task for someone to do their school or university assignment. This means that cheating is being facilitated, which is unethical.
- Payment for tasks is open for some negotiation between posters and taskers, which means it may vary for a similar task. This means that taskers and posters may pay, or be paid, too much or too little. This is unethical.
- A poster may be a company that needs an extra worker for a task, but the payment could be at a lower rate than a normal worker and with worse conditions. This means the poster is cheating the tasker, which is unethical.

The following sample shows one student's conclusion for Question 3:

The most important concern that underlies many of the ethical impacts listed above is the lack of monitoring of the arrangements between the poster and tasker. The app company is basically a facilitator and is not involved in the direct interaction between poster and tasker to a significant degree.

At the centre of this concern is that the tasker lacks secure work for a stable and reliable income, and also lacks the benefits that have been developed over time for most permanent jobs. This can lead to unethical conduct on the part of the poster and the tasker as listed

in the examples. This can be seen as exploitation of taskers, especially those that struggle to get permanent work and will take on many of these tasks under unethical conditions just to make a living.

Clearly these concerns can be addressed through more ethical arrangements between the poster and the tasker, which should be monitored by the app company as the central facilitator. Specific ethical concerns can be addressed by a set of criteria that the company can apply to the arrangements between poster and tasker. These criteria would best if made into a law and monitored by the government.

The sample answer above would be awarded the top markband and goes beyond the expectations of a response written under examination conditions in terms of length and detail.



The response is focused and shows an in-depth understanding of the demands of the question:

- There are a significant number of points, relevant and pertinent, that show an in-depth and focused understanding of the ethical considerations.
- There is a final, well-justified conclusion that draws the points together, which naturally leads to a recommendation, if it was required by the question.

The response demonstrates sustained evaluation that is relevant and well-supported throughout:

- The points are relevant to the various reasons for the ethical issues.
- The points are clear and explained well, providing reasons why the situation is an ethical issue.
- A fully developed use of these points would use connecting terms such as, ‘furthermore’, ‘additionally’, ‘however’, ‘but’, ‘conversely’, ‘likewise’, ‘in addition’, ‘on the other hand’ or ‘whereas’ to show evaluative and analytical connections between the ethical issues.

The response is well-structured and effectively organized:

- The list of points can be well structured using the connecting terms in the previous bullet point.
- The overall conclusion compares many of the points made to form an argument.

### ATL ACTIVITY

#### Thinking and communication

Develop a complete written response to the question using the points listed above, making connections between them and including your own version of the conclusion. Show your response to other students and your teacher for comment.

### Mark scheme

- 4 This question focuses on the intervention evaluation criteria of cost and feasibility, which are connected to the words in the question: ‘secure’ and ‘rewarding’.

The response needs to address the two main aspects of the question:

- **Secure work** has two interpretations – reliable, well-paid work over a significant length of time, and a safe working environment.
- **Meaningful work** is interpreted as being work that suits the worker’s circumstances and is personally satisfying.

The top markband for this question is 10–12 marks.

10–12 marks

- The response is focused and shows an in-depth understanding of the demands of the question.
- Response is well-supported throughout with relevant and accurate knowledge.
- Recommendations are presented and well-supported with a clear consideration of possible trade-offs and implications.
- The response is well-structured and effectively organized.



### Top tips

Your response to Question 4 must be supported by your own inquiries, carried out as directed in the pre-release statement. Research should be done in your local community, as well as in regional, national and international news articles (references to these are not included in the sample response as it would not be possible to give them in an examination).



## Top tips

These sample points are limited in length and need to be explained in more detail in your own response. They also refer to the gig worker, Paul, mentioned in the pre-release and in the examination paper. In order to show that your response is supported by your own inquiries, you should **refer specifically to people and situations from your own inquiries** instead of referring to Paul's more generic circumstances.

4 Answers may include a range of points, but are not limited to the following points:

- **Secure work** – achieved by Paul, who uses the app set up by the ride-share company:
  - Paul can find work at any time of the day.
  - Paul can find work on any day of the week.
  - Payment for the task is assured.
  - Payment for cancellation of trips is made.
  - Money is not handled by Paul, which could create a risk.
  - Paul's car can be used so the expense of buying and setting up a special one is avoided.
  - The communications technology is not expensive or hard to set up as it is based on Paul's own smartphone. All he needs to do is download the app and register with the app company.
  - The work can supplement Paul's income from his other job.
- **Secure work** – not achieved by the use of the app:
  - There can be issues when working at night or in isolated areas.
  - There are not a large number of rides available at certain times of the day, so Paul may need to wait a significant amount of time between jobs.
  - The location of pickups can be in areas that may not be safe for Paul.
  - Passengers who have used drugs/alcohol, or who might be violent or otherwise disturbed, may be encountered.
  - Passengers can provide negative ratings, which can risk Paul's chances of employment.
  - There are many drivers opting to work during busy times, which can mean less work for Paul.
  - Many rides are for short distances and do not pay much.
  - There is no sick leave, paid holidays or other entitlements that you would get in a normal job.
  - Low pay on slow times and days.
  - Paul needs to maintain his own car and pay for fuel.
  - The ride-share company could take a large percentage of the fare.
  - Little chance of job advancement and promotion for Paul.
- **Meaningful work** – achieved by Paul who uses the app set up by the ride-share company:
  - Paul can select when to work, which suits his personal circumstances.
  - The passengers are rated by Paul and other drivers, which ensures that problem passengers are not encountered often.
  - Most passengers like to have a chat during the ride, which can be meaningful and entertaining for Paul.

- Different and interesting types of passengers are encountered, which makes for interesting jobs for Paul.
- Paul does not need to go to a central location for work, saving personal time.
- Paul starts work from any location without having to commute, which can be time consuming.
- **Meaningful work** – not achieved by the use of the app:
  - There can be times when Paul has to wait a significant amount of time between rides, which can be boring.
  - No consistent contact with other workers means that Paul is usually working alone, which can be an issue.
  - Passengers can leave negative ratings, which puts pressure on Paul to be extra friendly.
  - It is difficult to obtain help from the ride-share app headquarters, which means issues and problems may not be solved easily.
  - The work can involve long hours on slow days, taking Paul away from other duties and interests.
  - Significant breaks may be difficult to obtain if Paul wants to make the most money.
  - Sitting in a car for a long time can have a detrimental effect on Paul's health.

## ■ Sample student response

The following sample shows one student's overall evaluation of the success of the ride-share app in providing meaningful and secure work for Question 4:

With regard to secure work, it is clear that a gig worker such as Paul does not have a large amount of reliable and well-paying work guaranteed over a length of time. The ride-share app allows Paul to select rides and earn money when it suits him, but there is no guarantee that he will earn enough money for his needs on any particular day or week. Paul has the advantage of the ride-share company finding work for him, which others may need to do for themselves. If he gets sick or some other circumstance happens and he cannot drive, however, then he will not earn any money, and the expenses of maintaining a car are not lessened significantly.

With regard to security at work, the dangers and risks are similar to other taxi drivers, but with the advantage of not having to carry money.

With regard to meaningful work, Paul can select when and how often to work, which suits his circumstances and provides satisfying work. The work is not boring as Paul has contact with different customers, which is meaningful. So, overall, working as a ride-share driver is to his advantage, but the work can be boring if there are few rides, or frustrating if there are a number of short rides that do not pay well. There is the added advantage that not much time is wasted with commuting or going to a central location, and the work is not physically demanding, but contact with other workers is minimal, taking away some part of job satisfaction.

Overall, the work can be secure and meaningful enough if the expectations of Paul for well-paid and very satisfying work are limited. This is the reason why many drivers do this work as a supplement to other work, or have enough other income and satisfaction to work part time. This means that, overall, the intervention is successful in meeting the challenge of meaningful and secure work for Paul, and is the reason for the success of the ride-share type intervention in the community.

The student then made the following recommendations:

*Clearly, the regulation of ride-share apps needs to be discussed and negotiated by all sides – the ride-share company, the drivers (sometimes through their unions) and the government – to develop laws, regulations and policies to ensure these issues are addressed. Ride-share companies need to become proactively involved in more positive action with regard to issues noted above to avoid the need for too much government legislation. Drivers may have to put up with these issues being unresolved for a while as this process will take time.*

*A recommendation is that a form of binding contract be used between ride-share companies and drivers that addresses the issues that can arise between them. This can be facilitated by ride-share companies, but improving working conditions for the drivers may mean that the price of rides has to go up, which may reduce the popularity of the ride-share app.*

The sample answer above would be awarded the top markband and goes beyond the expectations of a response written under examination conditions in terms of length and detail.



The response is focused and shows an in-depth understanding of the demands of the question.

- There are a significant number of points, relevant and pertinent to the focus of the question, that show an in-depth and focused understanding of the question.
- There is a final, justified evaluation, with associated recommendations, that answer the question comprehensively.

Response is well-supported throughout with relevant and accurate knowledge.

- There is a long and wide-ranging list of points that are explained with reference to actual situations from the student's research.
- Reference is made to the student's research into the issues found by local gig workers in their community.

Recommendations are presented and well-supported with a clear consideration of possible trade-offs and implications.

- Specific recommendations are made for each of these two stakeholders – the gig workers and the ride-share companies – which are based on the list of impacts and implications provided.
- There is an evaluation comment for each recommendation to show that there are implications and trade-offs associated with these recommendations.

The response is well-structured and effectively organized.

- There is a structured listing that explains a range of points, with appropriate supporting evidence, based on the two stakeholders.
- The list of points is divided, based on the two stakeholders, and evaluations and specific recommendations are made for each one.

## ATL ACTIVITY

### Thinking

Practise providing detailed answers to the other sample questions given below, questions from past Paper 3s, questions designed by your teacher, and others that you and your friends can think of.

Your answers need to be as detailed as possible. You can use the sample answers provided here as a model to structure your answers, especially the extended responses for Questions 3 and 4. Ask your teacher to mark your responses, and get feedback from your classmates. Your answers should be longer and take longer to prepare than you will have in the examination, but the extra effort will ensure you are familiar and comfortable with the requirements of top-ranked answers

## EXAM PRACTICE QUESTIONS



### Paper 3

Further practice questions of each question type (1, 2, 3 and 4) are given here for you to attempt; they all relate to the sample Paper 3 given earlier in this chapter.

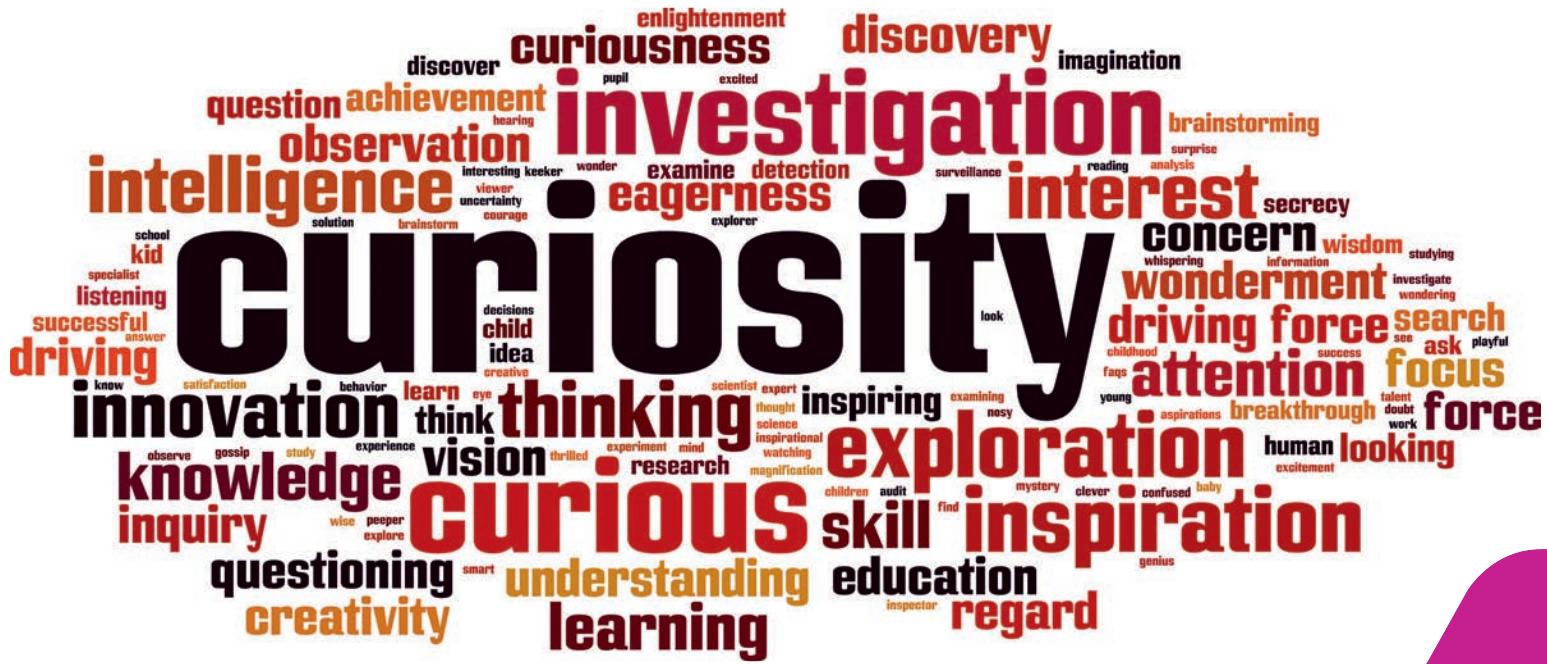
- 1 ■ **Describe** two features of a ride-share app, such as the Uber app, that help Paul organize his gig work. [4 marks]
- **Describe** two stakeholders associated with the use of gig work apps. [4 marks]
- 2 **Explain** how an app such as Airtasker uses backend technology that facilitates the linking of a gig job poster and a gig worker. [6 marks]
- 3 ■ **Evaluate** the success of such apps as Airtasker or Uber in addressing the challenge of secure and rewarding work for Paul. (Equity criterion) [8 marks]
- **Evaluate** the potential that the use of apps such as Airtasker and Uber will need to be regulated by the government. (Feasibility criterion) [8 marks]
- **Evaluate** the acceptability of the use of gig work apps by the stakeholders in terms of accountability and responsibility. (Acceptability criterion) [8 marks]
- **Evaluate** the impact on gig economy workers of the working arrangements and conditions. (Costs criterion) [8 marks]
- **Discuss** the types of change that gig work has brought about compared to more traditional types of work. (Innovation criterion) [8 marks]
- 4 ■ With reference to gig work apps such as Airtasker and Uber, and your own inquiries into the gig economy, **evaluate** which one addresses the challenge of secure and rewarding work for people like Paul more effectively, including recommendations for improvement. [12 marks]
- With reference to gig work apps such as Airtasker and Uber, and your own inquiries into the gig economy, and based on an evaluation of the issues that have emerged for Paul and others, **recommend** future steps that would address them. [12 marks]

### Reflection



Now that you have read this chapter, reflect on these questions:

- Do you know how to investigate using the pre-release materials?
- Do you know how to prepare for the Paper 3 examination?
- Do you know how to approach each question in Paper 3?
- Do you know how to approach the extended response questions in Paper 3?
- Do you know how to include the results of your own inquiries into the pre-release statement into your answer for Question 4?
- Have you completed a practice Paper 3?



## Section 8

# Inquiry project – internal assessment

# 8.0

# Overview of the inquiry project

The inquiry project is an individual inquiry into the impacts and implications of digital systems for people and communities. It is a common requirement for both SL and HL students. The inquiry project is 30% of the final assessment in the SL course and 20% of the final assessment in the HL course.

Approximately 30 hours of in-class time are allocated to the project, but additional time for research and development is also required.

The inquiry project involves using the inquiry process in order to:

- conduct initial research and plan an inquiry focus
- develop and refine an inquiry focus (inquiry question related to real-world examples and the 3Cs)
- explore and collect research from diverse and relevant secondary and primary sources
- investigate impacts and implications of chosen digital systems/technologies for people and communities
- develop findings and conclusions
- develop the skills required for preparing the recorded multimedia presentation
- proofread the inquiry process document (IPD) and presentation
- receive and act on teacher feedback at each stage of the inquiry process.

## Inquiry project submission requirements

The following components will be zipped in one file for submission.

### ■ Inquiry project submission requirements

<b>Inquiry Process Document (IPD)</b>	A written document that does not exceed 1500 words in total. It has two parts: <ul style="list-style-type: none"><li>● <b>inquiry focus</b> (maximum of 300 words)</li><li>● <b>claims and perspectives</b> (maximum of 1200 words).</li></ul> The cover page includes the topic and the total word count for the inquiry focus and the claims and perspectives.
<b>List of references</b>	A list of references of <i>all</i> resources used in the content and development of the project. It also includes the three sources listed in the IPD claims and perspectives. It should be included at the end of the IPD.
<b>Presentation</b>	A recorded multimedia presentation (maximum of 10 minutes in length). The content of the presentation should be aligned with the IPD and the list of references.

## IPD

You are advised to use the following structure to ensure that it includes all required sections. The IPD will be assessed using criterion A and criterion B.

- **Cover page**
  - topic (not the inquiry question)
  - total word count in the inquiry focus and claims and perspectives
  - do not include any school information or personal identifying information.

● **Section 1:** Inquiry focus (300 words)

Word count in Section 1: \_\_\_ words

**A Inquiry question**

Statement of the inquiry question

**B Real-world example(s)**

Description of a real-world example and the connection(s) to the inquiry question

**C Connections to digital society concepts**

Description of connection between the inquiry question/real-world example with the digital society concepts

**D Connections to digital society content**

Description of connection between the inquiry question/real-world example with the digital society content

**E Connections to digital society contexts**

Description of connection between the inquiry question/real-world example with the digital society contexts

● **Section 2:** Claims and perspectives (1200 words)

Word count in Section 2: \_\_\_ words

**A Source in standard bibliographical format**

Three to five paragraphs (approximately 400 words in total) that address:

- Purpose/overview: Thorough description of the claims and perspectives of the source.
- Authority/reliability: Justify the reliability of the source/expertise of the author or creator.
- Usefulness: Explain the usefulness of the source for the inquiry and presentation.

**B Source in standard bibliographical format**

Three to five paragraphs (approximately 400 words in total) that address:

- Purpose/overview: Thorough description of the claims and perspectives of the source.
- Authority/reliability: Justify the reliability of the source/expertise of the author or creator.
- Usefulness: Explain the usefulness of the source for the inquiry and presentation.

**C Source in standard bibliographical format**

Three to five paragraphs (approximately 400 words in total) that address:

- Purpose/overview: Thorough description of the claims and perspectives of the source.
- Authority/reliability: Justify the reliability of the source/expertise of the author or creator.
- Usefulness: Explain the usefulness of the source for the inquiry and presentation.

## List of references

This should include *all* references in a standard format that are used for:

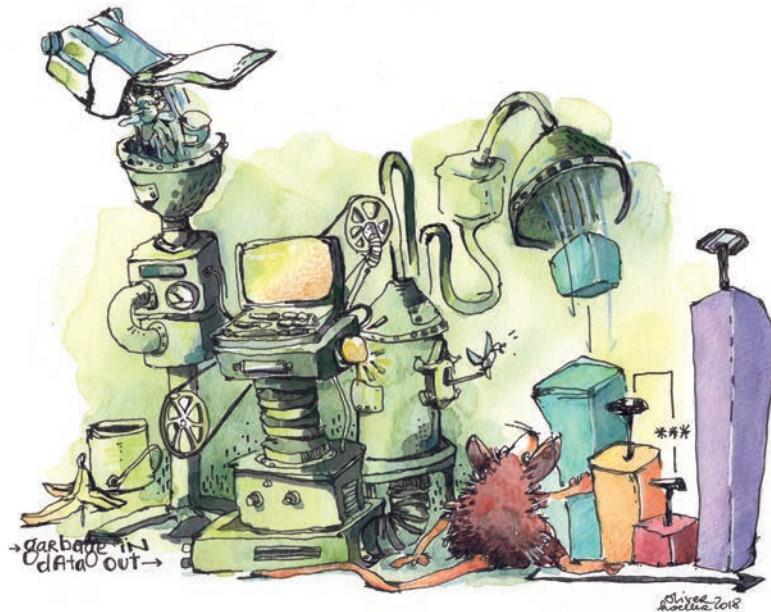
- the content of the presentation
- the development of the presentation.

Subheadings should be used as appropriate, and all three references in the claims and perspectives section must be included. For online sources, the URL and date of access must be given.

You should include:

- **Secondary research:** books/articles, audio, images and videos.
- **Primary research:** interviews, surveys, investigations.
- **Sources for development of the presentation:** applications, tutorials.

## GIGO



GIGO stands for ‘garbage in, garbage out’ and originated in the early days of computer programming. It means that what comes ‘out’ can only be as good as the inputs that go ‘in’, and this needs to be kept in mind throughout all of the stages in the inquiry process and the creation of the presentation.

The final inquiry project can only be as good as the work that goes into its development: information collected, resources used, analysis, tools and techniques, organization and communication.

Consequently, it is important to ensure the quality of your work at every stage of the process.

In a broader sense, GIGO applies to a number of real-world situations too. For example, the decisions that come out of a particular situation can only be as good as all of the information that was collected and considered when making the decision.

## Presentation structure

You now need to consider how to organize your multimedia presentation and communicate effectively using the general advice offered here.

- **Introduction:** Begin the presentation by presenting both the inquiry question and the real-world example (inquiry focus) and introducing its significance for digital society – this should be the same inquiry focus provided in the IPD.
- **Setting the scene:**
  - Present supporting information in order to understand the real-world example, the use of digital technologies, and how they contributed to the impacts for people and communities.
  - Additional real-world examples and information that support the inquiry focus can be highlighted.
  - References should be made to digital society contexts, content and concepts as relevant.

- **Analysis and evaluation:** This section provides:
  - findings from both secondary research and/or primary research
  - the student's own analysis and evaluation of the impacts and implications of the digital systems for people and communities, supported by evidence.
- **Conclusion:** This must be well-supported and be relevant to the analysis and evaluation that has taken place in order to:
  - provide the answer to the inquiry question
  - present the student's new understandings and perspectives on their inquiry focus following on from their analysis and evaluation
  - present additional considerations, emerging trends and future developments.

## Presentation organization and communication

### ■ Logical organization

You must consider the best approach to organize your presentation logically and communicate evidence and ideas so that they support understanding. Visual and/or audio cues should support the transition between the subtopics in the presentation.

### ■ Coherent and effective use of media and techniques

Determining the best applications and methods along with how to effectively present content requires research. Think about the ways that professionals communicate their ideas. What tools and techniques do they use?

Your presentation must integrate visuals, text and/or sound effectively so that they support understanding. This does not happen by accident.

Effective communication is also important so that the teacher and/or moderator can accurately mark your presentation.

Important considerations for an effective, coherent multimedia presentation follow here:

- An audible recorded commentary in your own voice should be used throughout the presentation. Text-to-speech tools may also be used for the recorded commentary as long as the text is your own work.
- Any audio-visual material included in the presentation needs to be seen and clearly heard. The volume of audio material needs to be reduced or turned off during your commentary to ensure that it is audible.
- Visual material must be legible and consistent with the audio track.
- All text must be legible and follow guidelines for displaying text and subtitles in presentations.
- All sources for content must be cited (for example, source of images, video, audio, interviews). Text and audio is advised so that the source is clear at the point at which it is being used.

## Inquiry process for developing the inquiry project

It is important to follow a step-by-step inquiry process throughout the development of the inquiry project. The following table outlines the steps in the process and the necessity for on-going feedback from the teacher.

■ Steps in the inquiry process for developing the inquiry project

Inquiry process	Student action	Follow-up with teacher
Determine inquiry focus	<p>1 Identify the inquiry topic and initial inquiry question. Plan your timeline for developing and submitting the inquiry project as required. Conduct initial secondary research and draft the inquiry focus, which explains the connection between the inquiry question, the specific, relevant real-world example(s) and course concepts, content and contexts. Include a list of references for those sources used thus far. At this stage it is too early to enter any information under the claims and perspectives heading.</p>	<p>1 Check if the inquiry topic is appropriate for digital society and seek advice on how to conduct further secondary and primary research. Discuss the draft of the inquiry focus with your teacher and the next steps in conducting research.</p>
Explore	<p>2 Conduct secondary research, collect relevant visual evidence and note the sources in a social bookmarking service such as Diigo, Pinboard or other application. As you conduct your research, enter resources in your list of references using any standard format.</p>	<p>2 Discuss findings and visual evidence with your teacher and determine any further secondary research that may be needed. Discuss findings up to now and reflect on what primary research is needed as evidence.</p>
Analyse and	<p>3 Collect primary material and data for the presentation, for example photos, screenshots, video footage, surveys, interviews, observations and investigations.</p>	<p>3 Check with your teacher whether the material you have collected is appropriate or if additional research is required.</p>
Reflect	<p>4 Analyse and evaluate evidence collected and how it relates to your inquiry focus.</p>	<p>4 Discuss with your teacher whether your analysis/evaluation is appropriate or if it requires more depth or breadth.</p>
Communicate	<p>5 Reflect on your findings. Draft the IPD. Finalize the list of references.</p> <p>6 Begin planning the approach for your multimedia presentation and determining the best tools, techniques and content to use.</p> <p>7 Create a draft storyboard for your multimedia presentation (see Chapter 8.5).</p> <p>8 Create a detailed storyboard with screens, descriptions and citations.</p> <p>9 Write the script for the storyboard for each screen or section of the multimedia presentation. Include evidence and audio citations.</p> <p>10 Develop your multimedia presentation using best practice for the media that you are using. Aim to produce a quality product.</p> <p>11 Finalize the IPD by writing the claims and perspectives section and proofreading the inquiry focus.</p> <p>12 Submit your IPD, list of references and multimedia presentation.</p>	<p>5 Present your work to your teacher according to the established internal deadlines and make adjustments based on the feedback provided.</p> <p>6 Seek your teacher's advice as needed on tools, techniques and organization of content.</p> <p>7 Discuss your storyboard with your teacher.</p> <p>8 Show your storyboard to your teacher to make sure it follows an organized, logical sequence.</p> <p>9 Make sure to follow your teacher's guidance.</p> <p>10 Present your work to your teacher according to the established internal deadlines.</p> <p>11 Make adjustments according to the feedback provided by your teacher.</p> <p>12 Submit your work to your teacher according to the established internal deadlines.</p>

The use of the inquiry process in the inquiry project will be considered in more depth in the following chapters. You are advised to read these chapters as well as consulting the *Digital Society Guide*. Topics include:

- how to meet the assessment criteria for the inquiry project
- the skills required to complete the inquiry project successfully
- the tools and methods required
- how to manage the inquiry project
- a step-by-step guide through a practice inquiry project.

# 8.1

## Developing an inquiry focus

### UNDERSTANDINGS

By the end of the chapter, you should understand:

- ▶ how to identify an inquiry focus
- ▶ appropriate topics for a digital society inquiry project
- ▶ what is required in the inquiry focus for the digital society inquiry project
- ▶ how to formulate an inquiry question
- ▶ how extensive your exploration needs to be.

### The inquiry focus in the IPD



Criterion A of the digital society inquiry project states:

*The inquiry process document provides an inquiry focus with an explanation of the connection between the inquiry question, a specific, relevant real-world example as well as course concepts, content and contexts.*

For full marks in this criterion:

*The focus includes an inquiry question and a thorough explanation of its connection to a specific, relevant real-world example and course concepts, content and contexts.*

The maximum word count for the inquiry focus section is 300 words.

# Where do we start in order to identify an inquiry focus?

You need to identify a digital society topic of interest. In order to do that, you can start by researching a real-life example, a news item or several secondary sources that cover the same or similar topics. Through searching and reading relevant news items, watching videos and/or listening to podcasts in a digital society area that interests you, you will be able to rule out topics that do *not* have sufficient material available to develop a meaningful project, as well as identify topics that do allow for meaningful investigation.

You will probably be able to identify one, or a few, topics that not only interest you but which can meet the requirements of the digital society inquiry project through deep exploration, analysis and evaluation. Once you have selected one or a few topics, you need to decide which topic will be the core of your investigation. Keep in mind that your topic must be focused enough so that you are not overwhelmed with too much information.

# What topics can be used for a digital society inquiry project?

You need to look for topics that:

- deal with digital systems that impact people and communities
- present opportunities for secondary and primary research
- have an element of uniqueness in the topic, perspective or approach taken to develop the inquiry.

For example, when you think of a smartphone and how much it has impacted a specified individual or group, you are thinking of a digital system that would be appropriate for an inquiry project.

The same can be said for social media, robots or digital technologies, such as autonomous vehicles. In fact, almost every digital system has impacts, as well as potentially having the power to transform our society for good or bad.

Look for a topic that inspires you and is something that you would enjoy exploring. You should avoid topics that might have been over-explored already, however. When you investigate a topic that has been explored many times in the past already, there will be a tendency to compare your work with previous work, which will not be beneficial. Your topic needs an element of uniqueness in order to impress your audience.

## ■ Key ideas to help you find your topic

Make sure that your topic:

- inspires you and is one that you would enjoy exploring
- focuses on a digital system that has impacts on individuals and societies
- allows for sources to be obtained that provide differing claims and perspectives
- is recent and has an element of ‘uniqueness’
- allows for primary investigation and/or research
- allows for a range of appropriate secondary sources to be accessed.

# What is required in the inquiry focus?

Your inquiry focus must address digital society concepts, content and contexts. You can check the list of concepts, content and contexts in the syllabus outline in the *Digital Society Guide* or in this textbook.

## Formulating an inquiry question

After selecting a topic, your next step is to formulate a concise and focused inquiry question related to this topic that is worth exploring. Your inquiry question will identify the focus of your inquiry project and will direct the entire development of your project. The final goal of your project is to provide a coherent answer to this question.

The inquiry question must not be one with an obvious answer, for example: ‘Can the use of smartphones in the classroom have a negative impact on learning?’ Anyone, with or without a digital society background, can think of several reasons why using a cell phone during a lesson may not be good for learning – most of those reasons would probably be associated with distraction. A ‘yes/no’ question is not appropriate either.

In the example provided, a much better question might be: ‘To what extent does the use of smartphones in the classroom have a negative impact on learning?’ However, this is still a question with obvious answers and lacks balance between positive and negative impact. Therefore, the inquiry question requires more refinement.

Continuing in this scenario, you might learn that the DP biology teacher and students make extensive use of smartphones in the classroom. You might contact the biology teacher informally, which results in a more-refined inquiry question to pursue: ‘To what extent does the use of smartphones in the biology classroom benefit the teaching and learning that takes place?’ This question is more interesting, since its answer is not so obvious and the research and investigation has the potential for uniqueness arising from the secondary research and also from the local DP biology class. The DP biology teacher may also be able to give helpful guidance for the secondary research. The local situation may also provide the possibility for primary research through interview, survey, observations and investigations in becoming familiar with the approaches being used in the biology classroom.

<b>Broad topic (yes/no question is not suitable)</b>	Can the use of smartphones in the classroom have a negative impact on learning?
<b>Refined question</b>	To what extent does the use of smartphones in the classroom have a negative impact on learning?
<b>Inquiry question</b>	To what extent does the use of smartphones in the biology classroom benefit the teaching and learning that takes place?

Steps to formulating your inquiry question:

- Identify what interests you about the topic you intend to explore and what makes it unique.
- Ensure your inquiry question is focused and stated concisely.
- Perform preliminary research to learn more about the topic to ensure the inquiry project is viable.

- Avoid simplistic research questions (such as ‘yes/no’ questions) and vague wording (such as ‘easy’ and ‘good’).
- Avoid broad topics that cannot be covered in the 10-minute limit for your multimedia presentation.

Formulate an inquiry question that is:

*... open-ended, thought-provoking and worth considering from different perspectives.*

Digital Society Guide

## ■ Keep your focus



Once you have formulated your inquiry question and identified the course concepts, content and contexts connected to it, this is where your focus must be. All your exploration must be focused on answering your inquiry question, and so must be your presentation. As you progress through the research and the development of your inquiry project, constantly ask yourself whether what you have written is relevant to answer your inquiry question. Anything that is not relevant is off-course and should be removed.

## How thorough does my exploration need to be?

Your exploration needs to be as thorough as possible. Anyone can formulate an opinion about almost anything and support that opinion with shallow information that they heard from somebody or found somewhere. Digital society students are expected to demonstrate that they understand how to:

- conduct academic research and provide supportive evidence
- investigate the truth related to an inquiry question thoroughly
- discuss their findings with authority supported by evidence.

## Inquiry focus example

Let's examine an example of the preliminary steps taken in the development of an inquiry focus and the inquiry focus section of the IPD.

- 1 Research through various news items until one topic of interest is located. During the search, a news item published by the BBC on 13 September 2021 was found. The headline is ‘Fake Walmart news release claimed it would accept cryptocurrency’.

Reading through the article, one learns that the fake news release caused the value of Litecoin to jump from £125 per token to nearly £170, before it was deleted.

The topic selected was ‘fake news and its social and ethical impacts’.

- 2 Formulate a provisional inquiry question: ‘To what extent can fake news about cryptocurrencies cause economic damage for customers and businesses?’
- 3 Identify course concepts, content, and contexts that have a connection to this inquiry question.  
Looking through the topics in the 3Cs in Section 2 through Section 4, this question can be connected to: values and ethics (concept), media (content) and economic (context).
- 4 Write the IPD inquiry focus section on fake news and its social and ethical impacts.

## IPD EXAMPLE

### Section 1: Inquiry focus

Word count: 286 words (headings are not counted)

#### *Inquiry question*

To what extent can fake news about cryptocurrencies cause economic damage for customers and businesses?

#### *Real-life example*

The cryptocurrency Litecoin had a sudden surge in price because of a press release saying that Walmart would accept payment in Litecoin in all of its digital stores. Walmart later stated the announcement was a fake. However, by that time the story had already been made public on both the GlobeNewswire service, which is used to distribute company press material widely, and the official Litecoin Twitter account. When the release was published as fact, the price of Litecoin jumped from about £125 per token to close to £170, before falling back near its original price, at £128.

#### *Connections to the 3Cs*

- **Concepts** (connects the real-world example above to specific concepts)  
**Values and ethics** are ways to determine what is right and wrong, fair and unfair, just and unjust, legal and illegal, proper and improper. Fake news is unethical and, in some countries, it is also illegal. Fake information about Walmart accepting Litecoin for payment aimed to give those who created the fake news an unfair economic advantage at the expense of others, who end up suffering financial losses.
- **Content** (connects the real-world example above to specific content)  
**Media** such as GlobeNewswire and Twitter have an obligation to spread news as quickly as it is received, often without checking the source and accuracy of the information thoroughly. The ethics of media is often superseded by its need to spread breaking news before everyone else, regardless of the damage it can cause if the information is found untrue.
- **Contexts** (connects the real-world example above to specific contexts including impacts and stakeholders)  
**Economic** impacts: Fake news about cryptocurrencies has the power to cause abrupt changes in the stock market, causing irreparable losses to customers and businesses. Those who published the fake news expected high profits from the anticipated increase in the value of Litecoin before the value dropped again.

## ACTIVITY

### Practice developing an inquiry focus

Let's suppose you have an interest in facial recognition, which is a relevant area to study. It is also extremely broad. However, you will need to conduct preliminary research into facial recognition and consider a range of articles on the topic.

One news item was published by the *Guardian* on 11 August 2021, called 'TechScape: Is Apple taking a dangerous step into the unknown?'

This article is very rich in material and can be used to trigger a deep exploration that will answer a thought-provoking inquiry question.

- 1 Search for this article on the internet, read it and list some areas connected to it that you could explore in more depth in order to create a meaningful inquiry project and multimedia presentation. If you cannot find this particular article, look for an article with a similar topic.

A summary of the technology is given here:

*Apple's tool, called neuralMatch, will scan images before they are uploaded to the company's iCloud Photos online storage, comparing them against a database of known child abuse imagery. If a strong enough match is flagged, then Apple staff will be able to manually review the reported images, and, if child abuse is confirmed, the user's account will be disabled and the National Center for Missing and Exploited Children (NCMEC) notified.*

Source: [www.theguardian.com/technology/2021/aug/06/apple-plans-to-scan-us-iphones-for-child-sexual-abuse-images](http://www.theguardian.com/technology/2021/aug/06/apple-plans-to-scan-us-iphones-for-child-sexual-abuse-images)

- 2 Formulate a thought-provoking inquiry question based on the article above. The question must not have a simple answer and must not use vague words.
- 3 Identify concepts, content, and contexts connected to your inquiry question.
- 4 Write a draft inquiry focus section in an IPD with no more than 300 words.
- 5 Compare your work with at least two of your peers. Comment on what you like about their work or what you would change, and on what you would change in your work after what you have seen theirs. Note that this collaboration is only appropriate for this practice activity – in the actual inquiry project you must work individually.

# 8.2

# Assessment criteria and working with sources

## UNDERSTANDINGS

By the end of the chapter, you should understand:

- ▶ how to achieve high marks for the digital society inquiry project
- ▶ how to use citations and references appropriately.

The *Digital Society Guide* provides the assessment criteria that are used for the assessment of the inquiry project. The criteria are the same for both SL and HL inquiry projects.

The following checklist provides additional detail that may help you to maximize your marks.

You should use both the assessment criteria and the question checklist as you develop your inquiry project.

## Checklist for inquiry project assessment criteria



### ■ Requirements for the IPD

Two sections of the IPD are assessed:

- inquiry focus – the inquiry question, the real-world example and the digital society concepts, content and contexts
- claims and perspectives.

The list of references for the entire inquiry project should be included at the end of the IPD.

### **Criterion A: Inquiry focus (3 marks)**

- Does the inquiry focus have a concise and focused inquiry question?
- Does the inquiry focus have an inquiry question that can be researched?
- Does the inquiry focus include a description of a relevant, real-world example involving digital systems and/or digital technologies?
- Does the inquiry focus include a thorough explanation of the connection between the inquiry question, the real-world example and the related digital society concepts, content and contexts?
- Is it a maximum of 300 words?

### **Criterion B: Claims and perspectives (6 marks)**

- Have three sources been used for the claims and perspectives?
- Are the three sources included in the list of references?
- Are there source references, headings, labels and captions as appropriate? (Note that these elements do not count against the word limit for this section.)
- Is each source:
  - relevant and appropriate to the inquiry focus
  - contemporary (not more than three years old)?

NOTE: this is not a requirement, but it is highly recommended (see Key ideas, page 422).
- Is there a discussion addressing each source's origin and purpose, meaning and methods as well as corroboration and use?
- Is there a thorough discussion of the claims and perspectives of each source?
- Is there a justification of why the sources are useful in the inquiry?
- Do the sources provide a balance of claims and perspectives?
- Is the section a maximum of 1200 words?

## **■ Requirements for the presentation**

- Does the presentation align with the content of the IPD?
- Does the presentation address the inquiry question in a well-structured and organized manner?
- Does the presentation use visual material, text and/or sound to communicate effectively?
- Is the student's commentary audible and free from extraneous sound that interferes with the quality?
- Does the presentation use subtitles and text where necessary to effectively support communication?
- Does the presentation display and/or present audio citations appropriately?
- Is the presentation a maximum of 10 minutes in length?

### **Criterion C: Analysis and evaluation (6 marks)**

- Is the analysis balanced?
- Is the analysis sustained and well-supported by evidence?
- Does the analysis address all parts of the inquiry focus?
- Does the evaluation build on (rather than restate) the analysis?
- Does the evaluation provide opinions underpinned by the analysis?
- Does the evaluation show evidence of original thinking?
- Does the evaluation relate to the inquiry focus and the inquiry question?

- Does the evaluation consider the impacts and implications of the digital systems for people and communities?

#### Criterion D: Conclusion (6 marks)

- Does the conclusion address the inquiry question with supporting evidence?
- Does the conclusion provide additional insights into the inquiry focus following on from the analysis and evaluation?
- Does the conclusion provide a thorough and substantiated discussion of emerging trends and future developments that relate to the inquiry focus?

#### Criterion E: Communication (3 marks)

- Does the presentation communicate effectively through its organization of ideas and supporting material?
- Are the various media used coherently and integrated seamlessly.

### **■ List of references (document) and citations within the presentation**

You must include all sources in a standard format that were used in developing the presentation (all content material, resources and techniques). There is no word limit for this content.

References must be:

- consistently and appropriately cited (written, visual and/or verbal) at the point of use in the presentation
- logically organized (alphabetical, or in order of use in the multimedia presentation)
- listed in a standard format with complete information, for example using one of the following styles:
  - MLA (Modern Language Association)
  - APA (American Psychological Association)
  - Harvard
  - Chicago/Turabian.

Note that references to online sources must include the URL and date of access.

# 8.3

## Skills for the inquiry project

### UNDERSTANDINGS

By the end of the chapter, you should understand how approaches to learning (ATL) skills contribute to developing a successful inquiry project:

- ▶ self-management skills
- ▶ thinking skills
- ▶ communication skills
- ▶ research skills
- ▶ social skills.



One of the most significant outcomes of the inquiry project are the skills that you will develop. These skills are vital for the quality of your project, and they will be important for future studies and life as well. In the paragraphs that follow, we will explore the ATL skills that are necessary for the development of a successful digital society inquiry project.

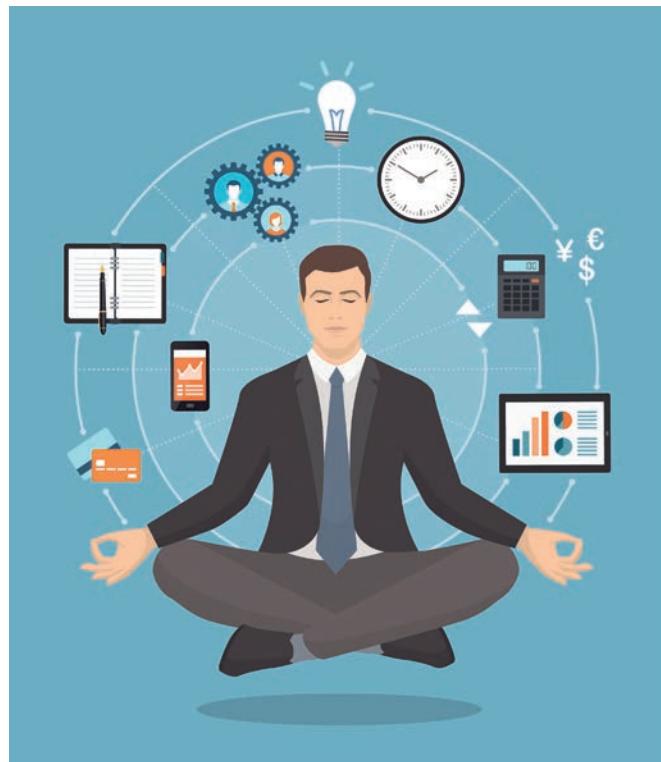
# Self-management skills for the inquiry project

Self-management involves both knowing what to do and having the ability to manage all of the stages involved in the inquiry process and when developing the multimedia presentation, IPD and list of references. You must know how to avoid distractions while working on a task, so that you can maintain focus and stay productive.

Self-management skills focus on personal responsibility in the following areas:

- **Organization:** You need to be organized with your allocation of time, physical space, energy and mental capabilities in order to achieve your goal of developing an excellent inquiry project.
- **Goal setting** is the ability to determine what you want to achieve with your project in a clear and well-defined manner. It enables you to manage your time and actions.
- **Time management** allows you to prioritize tasks, avoid distractions, maintain focus and meet deadlines. It is necessary to work to a timeline in order to complete all of the stages in the inquiry process and to develop all of the components of the inquiry project.
- **Self-motivation** is the driving force in taking the initiative and completing tasks. In order to be self-motivated, your inquiry focus must be one that you are personally interested in developing.
- **Stress management:** Handling stress before it becomes an issue will allow you to focus on your project and make steady progress. Whenever you face a challenge, it is best to consult with your teacher for guidance.
- **Accountability** is the act of taking personal ownership of your thoughts and actions. When you maintain responsibility, you're better equipped to evaluate your work and determine the best way to proceed to complete your project.

At the outset of the inquiry project, you are advised to identify your inquiry focus and the subtopics that emerged from your preliminary research used to formulate your inquiry question.



# Thinking skills for the inquiry project



Thinking skills refer to the abilities of:

- processing information, selecting relevant pieces of information and ignoring irrelevant ones
- storing and retrieving information, and arranging it so that it can be used more effectively
- breaking information down in order to understand it in more depth
- making connections and combining information
- evaluating ideas in order to present and defend points of view, make decisions, produce new information, or create new ideas or ways of viewing things.

Your creative and critical thinking skills will be constantly required throughout the development of your project.

## ■ Identifying your inquiry question

To begin with, you will need to identify the inquiry question by researching articles and news items until you find a topic that seems worth investigating (this is discussed in detail in Chapter 8.1).

Questions you might ask yourself include:

- Is this a topic that I will enjoy exploring?
- Will this topic be interesting to those that will watch my presentation?
- Will I be able to find enough relevant material for this topic?
- What inquiry question can be asked about this topic that will grab the attention of my audience?
- How can I make this question specific and not too broad?

## ■ Developing your inquiry project

After you have decided on your topic and the inquiry question, you will need to keep your inquiry focus in mind throughout the project. Again, thinking skills will be required:

- You need to find several sources that present different perspectives and points of view.
- You need to make certain that you are not selecting only data that supports your initial view.
- You also need to evaluate the credibility and reliability of your sources of information and establish which information is most important to address the inquiry question.
- You need to gather, analyse and evaluate sufficient evidence for the conclusion of your presentation.
- Finally, you need to think about the best way to present all your relevant material and findings in your multimedia presentation.

# Communication skills for the inquiry project



In the context of the inquiry project, these skills refer to organizing your presentation in such a way that:

- its structure has a logical flow, clearly highlighting the inquiry focus
- the ‘right’ presentation is delivered to the ‘right’ audience (in this case, the examiner that will assess your work), providing solid research and evidence so that they are interested in the presentation
- the speaking is clear and concise, uses audio tracks relevant to the context being presented, and there is no extraneous noise or other distracting audio tracks
- arguments are formulated in a convincing manner, creating a presentation that connects directly to the inquiry focus and inquiry question
- there is sufficient evidence to answer the inquiry question and leave the examiner with a strong final impression
- a connection is made to the inquiry focus and inquiry question, and with a clear understanding of the points that were explored.

For a successful video presentation, you will need to produce content and communicate it effectively through a variety of digital media tools. This is more than knowing how to use a word processor or write an email – it includes being able to create and communicate using rich media such as images, photographs, text, video, speech and sound. In order to do this for your multimedia presentation, you are most likely to use a video production application and/or slideshow presentation.

## ■ Video presentations

A video presentation must have professional-like quality, have good audio and video quality, be within the 10-minute time allowance and, above all, must be relevant to the topic.

It is best to use original video and visual material whenever possible. Original primary research, such as interviews, observations and investigations, often contribute to video footage and other visual evidence.

## ■ Slide show presentations

A useful rule for a slide show presentation is the ‘6 × 6 rule’. It limits any text to six words per line and six lines per slide for legibility and conciseness. Too much text can be monotonous and tiring for audiences to read. You must refine your thoughts into short lines and use the narration to expand them in more detail. Be careful to time your presentation, however, to ensure your narration matches the correct slide.

The presentation must be dynamic, so that you keep the attention of your audience. Presentation expert David JP Phillips provides the following tips for creating engaging presentations:

- deliver one message per slide
- avoid text sentences
- make the most important element of the slide the biggest in size
- use contrast to steer focus
- use a maximum of six objects on a slide
- use a dark background.

## ■ Presentation guidelines

In order to combine your research, short videos and recordings into a meaningful and interesting 10-minute video, you should consider these guidelines:

- **Your topic must excite you.** If you are really eager to learn more about the topic you are investigating, chances are your presentation will be exciting.
- **Learn everything you can about your topic.** Go deep, gather facts and search for leads on interesting characters and storylines. The gems of your research are sometimes buried deep out of sight.
- **Make a plan.** The planning phase typically accounts for 50% of the time you will spend on your presentation – it’s that important. The better you prepare, the smoother filming and editing will go. For instance, if you know exactly what shots you’re looking for, shooting them is quick and they require fewer edits. Create an outline. Think about how you’re going to share your findings. What’s the structure? The style? Is there existing footage or photos that help develop your arguments, or will everything need to be shot brand new? Where will your primary sources come from? What are the most important points of your topic that you want to emphasize? What are the most compelling elements of your topic? How can you keep the audience interested in your presentation from beginning to end? It can be difficult to hold the viewer’s attention, so think about visual ways to keep people engaged throughout the whole video. Is there some relevant fact you can film, or can you use some short video that has already covered the same topic?
- **Create a shot list.** This is a list of the footage and interviews you’ll need to make your presentation.
- **Plan your interviews.** Often the best way to learn about people and their experiences or expertise is through their own words. Most expository, participatory, observational, and performative documentaries contain interview footage. Don’t be afraid to ask questions that might seem dumb or obvious. You never know how many viewers have the same questions but have been afraid to ask, or where those answers might lead. Follow these up with informed questions based on your research.
- **Start shooting.** Keep in mind that your video will mainly be viewed by one or more IB examiners, because that can dictate your shooting and storytelling style. When you’re shooting an event, be sure to capture a variety of angles including close-ups, medium shots and wide shots.

- **Capture a lot of footage.** As you shoot your video, you won't really know what it will be or where it will go, so try to capture everything. This takes the pressure off from trying to get the perfect shot or interview.
- **Organize your footage** and all the elements of your presentation. Don't lose footage that you worked hard to collect. Download everything to your computer device and keep a cloud storage backup. Arrange everything in properly named folders, so that you can find what you need quickly when the time comes to create and edit your full video.
- **Write a script.** Once you have collected your short videos from other sources, your slide shows are ready and all of your original footage is shot, it is time to start organizing it into a script. Although your project video will not be scripted like a professional film, you can create a broad outline or even draw up storyboards to help you think about the footage you need and the possible directions your presentation might take. Pinpoint the most compelling elements of your topic and start crafting 'mini scenes' around those events. Remember, a script isn't necessarily what's spoken or a voice-over. A script describes what the audience is seeing and hearing.
- **Begin editing.** Once you're all set with equipment, you need to start putting down your elements in a sequence. The art of editing is to create a 'roller coaster' ride of emotion – with some fast parts and some slow parts – to produce a dynamic viewing experience.
- **Start with a hook.** Many film trailers start in the middle of the story or action, then jump back to explain to viewers how they got there. You might try that in your video to catch the attention of the viewers. That out-of-order introduction is your hook.
- **Include voice-over narration.** This is extremely important for the digital society inquiry project, so that you can provide important information or explain who's who to your viewers.  
For slide shows, keep in mind that some action must be happening while you are talking, for example an arrow moving and pointing to a specific area of the slide or some sort of highlighting a sentence. Watching an image stuck on the screen without any action for more than 15 seconds can be very tedious. Likewise, be careful to not overdo the action – it can distract the viewer's attention and can be quite annoying.
- **Create animated title sequences** that engage your viewers from the start. You can also use graphics to give your viewers details such as the time, place and the names and titles of interview subjects.
- **Be prepared to rewrite your script.** You need to recognize that sometimes things don't go as anticipated, and you might need to rewrite your script and reorganize elements of your video.
- Make sure that your presentation is **clear and concise**, and that your narration is spontaneous.
- Make sure that your final product does **not go over 10 minutes**, since this is the limit determined in the digital society inquiry project criteria.

In addition to these points, further requirements of the digital society inquiry project need to be taken into consideration:

- Any **audio facts and figures need visual evidence**, for example creative use of text, diagrams, images and video to get the message across. It is too difficult to simply listen to statistics. Also keep in mind that the visuals on the screen need to support the audio.
- **Sources of evidence** need to be included within the inquiry project where relevant. For example, if the audio track refers to the author/originator of the particular item, it should also be cited in a small font on the presentation. Citing sources adds validation to the content being presented.
- The sections of the video should be clearly **organized** into parts that are aligned with the assessment criteria.
- Use **original content** wherever possible.

# Research skills for the inquiry project



These skills refer to the abilities of knowing how to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.

In order to develop a successful digital society inquiry project, you need to know how to:

- carry out basic internet searches for sources that will help you to answer your inquiry question; Google and Wikipedia may not always be reliable, but they are very helpful as a starting point to help you find a topic
- narrow and refine search queries to get better research results
- locate and extract information that is relevant to the inquiry focus
- organize the information that you find – you will be seeing a huge amount of information, from web pages to PDFs to videos; if you are unable to keep this information organized in some way, you may lose it or you might not be able to cite something correctly
- evaluate information found on the basis of accuracy/trustworthiness, validity, appropriateness for needs, importance, and social and cultural context, for example by:
  - checking whether the source agrees with other sources that you have found
  - checking that the author is an expert in the field
  - verifying information from several sources (rather than going off of one webpage, make sure that at least two other places say something similar)
- pursue further information to gain a broad perspective (exploring deeper than the first options)
- review, analyse and interpret information in a manner that brings up a solution
- avoid distractions and make good use of your time
- respect the intellectual property rights of other creators and producers, using citations or getting permission to reproduce material.

You are expected to have the necessary technical fluency needed to engage with computers and the internet. You should know how to use computer programs such as word processors, web browsers, email and other communication tools, such as wikis, blogs, image manipulation software, presentation software and video creation/editing software, etc. to showcase learning.

It is also expected that you will have or acquire more sophisticated abilities for accessing and using knowledge resources, such as search engines, online databases and cloud computing. It will be necessary to know how to download images from the internet and insert them into presentation slides or videos, in addition to using alternative text for images to support those with visual disabilities.

Your research will be considered good if you are able to find good evidence to answer your inquiry question. At times you might find that the answers you get contradict your original beliefs, so keep an open mind. Research is not about confirming what you already know, but about learning as deeply as possible about the topic you are exploring.

A final piece of advice on this topic: remember to use library resources as well as internet resources. Be sure to check out library websites for research guides or access to specific databases.

## Social skills for the inquiry project

During the development of your digital society inquiry project, you will need to interact with several people.

- Your teacher will introduce the internal assessment requirements and expectations, and will guide you with directions for the project. As you get started and move on the development of your project, you will need to approach your teacher frequently to present your work, discuss any questions and seek confirmation that you are on the right path. Do not wait until the last minute to come to your teacher – this is something that needs to happen regularly throughout your project (see ‘Inquiry process for developing the inquiry project’ in Chapter 8.0).
- Although the digital society inquiry project is an individual project, you might need some help from other teachers and peers in order to learn how to use the necessary software to create your presentation. You cannot have someone else do the work for you, but you are allowed to seek help so that you learn how to do the work.
- For a successful project, part of your project needs to include primary research. You may need to interview people or create and perform surveys. Plan ahead for these situations. Spend some time identifying relevant people to interview who can truly contribute to your project findings. Then, contact that person to learn if they would be available and willing to answer your questions. Once you get confirmation, make an appointment. Prepare your questions carefully and make sure they are meaningful for the topic. Dress appropriately for the interview, and act in a friendly but professional manner, especially if you are approaching high-ranking people.



# 8.4

## Tools and methodologies for the inquiry project

### UNDERSTANDINGS

By the end of the chapter, you should understand:

- ▶ the web tools that can help you with your inquiry project
- ▶ the methods of inquiry that can be used for your inquiry project
- ▶ the tools that can be used for data collection.

### Information technology tools for research



A significant number of web tools can help you in your inquiry. The list below is just a sample of web tools and it is by no means exhaustive. Hopefully, it will give you a good idea of where to start.

- Search engines, such as Google, Bing and Baidu, or more academic search engines such as Google Scholar, Library of Congress, and so on.
- Social bookmarking, research and knowledge sharing tools, such as Diigo ([www.diigo.com](http://www.diigo.com)) and Pinboard (<https://pinboard.in>). You can use them to bookmark and organize relevant news items as you find them, so you can easily find them again later when you are working on your inquiry project.
- Personal dashboards, such as Netvibes ([www.netvibes.com](http://www.netvibes.com)). You can place IT news sites on the dashboard and the RSS feeds will do the rest. You will be able to see new IT news headlines every day.
- Software that helps with the creation of surveys and the collection of results, such as Google Forms, SurveyMonkey and MS Forms.
- For the presentation itself, there is a plethora of great software available, including text editors, image creation, photo-editing software, presentation software, video editors, and screencasting tools. You are advised to research ‘design guidelines’ and ‘best practice’ for the tools that you plan to use to create your multimedia presentation.

For a complete list of tools that may be beneficial for the development of your inquiry project, search the internet for ‘toptools4learning’ – you will find useful tools out there that you did not even know existed!

## Methods of inquiry

Research can be divided into two types:

- Quantitative research, which deals with numbers and statistics. Quantitative methods allow you to systematically measure variables and test hypotheses.
- Qualitative research, which deals with words and meanings. Qualitative methods allow you to explore concepts and experiences in more detail.

Although there are possibilities for quantitative research in the digital society inquiry project, most of your research will be qualitative. Qualitative research is generally used to explore values, attitudes, opinions, feelings and behaviours of individuals and to understand how these affect the individuals in question.

Researchers using qualitative methods are concerned with individuals' perceptions of specific topics, issues or situations, and the meanings they assign to their lives. This kind of research is important for generating theory, developing policy, improving educational practice, justifying change for a particular practice, and illuminating social issues. It may also be used to explain the results of a previous quantitative study or to prepare for the development of a quantitative study.

Qualitative methods include data collection through interviews, observation, discussions and review of documents (such as diaries and historical documents). The results of qualitative research are descriptive or explanatory rather than predictive, and are typically time-consuming to collect and analyse.

Qualitative data collection methods play an important role in impact evaluation by providing information that helps us to understand the processes behind observed results and assess changes in people's perceptions of their well-being. Furthermore, qualitative methods can be used to improve the quality of survey-based quantitative evaluations by helping to generate evaluation hypotheses, strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluation findings. These methods are characterized by the following attributes:

- they tend to be open-ended and have less structured protocols (for example, researchers may change the data collection strategy by adding, refining or dropping techniques or informants)
- they rely more heavily on interactive interviews; respondents may be interviewed several times to follow up on a particular issue to clarify concepts or check the reliability of data
- they use triangulation to increase the credibility of their findings (that is, researchers rely on multiple data collection methods to check the authenticity of their results)
- usually their findings are not generalizable to any specific population, rather each case study produces a single piece of evidence that can be used to seek general patterns among different studies of the same issue.



### Links

This content links to Section 3.1B Types of data.

Regardless of the kinds of data involved, data collection in a qualitative study takes a great deal of time. The researcher needs to record any potentially useful data thoroughly, accurately and systematically, using field notes, sketches, videos, audiotapes, photographs and other suitable means. The data collection methods must observe the ethical principles of research.

## Tools for data collection



Methods used for data collection could include questionnaires, interviews, observation and investigative techniques. The process for collecting data must be carefully considered to avoid bias and provide for sufficient and reliable data collection.

### ■ Questionnaires

A questionnaire is a list of questions related to one topic. A good questionnaire:

- deals with an important or significant topic
- clearly states its purpose, either on the questionnaire itself or on its covering letter
- only seeks to collect data that cannot be obtained from resources such as books, reports and records
- is as short as possible – it should only be long enough to gather the essential data
- is attractive in appearance, neatly arranged and clearly duplicated or printed
- has clear and complete directions, and important terms are clarified
- has objective questions with no clues, hints or suggestions
- presents questions in an order from simple to complex
- avoids double negatives, adverbs and descriptive adjectives
- avoids ‘double barrelled’ questions (putting two questions in one question)
- includes questions with an adequate number of alternative answers
- is easy to tabulate, summarize and interpret.

## Interviews

An interview is a two-way method that permits an exchange of ideas and information. A good interview:

- can probe into causal factors, determine attitudes and discover the origin of the problem
- deal with young children and people of differing levels of education appropriately
- can make cross questioning possible to better judge the sincerity, frankness, truthfulness and insight of the interviewee
- helps the investigator to gain an impression of the person concerned
- can deal with delicate, confidential and even intimate topics
- has flexibility
- does not allow interviewees to change their earlier answers.

## Observations

Observation is an objective, direct technique of evaluation in which behaviour is observed in natural situations to study an object, an event or a problem. Good observation:

- is planned systematically to serve a research purpose
- is related to more general propositions and systematically recorded
- is subject to checks and controls with respect to validity, reliability and precision
- establishes a cause-and-effect relationship
- is both an objective and subjective evaluation technique
- can be formal or informal
- can be quantitative as well as qualitative.

## Investigations

Investigations involve examining original documents, policies, laws, publications, photographs, video footage or events to determine to what extent a claim is true. It can also include experiments with digital technologies to demonstrate how a particular outcome was achieved in a real-world example. Good investigative techniques:

- are conducted using well-defined processes
- can be replicated by simulations or further experiments
- can be used to demonstrate how digital technologies were used and produced a specific outcome.

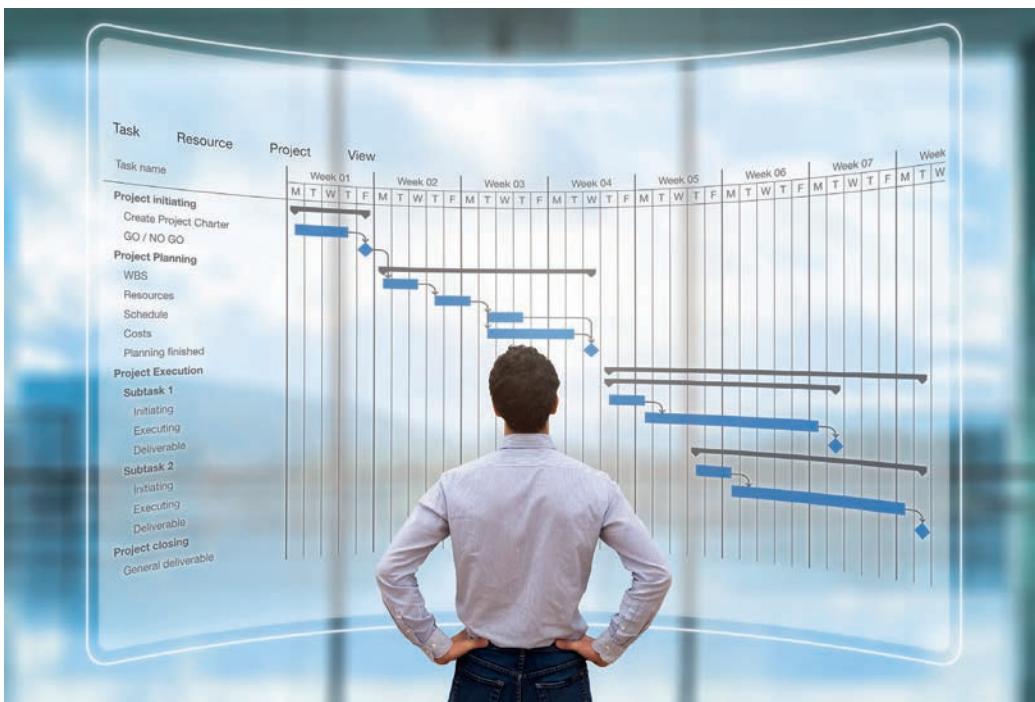
# 8.5

# Project management

## UNDERSTANDINGS

By the end of the chapter, you should understand:

- ▶ how to manage your content
- ▶ how to manage your time
- ▶ how to manage your process
- ▶ how to manage your backups.



The management of the digital society inquiry project involves the combination of processes, methods, skills, knowledge and experience to meet the inquiry project assessment criteria.

Although your ideas for the project can be valid, and you can even complete the project to an adequate level of acceptance, your project will be successful in reaching the goal that was originally expected if you make sure to have:

- good planning
- sufficient and appropriate secondary and primary research
- organized data collection (content, visual material, sources)
- realistic time frames and good time management
- investigation into the best methods for developing the presentation
- inadequate consideration of the requirements for the IPD.

Planning and proper project management are essential to avoid failure. In this chapter we will focus on best practices to manage your content, planning, time and backups to successfully develop your project.

# Managing your content



To ensure you are following a clear workflow throughout the development of your project, you will need to keep your content organised, and keep track of its status and progress. Doing this will help you to speed up the process and ensure that only high-quality content will be published in your documentation and multimedia presentation.

## Categorize and organize content

Maintain accountability of your content production and organization by keeping the content all in one place (with a backup on a cloud service or on an external storage device), defining the upcoming tasks to gather missing content, tracking changes in your inventory of content, and setting deadlines.

Create an up-to-date, detailed inventory of every single piece of content you gather for the project. Place everything in organized, properly named files and folders. Make sure you divide your folders by categories (types of media you will be using, sub-topics of your main topic, and so on). Also, make sure you follow a consistent approach to naming your files and folders to avoid confusion.

At an early stage of the project, you will identify the real-life example that will be the basis for your inquiry question and your project. Create folders for different related topics around this real-life example – this will make it easier to link your main topic and inquiry question to those topics in an organized manner.

## Mapping content

Rather than just piling up content randomly, you should always tie each piece back to a need or a goal you want to achieve. Map each piece of content to a different stage of your inquiry document or presentation. Doing this will allow you to then strategically link a piece of content to another that's in the next stage of the project.

## ■ Tracking content

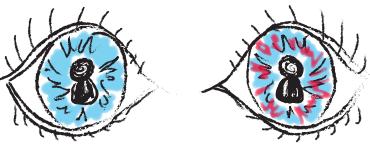
Keep track of everything in one place when you're creating and managing content with a simple spreadsheet. This will help you document and find the content you are going to publish quickly. Make sure you include bibliographical notes, such as authors, titles, date of publication, and so on, as you will need this to refer back to the content in case it is necessary to cite it in your inquiry document and/or presentation.

## ■ Creating a storyboard

You are also advised to outline the sections of your multimedia presentation in a storyboard – a tool for maintaining an overview of the overall plan for the presentation – that will continue to be updated and refined as your research progresses. It can be in the form of a simple table created with word-processing software, like the example storyboard template given below.

It can be initiated by filling in the main entries in the first column, including the inquiry question and main sections. As your inquiry project evolves in consultation with your digital society teacher, rows can be rearranged, added, deleted and edited as needed. The table may only contain a few rows with some text at the beginning, but more rows and details will be added as the inquiry process progresses.

### ■ Example of a storyboard for developing your multimedia presentation

	<b>Overview: Description for slide/sequence</b>	<b>Sketch of slide/sequence to represent a section of the presentation</b>	<b>Script for each slide/sequence (actual text for audio or outline)</b>	<b>Resources used for visual material/audio/script</b>
1	Title screen with the inquiry questions	To what extent can an individual control their digital footprint? 		
2	Introduces two perspectives of how a digital footprint is created	Keep a close watch over our own digital footprint! 		
3	First section: Identify specific actions taken by an individual that contribute to their digital footprint	How does an individual contribute to their digital footprint?		

# Managing your time



Time management – how we choose to use and organize our time – is something many of us struggle with. Effective time management allows us to make the most of our day, accomplishing tasks more quickly and prioritizing those that will make the most impact. Lack of proper time management is the reason why many great ideas go to waste and projects end up unfinished.

Let's look at some best practices on time management that can be applied in the development of the digital society inquiry project.

## ■ SMART goals

SMART goal-setting techniques have been popular since 1981, when a paper called ‘There’s a S.M.A.R.T. way to write management’s goals and objectives’ was published by George T Doran. The idea is pretty simple – every SMART goal should be created using the following criteria:

- **Specific:** It needs a clearly defined outcome (what you want to achieve).
- **Measurable:** There must be a way to measure progress.
- **Achievable:** The goal can be met with available resources.
- **Relevant:** It must fit a bigger picture and you must know why you want to achieve the goal.
- **Time-bound:** It has a clear deadline for when the goal must be achieved.

## ■ Prioritization

Once you have your goals written in a SMART way, you should break them down into concrete, actionable tasks. These tasks must then be prioritized. The Eisenhower Matrix is one of the most popular frameworks for prioritizing tasks, which recommends arranging tasks into one of these four categories:

- urgent *and* important – do first
- not urgent *and* important – schedule
- urgent *and* not important – delegate
- not important *and* not urgent – eliminate.

Urgent tasks in the scope of the digital society inquiry project are tasks that are time sensitive, meaning that you have strict deadlines by which to finish them.

Important tasks, on the other hand, are the ones that contribute to your project goals and are things that you really want to have as part of your document and/or presentation. Important tasks are the ones that are part of your project vision.

Of course, you should always tackle urgent and important tasks, so it's important that you spend most of your working time on these tasks (*urgent and important*).

You should schedule the important but not urgent tasks in your calendar so that you do not forget them. As you cannot delegate your project tasks to anyone else (the digital society project is an individual assignment), you will also need to give some attention to the urgent but not important tasks. Tasks that are neither important nor urgent should just be ignored.

## Kanban

'Kanban' is a Japanese word meaning a billboard or signboard, but it is also an additional excellent practice for managing your time. The main idea is to have a visual board that helps you to track progress on your goals.

On a large posterboard or whiteboard, you should draw three columns visualizing the stage of each specific task. The columns will be labelled as 'to do', 'in progress' and 'done'.

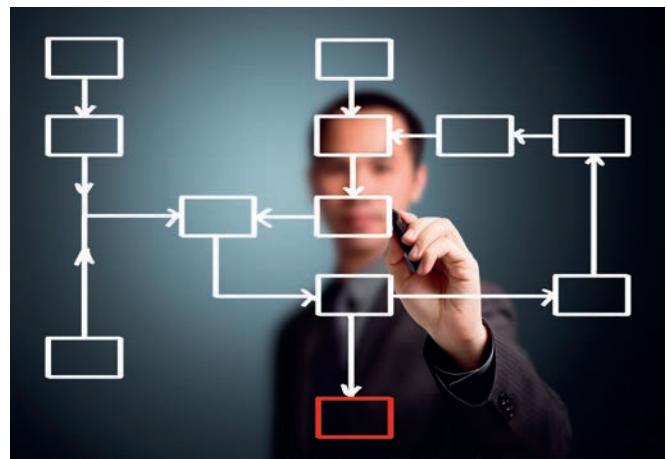
Then you need sticky notes. Each sticky note represents a task that needs to be completed. You simply write the name of the task that needs to be completed on the note and stick it into one of the columns, depending on the phase the task is in. This should produce a nice visual representation of your tasks and which stage they are at. You can then move the sticky notes through these columns based on your progress.

Consider using different colours of sticky notes for different types of tasks.

## Managing your process

Process management refers to the identification, improvement and management of processes. Effective process management in the scope of the digital society inquiry project has several benefits, for example it enables agility, allowing you to review and adapt processes quickly and remain responsive to unforeseen situations. It also promotes efficiency, which means that bottlenecks are quickly identified and resolved, reducing delays.

There are five key stages in the process management lifecycle.



## Analysing

The analysis stage is an important pre-step before the main process management lifecycle kicks in. At this stage, you should envision how you will approach the project and analyse how you can improve your initial plan.

## Designing/modelling

The ideal process should be designed during this stage. The aim is to create a sequence of logical steps that visually document the end-to-end process of development of your project. Additional information may be added once these steps have been documented, such as the time and duration of tasks, where they occur, who is involved and how information flows through the process. After the process is fully mapped, you should review it to ensure its accuracy and check your ability to meet the plan.

## ■ Implementing

At the implementation – or execution – stage, you carry out your plan. This may require the addition of technology, procedural updates, or changes to resourcing or ways of working.

## ■ Monitoring

During the monitoring stage, data is collected on your performance. Information should be gathered about whether the process you are following is effective and whether the expected goals are being achieved. Performance data can also inform decisions as to what steps should be taken next.

## ■ Optimizing

At this stage, the process is continually refined based on the information and experience you gathered in the monitoring stage and as your project goals change over time. As the project advances you may find that your processes have become sub-optimal or overly complex. In these cases, it may be worth creating an entirely new process to support the changes.

# Managing your backups



Computers crash and data is lost more frequently than you might think. You do not want to take the risk of losing all your valuable work and the time that you have spent developing it. You must have been reminded to backup all of your data by your IT teachers numerous times, but do you actually do it? While data storage and recovery are fundamental IT activities, the key message here is that you must be proactive about protecting and securing your resources.

- Set backup schedules and follow them precisely. Modify schedules as needed to accommodate process-related changes, but try to keep to the schedule.
- Arrange for multiple backup repositories, for example on-site, remotely in a cloud or with a managed data backup service provider.
- Test your data backup and recovery activities to check that the technology works, and that the data is available and can be recovered.
- Use technologies to free up storage space. Sufficient space for mission-critical data is essential to backup management, regardless if backups are completed on-site or remotely. Depending on your project needs, free up storage space on-site with technology such as de-duplication software.

# 8.6

## Practice inquiry project

Now that you have an overview for developing a successful digital society inquiry project, it is time to practice. Tie your shoes and get ready!



### UNDERSTANDINGS

By the end of the chapter, you should understand:

- the stages in the inquiry process for developing the inquiry project
- how to develop your own inquiry project.

Please refer to the inquiry process in Chapter 8.0, as you will be following it in order to complete the activities.

### The inquiry project starting point

*Starting point*

The first step to get started with your digital society inquiry project is to identify a real-world example (stimulus material), which will trigger the inquiry question and the entire inquiry focus. In order to do that, you should read several news items and watch several videos related to digital society. You should be looking for an up-to-date topic of interest, which clearly has its focus on the use of digital system(s), and through which it is possible to identify impacts and implications for people and communities.

### ACTIVITY

Think of a digital society topic of interest and research news items related to it on different websites. Keep a record of the ones that might be useful starting points for your digital society inquiry project. You should select at least 10 sources, then choose the one that seems to be the most appropriate. Keep the other nine (or more) as they may still be useful, either to replace the source selected initially or as supporting sources for your project.

To be an appropriate news item (or real-world example) for the inquiry project, the article must include a relevant digital system and address impacts and implications for people and communities. You should also check the reliability, verifiability and validity of your sources by checking their origin and purpose, as well as corroboration and use (see the *Digital Society Guide*).

## Creating an inquiry focus

Through our search, we identified an excellent podcast on the ‘alt-right pipeline’ by Matthew Suescun called ‘We explored internet extremism so you won’t have to’. ‘Alt-right’ is an abbreviation of alternative-right and identifies an ideological movement characterized by the use of online media to disseminate right-wing content; it is provocative and often connected to racism, religious intolerance and opposition to gender equality.

The podcast can be found here:

<https://soundcloud.com/user-426817413/we-explored-internet-extremism?>

The podcast discusses the mechanisms of the alt-right pipeline and how it attracts impressionable audiences, as well as the impact of echo chambers. Should your inquiry project follow in this line of thought, your inquiry question would most likely address the alt-right pipeline or echo chambers. Rather than jumping right into it as your topic of choice, however, you should continue to look at possible alternatives. If you felt sure that this would be a good topic for your digital society project, you should continue looking for articles that have a similar focus, even if the topic is slightly different.

We continued our search and selected some potential news items that could also be used, for example, this article from MIT Technology Review, 29 January 2021 called ‘YouTube’s algorithm seems to be funneling people to alt-right videos’: [www.technologyreview.com/2020/01/29/276000/a-study-of-youtube-comments-shows-how-its-turning-people-onto-the-alt-right](https://www.technologyreview.com/2020/01/29/276000/a-study-of-youtube-comments-shows-how-its-turning-people-onto-the-alt-right)

Here is a summary of its content:

*A study suggests that YouTube is a pipeline for extremism and hate. More than 330,000 videos on nearly 350 YouTube channels were analysed and manually classified. They were labelled as either media, ‘alt-lite’ intellectual dark web, or alt-right. The alt-right is what is traditionally associated with white supremacy. Those who affiliate with the ‘intellectual dark web’ justify white supremacy on the basis of eugenics and ‘race science’. Members of the alt-lite purport to not support white supremacy, though they believe in conspiracy theories about ‘replacement’ by minority groups.*

*More than 26% of people who commented on alt-lite videos tended to drift over to alt-right videos and subsequently comment there. The researchers found that YouTube’s algorithm often directed users who searched for specific keywords toward increasingly violent, extreme content. About 60,000 people who commented on alt-lite or intellectual dark web content got exposed to alt-right videos over a period of about 18 months.*

*We are not quite sure exactly what makes people move from alt-lite material to the far-right stuff. But this research suggests that YouTube’s recommendation algorithms may play a significant role. YouTube has long struggled with the balance between maintaining free speech and addressing hate speech.*

Source: [www.technologyreview.com/2020/01/29/276000/a-study-of-youtube-comments-shows-how-its-turning-people-onto-the-alt-right](https://www.technologyreview.com/2020/01/29/276000/a-study-of-youtube-comments-shows-how-its-turning-people-onto-the-alt-right)

### ACTIVITY

Search the internet for the podcast mentioned above and, if you are able to find it, listen to it. Look the article too and read it. If you cannot find either of them, research for and read three articles that address similar topics and then write down three areas that could become the focus of your inquiry project.

Keep in mind that the focus of the project does not need to be the most obvious focus of the article you are using as the starting point for your project. It may be a marginal area covered in the news item or even an area just slightly related to what has been covered in the news item. Once you have selected your inquiry focus, you will research other sources and will be able to find articles that are mainly focused on the area of your choice.

# Formulating an inquiry question

Based on the real-world example, we can now draft an inquiry question. This question will help us to plan what other sources we should explore. It does not need to be perfect at this point; in fact, it can be very general. It can be refined later as we move on with our exploration of the topic.

For our example, it seems that our focus should be on the impacts and implications of the alt-right movement or on how online media has been leading users to embrace extremist movements. However, from the same article it is possible to infer that the algorithms used by YouTube may be making the decision on what content should be emphasized and what content should be hidden from the general audience.

The inquiry question determines the inquiry focus. So, if you decide that your inquiry will be on how algorithms can influence and impact society, everything else (including the alt-right movement) will become secondary in your research and will only be used to support your main topic. For the purpose of modelling the inquiry project process, we have decided to follow this direction in our investigation. We have kept the news item we summarized above as our real-life story.

The digital system mentioned in the article is YouTube, but we have decided to expand our investigation to other social media (such as Facebook) in order to explore in more depth whether social media's algorithms, by allowing certain content and blocking other content, have been used to favour some groups and ideas, while threatening free speech and depriving a large number of other users from sharing their own ideas, thus guiding users to react and think a predetermined way and therefore impacting the entire society.



## ACTIVITY

Based on the information provided in the paragraph above, formulate your own inquiry question. Compare it with the inquiry question we have decided to use for our investigation.

## Initial inquiry question

Our initial inquiry question is:

- To what extent do algorithms used by social media sites, such as Facebook and YouTube, interfere with the free expression of ideas and influence their users by promoting their own political views and blocking opposing ones?

Our inquiry will now explore the connections to the course concepts, content, and contexts that we should focus on in order to have an effective investigation. There are multiple possibilities, so an in-depth investigation must focus on a limited number of them.

You can find a list of course concepts, content and contexts in the *Digital Society Guide* and in Sections 2, 3 and 4 of this textbook.

## ACTIVITY

Considering the proposed real-world example, the initial inquiry question and the list provided in the *Digital Society Guide*, identify relevant concepts, content and contexts that could be part of the inquiry focus in your opinion.

# The inquiry focus

In our example, we decided to focus on:

- **Concepts:** The *power* exerted by social media to influence the thoughts and actions of its users, possibly causing *change* and affecting the *identity* of people and communities (see *Digital Society Guide* Sections 2.1, 2.3 and 2.4).
- **Content:** The content of our inquiry is clearly the *algorithmic* and *digital media dilemmas* (see *Digital Society Guide*, Sections 3.2E and 3.5D).
- **Contexts:** The contexts are the *online communities* (subcultures) and *political advertising and propaganda* (political process) (see *Digital Society Guide*, Sections 4.1D and 4.6A).

The real-world example, the inquiry question and the specific concepts, content and contexts will now define the inquiry focus of our investigation.

## Explore

Explore

Once the inquiry focus is clear, you will need to explore and collect information from other relevant secondary sources, which will provide claims and perspectives that will be useful in the inquiry.

Criterion B of the digital society inquiry project requires a discussion of the claims and perspectives for three sources, including a justification of their usefulness in the inquiry. Obviously, the three sources will be selected after searching for and reading dozens of possibly relevant articles.

### ACTIVITY

Considering the inquiry question we have established and the concepts, content and contexts we have identified, explore and select three other sources that could be part of the digital society inquiry project.

When you select your sources, keep in mind that in order to determine whether or not the source is reliable and relevant, you must check its origin and author, its main ideas, and how it compares and contrasts with other sources that have attempted to explain the same topic, (see Criterion B IPD Claims and Perspectives and/or the *Digital Society Guide*, Researching/Claims and perspectives).

For our sample, we have selected the following sources:

- 1 An article from The Verge published on 2 July 2021 called 'Facebook confirms tests of a new anti-extremism warning prompt'.

It can show up if you've seen extremist content.

*Facebook says that it'll continue to remove extremist content that violates its rules, though the company has had issues tracking down and removing similar content, even from groups that it's actively tried to kick off the platform. Facebook has long been the subject of scrutiny from the public and lawmakers, as many say that its algorithms divide people and push them towards extreme ideologies, something the company has itself recognized.*

*Facebook says that the tests go along with its Redirect Initiative, which "helps combat violent extremism and dangerous organizations" in several countries. According to its webpage, the program (as the name implies) redirects users to educational resources instead of further hateful content.*

Source: <https://www.theverge.com/2021/7/2/22560108/facebook-anti-extremism-prompt-user-resources-content-moderation>

- 2** An article from *The Conversation* from 16 May 2021 called ‘Beyond a technical bug: Biased algorithms and moderation are censoring activists on social media’.

*Social media platforms have been under scrutiny because of their erroneous censoring of grassroots activists and racial minorities. So, were these really about technical glitches? Or did they result from the platforms' discriminatory and biased policies and practices? The answer lies somewhere in between. There is an inherent belief that AI systems are less biased and can scale better than human beings. In practice, however, they are easily disposed to error and can impose bias on a colossal systemic scale. While AI is celebrated as autonomous technology that can develop away from human intervention, it is inherently biased. The inequalities that underpin bias already exist in society and influence who gets the opportunity to build algorithms and their databases, and for what purpose. As such, algorithms do not intrinsically provide ways for marginalized people to escape discrimination, but they also reproduce new forms of inequality along social, racial and political lines.*

*Source: <https://theconversation.com/beyond-a-technical-bug-biased-algorithms-and-moderation-are-censoring-activists-on-social-media-160669>*

- 3** An article from the Harvard Business Review from 12 November 2019 called ‘When algorithms decide whose voices will be heard’.

*Everything digital we do daily (such as using our smartphones, checking social media, buying products online) is analysed and determined by algorithms. Search engines decide what to present and how to rank what is presented when we type a query, and algorithms are the ones responsible for these decisions. But what happens when algorithms decide whose voice gets to be heard? What if only a selected group of individuals gets heard? We need to reflect about this, and checks and balances need to be developed to ensure our lives and our future are not determined by algorithms.*

*Adapted from <https://hbr.org/2019/11/when-algorithms-decide-whose-voice-will-be-heard>*

## **Criterion A – IPD inquiry focus**

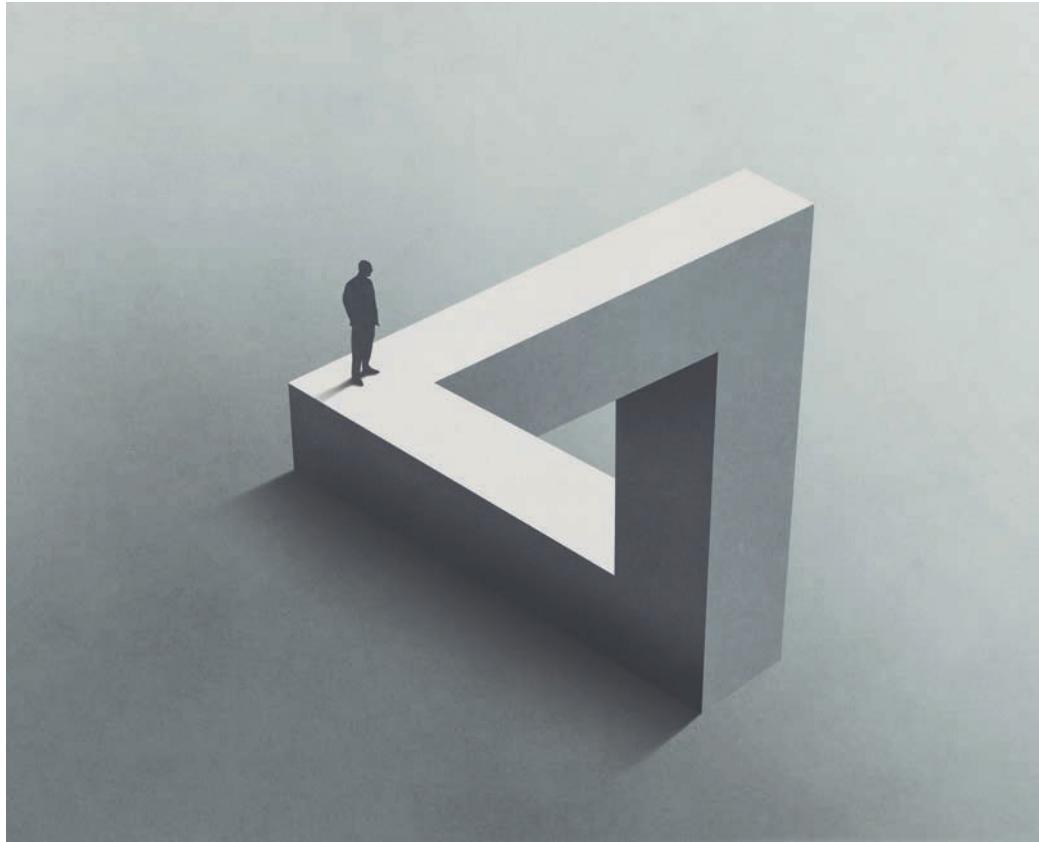
One of the requirements for the inquiry project submission is the IPD, which is a written document that does not exceed 1500 words total. Criterion A is based on the IPD.

The IPD includes the inquiry focus, which provides an explanation of the connection between the inquiry question, the real-world example and the course concepts, content and contexts. The maximum word count for the inquiry focus section is 300 words.

### **ACTIVITY**

Considering the proposed inquiry question and focus, write the first part of the IPD. This section must not be longer than 300 words and must explain the connection between the inquiry question, the real-world example and the course concepts, content and contexts (see Chapter 8.1 for an example).

## ■ Criterion B – IPD claims and perspectives



The other section of the IPD addresses the claims and perspectives. That is where you should demonstrate how research was conducted with a discussion of the claims and perspectives for the three selected sources, including a justification of their usefulness to the inquiry. Only the most relevant sources for the discussion should be selected. All other sources and materials used in the inquiry must also be included in the list of references, however. The discussion for each source should justify why and how the source supported the inquiry and your understanding. It should also address the source's origin and purpose, meaning and methods, as well as corroboration and use. The maximum word count for the claims and perspectives section is 1200 words.

For the maximum number of marks under criterion B, you must provide a thorough discussion of the claims and perspectives for each source that includes a clear justification for their usefulness in the inquiry.

Some claims can be made based on statements presented in the selected sources of our sample. Some of the statements that have been selected and the possible claims that could be made are discussed below. Whether these claims are real or not needs to be thoroughly discussed, and this discussion should be supported through the use of other sources.

### **Source 1: Facebook confirms tests of a new anti-extremism warning prompt**

- Users may receive an alert saying that they may have been exposed to extremist content.  
Facebook is, therefore, the one deciding what extremist content is.
- Facebook redirects users to educational resources instead of further hateful content. Therefore, Facebook makes the decision of what users will see to combat this exposure to extremist content.
- Facebook removes content and accounts that violate its rules. Therefore, Facebook is the one who decides what/who needs to be removed.

## Source 2: Beyond a technical bug: Biased algorithms and moderation

- Social media platforms have been under scrutiny because of their erroneous censoring of grassroots activists and racial minorities. Therefore, social media platforms erroneously censor users.
- BLM activists were frustrated when Facebook flagged their accounts, but didn't do enough to stop racism and hate speech on their platform. Therefore, Facebook flags some accounts but does not do anything about others with different views.
- Did this result from the platforms' discriminatory and biased policies and practices? Therefore, platforms practice discriminatory and biased policies and practices.
- Algorithmic bias may jeopardize some people who are already at risk of being wrongly categorized as offensive, criminals or even terrorists. Therefore, algorithms have bias.
- The inequalities that underpin bias already exist in society and influence the people that build algorithms and their databases, and why they do it. Therefore, algorithm bias is determined by those who build the algorithms.

## Source 3: When algorithms decide whose voices will be heard

- Our day-to-day consumption of all things digital is increasingly being analysed and dictated by algorithms. Therefore, we do everything as we are told by algorithms.
- Some dating apps use 'collaborative filtering,' which generates recommendations based on majority opinion. Therefore, over time, such algorithms reinforce societal bias by limiting what we can see.
- Implemented incorrectly, AI will only repeat the mistakes of the past. Therefore, AI is not perfect and does make mistakes.
- Organizations must be open and transparent in disclosing what defines fairness and biases. Therefore, as it is today, organizations carry their own bias.

### ACTIVITY

Research other sources that support or deny the claims made above.

## Analyse and evaluate

### Criterion C – analysis and evaluation

At this point, you must already be thinking about your presentation. It needs to start with an introduction, where you present the inquiry focus (which must be the same one you identified in your IPD) and provide an outline of its significance for digital society.

Following the introduction, you will need to analyse and evaluate the impacts and implications of the digital systems for relevant people and communities. The presentation will be completed with a conclusion, where you will reflect on the new understanding and ideas that came as a result of the analysis and evaluation, and you will discuss possible new trends and future developments.

Criterion C states that: 'The investigation stage of the inquiry includes sample supporting questions useful to consider for analysis and evaluation.' Refer to the *Digital Society Guide* (under Inquiry stages, Investigate) for some supporting questions that can help you in your analysis and evaluation.

In order to achieve the maximum number of marks in Criterion C, your analysis and evaluation of impacts and implications for people and communities must be effective, sustained, and well-supported by evidence.

So, let's take a look at the sources we have selected and extract some statements that require some analysis and evaluation, and which will end up causing impacts and implications for people and communities.

Analyse

Explore

### **Source 1: Facebook confirms tests of a new anti-extremism warning prompt**

- When Facebook algorithms detect ‘extremist’ content, a pop-up message redirects users to a support page. But who decides what is extremist content?
- Facebook claims that it removes content and accounts that violate its rules, but who makes Facebook’s rules? These rules therefore determine what people can see.

### **Source 2: Biased algorithms and moderation are censoring activists on social media**

- The article claims that ‘social media platforms have been under scrutiny because of their erroneous censoring of grassroots activists and racial minorities’. When posts about missing and murdered indigenous women and girls (MMIWG) disappeared from some Instagram accounts, Instagram explained that this happened due to a technical bug. However, the doubt persisted over whether these were really technical glitches, or the result of the platform’s discriminatory and biased policies and practices.
- Social media platforms sometimes remove posts at request of and/or in coordination with governments, either to maintain their market access or to protect themselves from legal liabilities, through the use of artificial intelligence (which helps identify and remove prohibited content).
- Algorithms decide what users can and cannot post online.
- What is considered offensive is bound to social context.
- The inequalities that underpin bias already exist in society and influence the people who build algorithms and their databases, and why.

### **Source 3: When algorithms decide whose voices will be heard**

- While we may have the *perceived* power to express ourselves digitally, our ability to be seen is increasingly governed by algorithms programmed by fallible humans.
- What if algorithms operating in a black box decide whose voice is prioritized?
- What if the internet becomes a guarded space where only a select group of individuals get heard – and, in turn, our society is shaped by those voices?
- Whose values will the algorithms be based on?
- When institutions do not have diverse staff that reflect the demographics they serve, the outcome of their algorithms can disproportionately impact those who ‘don’t belong’.
- How does society prevent this?

Remember that an effective analysis requires balance; that is, you need to present the advantages as well as the disadvantages of each situation. For example, it is positive to stop people from being influenced to become extremists as this can harm society deeply; on the other hand, by removing content from the view of users, the media is actually influencing people to think the way the company thinks, which can harm society even more.

An effective evaluation will take the points raised in the analysis and move further by discussing the consequences of the advantages and disadvantages. By properly evaluating each situation, it will be possible to get to the impacts and implications for people and communities.

As mentioned before, the analysis and evaluation must be sustained by evidence. Any claim that is not sustained by evidence is considered to be an opinion, and personal opinions are not acceptable in an inquiry.

# Reflect

## Criterion D – Conclusion

The final part of the presentation is the conclusion. In the conclusion, you are expected to reflect on your research and findings, emerging trends, future developments, and further insights, considering what needs to be shared and how.

Keep in mind throughout the construction of your presentation that the whole presentation must lead towards answering the project inquiry question, and the conclusion must answer that question.

# Communicate

## Criterion E – Communication

Your presentation must be organized in a logical manner so that those watching it will be able to understand it. Media must be used coherently. Refer to Chapter 8.3 for the communication skills that you are expected to demonstrate through your presentation.

Start the presentation with your inquiry question and then, throughout the presentation use the material that you prepared following the guidelines for Criteria B, C and D. You might also consider using a few short videos that will support your claims, and your analysis and evaluation.

For our example, we selected three videos that deal with algorithmic bias and how algorithms can influence us. In your research, you will need to look at a lot more than just three videos in order to select those that are really appropriate, but the ones we have selected will give you an idea of what is expected to enhance your presentation. The three videos we selected can be found at YouTube. They are:

- Algorithmic bias explained: [www.youtube.com/watch?v=bWOUw8omUVg](http://www.youtube.com/watch?v=bWOUw8omUVg)
- Is the YouTube algorithm controlling us?: [www.youtube.com/watch?v=XuORTmLhliU](http://www.youtube.com/watch?v=XuORTmLhliU)
- How social media algorithms shape the way we get information and news:  
[www.youtube.com/watch?v=gdG4vorlWOU](http://www.youtube.com/watch?v=gdG4vorlWOU)

In case one or more of the three videos cannot be viewed in your region, consider this fourth video: How news feed algorithms supercharge confirmation bias by Eli Pariser, Big Think  
[www.youtube.com/watch?v=prx9bxzns3g&t=10s](http://www.youtube.com/watch?v=prx9bxzns3g&t=10s)

A good part of the presentation will be made up of slides. Refer to Chapter 8.3 for good practices in the creation of slide shows.

Your presentation must not be longer than 10 minutes. Once you are done recording the first draft of your presentation, watch it and take note of needed corrections and possible areas for improvement. Record your presentation a second time and repeat the procedure. Do it as many times as necessary – the time invested in doing this is worth it, since the project represents 20% of your final digital society grade if you are an HL student and 30% if you are an SL student.

## Reflection

Now that you have read this chapter, reflect on these questions:

- How are you planning to get started with your inquiry project?
- What digital society inquiry topics attract your interest the most?
- Which of these topics will be most interesting to those watching your presentation?
- How do you plan to conduct your secondary research?

## ACTIVITY

Write a list of findings, emerging trends, future developments and further insights that you were able to extract from what has been discussed so far regarding this sample inquiry project. This can be done in bullet points at first. Once the list is done, can you write your conclusion in paragraph format for the presentation?

## Communicate

## ACTIVITY

Based on the work done so far for this sample inquiry project, prepare a 10-minute presentation following the guidelines and hints provided. Exchange your presentation with a few classmates – provide feedback to them and have them provide feedback to you.

Remember, this is only for the purpose of practice – the actual inquiry project must be your own individual work.



- How do you plan to collect primary data and original material for your presentation?
- What skills are needed in order to complete all of the components in the inquiry project?
- How will you organize your time to ensure you complete all of the components in the inquiry project?
- How do you plan to evaluate your own work to make certain that the inquiry project assessment criteria have been met?



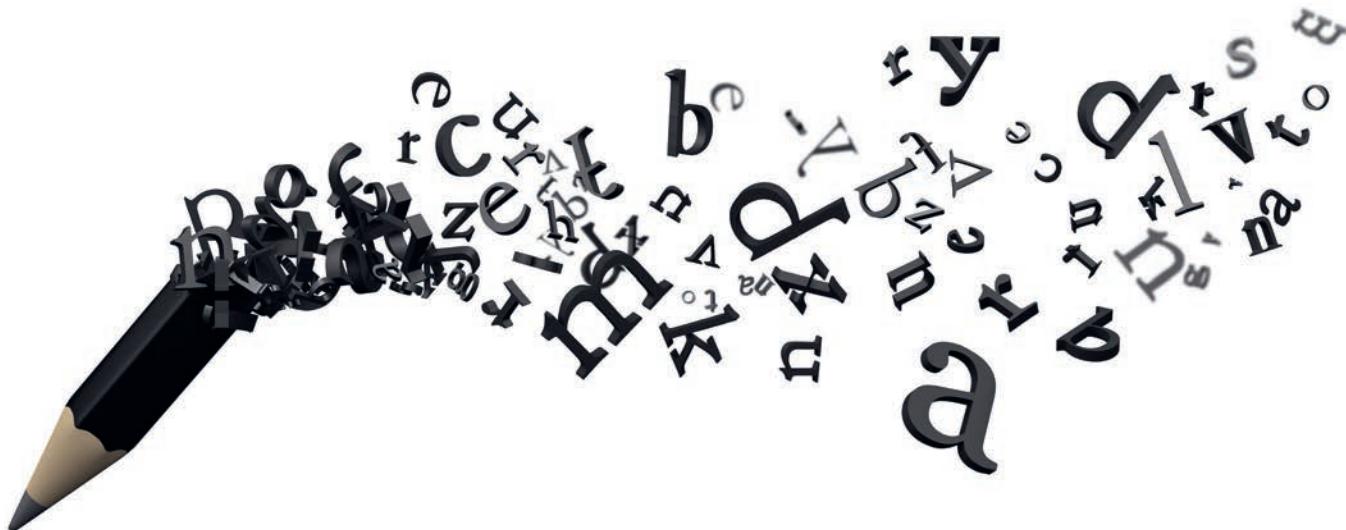
## Section 9

# Digital society extended essay

## UNDERSTANDINGS

By the end of this chapter, you should understand how to:

- ▶ state a concise research question
- ▶ use formal secondary and primary research and investigations
- ▶ manage the research process, which includes planning, recording findings and recording sources using an accepted format
- ▶ support arguments with evidence from your research
- ▶ use critical thinking in analysing the findings from secondary and primary research and investigations
- ▶ use effective communication skills in sharing findings, providing conclusions and citing sources of evidence and your bibliography
- ▶ follow IB guiding principles for academic integrity in the extended essay.



Although not mandatory, IB strongly recommends that students carry out research in a DP subject that they are currently studying to ensure that they have sufficient knowledge of the subject. If you decide to develop a digital society extended essay, you are expected to be taking the Digital Society course. In this case, you will be investigating a topic of interest that is included in the Diploma Programme *Digital Society Guide* or relates to digital society.

The extended essay will help you to develop the research, thinking, self-management and communication skills that you need to fulfil the requirements for the IB Diploma, and will support you in your future studies and work life. Your extended essay supervisor will provide you with ongoing guidance throughout the inquiry process.

# What makes a digital society extended essay?

If you choose to write your extended essay in digital society, it may be because one of the ATL activities or inquiries has sparked your interest to learn more. A digital society extended essay will provide you with an opportunity to research an area of interest relevant to the Digital Society course in order to add knowledge to an existing body of research, and should be relevant to the course concepts, content and contexts.

The main topic for the extended essay must be completely different from the topic chosen for the inquiry project. Consequently, you will embark on a second topic for your independent research. Be sure to follow the guidelines provided by your extended essay supervisor regarding requirements and deadlines.

For the extended essay, you will submit one written essay of 4000 words or less, as well as a Reflections on Planning and Progress Form (RPPF) with the three formal reflections that you will write throughout the process.

## Outline of a successful digital society extended essay

Here is a basic list of what is required for a successful digital society extended essay and some observations.

- The **title page** must contain the extended essay subject area (digital society), the title of the essay, the research question and the word count. The student must not include the name of the school, their teacher, or their own name. This page must not be numbered.
- The **research question** must be properly narrowed and sharply focused. It must allow primary investigation, so the scope of the question must be narrow (a small city, a district, a small company, a school or a grade level, for example, rather than a big city, a multinational company or a country), and/or the age group investigated must be limited. Broad topics (for example, games or social media) must also be avoided. It is advisable that the connections to the 3Cs (concepts, content and contexts) should be apparent in the statement of the research question, but they do not need to be all explicitly stated.
- The **contents page** must include all of the sections within the essay (headings and subheadings) with page numbers. The page numbers must be correct. It should not include the title page or the table of contents in the list, however. This page must not be numbered.
- The **introduction** must state the research question and may include the reasons why the candidate has selected the topic. This is not mandatory but it is recommended as it speaks of the importance of the topic. The introduction, in most cases, includes some evidence from research that underpins the importance of the topic.
- The **methodology** describes the type of primary and secondary sources the candidate will be using in the investigation. The most successful essays will have at least 25 secondary sources and relevant primary sources, such as interviews with experts and/or meaningful surveys with an adequate sample (not surveys with small samples selected ‘at random’). The methodologies used for conducting secondary research and primary investigations and research need to follow accepted academic practices for data collection, analysis and presentation.

- Students should describe and explain, in as much depth as possible, the main **digital systems** involved in the topic. The explanations need to be relevant to what is being investigated, otherwise the student takes the risk of going off course. If the student spends too much of the essay describing the digital systems, however, the essay becomes descriptive, when it is expected that the essay should be mostly analytical.
- **Findings** from the formal secondary research should cover what was found on the internet and in books and magazines and so on, that was relevant to the research question. These findings may come from a global level (all the world). Students should use the findings from their secondary research as the basis for conducting primary research and investigations. For this reason, most/all secondary research needs to be completed before engaging in primary data collection.

Findings from formal primary research and investigations can be presented graphically, for example, giving the results of survey findings in a pie chart. Primary research and investigations should be at the local level.

- **Analysis of the findings** can take place in three ways in an extended essay:
  - a comparison of findings from secondary sources/authors
  - an analysis of findings from primary research, such as a comparison of outcomes of interviews, surveys, observations, examination of original material, and so on
  - an analysis of claims from secondary sources compared with outcomes from primary research.
- **Common errors** made by students who choose to carry out surveys include:
  - providing a report of the results of a survey and identifying the report as an analysis (an analysis is an explanation of *why* the results are as they are; a report is just a description)
  - extrapolating the results of a survey to the whole world (for example ‘60% of people consider themselves addicted’, instead of ‘60% of the participants of the survey consider themselves addicted’)
  - failing to indicate how many participants are in the survey or to indicate why (and/or how) these participants were selected (the majority of candidates say they were selected ‘at random’, which is the same as saying that there was no methodology to select the participants).

Well-defined processes must be used when conducting a survey and analysing the results to avoid/minimize bias.

- The goal of the extended essay is to answer the research question, so the whole essay must be aimed at that. In the **conclusion** the student must summarize their findings, present solutions if applicable and demonstrate the conclusions. It is not simply the statements in the extended essay repeated at the end of the essay.

## Additional considerations

- It is very important that arguments, analysis and conclusion are all supported by **sources**. Any claim made without support is considered an opinion, and opinions must be avoided. The essay is a work of formal academic research and investigation and not a place to express personal opinions.
- Inclusion of visual material within the body of the extended essay, for example **diagrams**, **images** or **screenshots**, may be helpful when explaining how a digital technology is involved in the specific topic. Visual outcomes from surveys (such as pie charts and bar graphs) may also be needed in the extended essay. Images need to have titles and the source should be cited; in addition, either the paragraph above or following an image should explain the image. The examiner should not need to ‘guess’ why an image has been included or what it is attempting to show. All sources for images must be included in the bibliography.

- Every claim made in the essay must have a source, unless it is common knowledge. When in doubt whether the claim is common knowledge or not, it is best to cite the source. As pointed out in an earlier observation, if a claim is made but is not backed by sources, that is considered opinion. Throughout the essay, the candidate must provide **references** to the sources being used. The **bibliography** is a complete list of all these sources. There must be no source in the bibliography that has no corresponding references in the essay. Likewise, there must be no references in the essay that are not listed in the bibliography. The references and the bibliography must have exactly the same sources.
- The process for *how* primary research has been carried out must be included in the body of the extended essay. The presentation of the *outcome* of interviews, surveys, observations and examination of original material should be presented in an accepted manner in the **appendix**. It should include graphs of surveys, samples of responded surveys and transcripts of interviews.

Since all marks for the extended essay come from the body of the extended essay, the body must refer to and cite specific parts of the information that is included in the appendix and include those parts within the extended essay. It should be possible to understand the extended essay without referring to the appendix. The **appendix is for academic support of the material**.

- The **reflections** written in the Reflections on Planning and Progress Form (RPPF) must be analytical explanations (real reflections of the extended essay experience, challenges and decisions) and not descriptive entries (such as, 'I did this ... I did that ... then I did that other').

An excellent source for the extended essay research processes (secondary and primary) is the Purdue Writing Lab website (<https://owl.purdue.edu>). Click on the Site Map tab on the main menu and look for Research (research and citation, conducting research, research overview, conducting primary research, and so on).

## Formal reflection sessions and the RPPF

As a part of the extended essay, you are expected to show evidence of your intellectual growth, critical and personal development, intellectual initiative and creativity. To this end, you are required to complete three reflections on the RPPF. These are explicitly assessed under assessment Criterion E (engagement). The depth of your reflections will demonstrate that you have constructively engaged with the learning process and also will demonstrate the skills that you have learned. The three reflections must not go beyond 500 words in total.

It is very important to keep in mind that your reflections must be what the name says – reflections are not descriptions! You must not use your reflections to describe what you did during the extended essay development process step-by-step. Instead, your reflections must be evaluative and include reference to your capacity to consider your actions and ideas in response to challenges you have experienced in the research process. Descriptive reflections will not be awarded more than two marks out of six in Criterion E.

### Initial reflection

At the start of the extended essay development process, you will approach your supervisor with your ideas, the topic (or possible topics) you want to investigate, and possibly one or more initial research questions to be discussed. Consider sending an outline of your research proposal to your supervisor prior to this meeting so that your supervisor has the opportunity to review your work and ensure that the reflection session will be focused and productive.

Your supervisor will use these ideas as the basis for your discussion so that you come to a conclusion about the topic you will be researching. Your supervisor will also guide you to create a workable

research question. Your initial ideas and the outcome of this initial meeting will be the basis for the reflections you will be writing in the initial reflection section of the RPPF. This initial reflection should be about 150 words long.

## **■ Interim reflection**

The interim reflection session will happen somewhere close to the midway between the first formal reflection session and the completion of your essay – most likely when you have had the time to perform a great part of your explorations, written at least 1000 words, and experienced your first challenges.

You will have a chance to discuss your achievements so far with your supervisor, as well as the difficulties you have been facing. More importantly, you will have a chance to look ahead at how to overcome these obstacles and reach your desired goals for the extended essay. Your supervisor will check whether you have collected a proper range of sources and will guide you on what still needs to be done in order to produce an appropriate full draft of your essay.

The outcome of this interim session will be the basis for the reflections you will write in the interim reflection section of the RPPF. This reflection should be about 150 words long.

## **■ Final (*viva voce*) reflection**

The *viva voce* reflection session happens at the end of the extended essay process, after you have completed and handed in your extended essay to your supervisor. This is an opportunity to sit with your supervisor and look back at your difficulties and successes along the way, to reflect on your strengths and weaknesses, the experiences you have had, and especially on how you can use these experiences and the skills you have acquired to face your future challenges at university and throughout your life.

The outcome of this *viva voce* session will be the basis for the reflections you will write in your final reflection section of the RPPF. This reflection should be about 200 words long.

# **Academic integrity**

According to the IBO, as stated in the document ‘A principled approach to academic integrity’, academic integrity is a guiding principle in education and a choice to act in a responsible way whereby others can have trust in us as individuals. It is the foundation for ethical decision-making and behaviour in the production of legitimate, authentic and honest scholarly work.

Plagiarism, on the other hand, is presenting someone else’s work or ideas as your own, by incorporating it into your work without full acknowledgement.

As pointed out in the notes on references and bibliographies above, you must provide references to the sources being used throughout your essay in a standard academic format. The essay must provide the reader with the precise sources of quotations, ideas, points of view and images. Accurate citations can either be given within the text or in footnotes, with full references listed in the bibliography. Failure to comply with this requirement will be viewed as academic misconduct and will, therefore, be treated as a potential breach of IB regulations.

Therefore, ensure that you have acknowledged all sources of information and ideas in a consistent manner, so that you do not take the risk of being considered in breach of academic integrity.

The purpose of this chapter is to provide a sample outline for an actual digital society extended essay. The research topic for your extended essay will be a different one, of course, but this chapter will give you an overview of the investigation you will need to perform and the various sections that may be used to develop your essay.

At the end of the chapter, you will also be given an opportunity to perform a sequence of activities that will help you to select a relevant topic for your extended essay, formulate a working research question, create your extended essay outline, create an annotated bibliography for your secondary research, plan your primary research, and write your reflections.

## Outline of a sample digital society extended essay

### Topic

Impacts and implications of Instagram in the lives of high school students

### Research question

To what extent does Instagram influence and control the actions of XXX high school students?

Note: “XXX” represents the name of a specific high school, so the scope of the investigation is narrow and the research question is sharply focused.

### Table of contents

#### Introduction

Includes the significance of the use of Instagram by high school students and the value of the investigation. The introduction includes citations to the evidence for the claims.

#### Research methodology

- Secondary research using academic books and internet sites. At least 25 secondary sources will be used.
- Primary investigation through interviews with at least three experts and a survey with at least 100 high school students. The questions are based on findings from the secondary research.

#### Digital systems background

- How did Instagram evolve as a social network?
- Technical aspects of how Instagram functions and is accessed.
- Characteristics of Instagram algorithms and features that keep users logged in:
  - pull to refresh
  - infinite scrolling
  - like button
  - notifications.

Include visual evidence – screenshots, images, diagrams – to support the explanation.

- Advantages of using Instagram:
  - expansion of social life (virtually)
  - entertainment
  - economic profits
  - personal publicity.
- Problems caused by the use of Instagram
  - addiction
  - peer pressure
  - social isolation
  - loss of focus in the real world.
- Comparison between findings from secondary research (global level) and findings from the primary research (local level).

## Conclusion

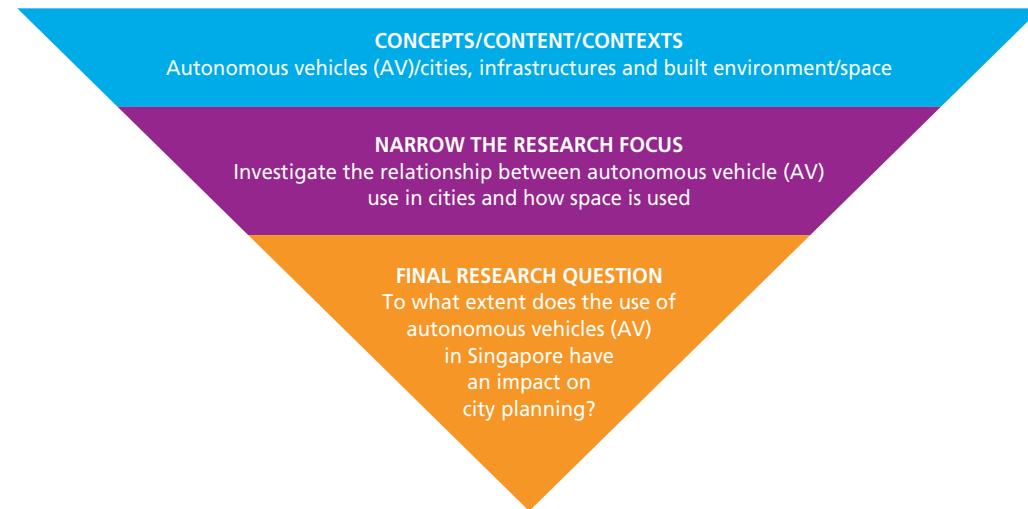
Answers the research question based on evidence provided from secondary and primary research.

## Bibliography

## Appendix

- transcripts from interviews
- summary of the outcomes from the survey conducted with 100 high school students.

# Approaching a digital society extended essay with activities



- How to narrow down the research focus

## ACTIVITY 1: REFINING THE RESEARCH QUESTION

Many of the essays submitted to the IB have research questions that are far too broad. Consequently, they do not achieve full marks in Criterion A. Consider the following research question:

*To what extent have the changes in digital technology been positive for education in the XXX school?*

While 'XXX school' may be narrow enough, as it identifies the school, 'changes in digital technology' is not, because there may have been an extensive number of changes in digital technology in the school since, let's say, the year 2000. Maybe you could restate this question as:

*To what extent have the changes that occurred since 2018 in digital technology used in the XXX school been positive for its students' education?*

Think about another question that is too broad and needs refining. For example:

*To what extent has playing games affected high school students' grades?*

Can you refine this question so that it becomes narrow enough to allow effective primary research?

Here are some hints. How many high school students are there in the world? Too many, right? How many are there in your school? Still too many? Then, how about focusing your question only on IB students in your school? How about games? Isn't that also a too broad area? After all, there are all sorts of games, from educational games to extremely violent games. What kind of game is the favourite one played by many of your classmates? Maybe that is the game that you should focus on. Can you properly refine the question now?

## ACTIVITY 3: NARROW THE FOCUS

It is now time to start narrowing the focus.

### More focused research

What has already been written about this topic and research question? Once you have a range of sources for the topic and research question, review the sources to check that you have collected sufficient and appropriate evidence to start writing the essay.

- Do the sources help you understand the topic better? Do they help you narrow the research question?
- Are the sources credible?
- Do the sources provide different perspectives on the topic?
- Do the sources agree with the general viewpoint, or do they contradict it?

### Narrow your focus

While your secondary research will use resources that will allow you to come to conclusions about the answer to your question from a broader perspective, your primary research needs to be conducted in a much narrower scope. For that, you need to narrow your research question and consequently your focus.

From Activity 2, you should be looking at specific business and even at specific companies – ideally a company that is established in your city so you can approach managers, staff, and/or clients of the company for effective primary research. For example, the research question could be narrowed at this point from 'businesses' to 'financial institutions'.

## ACTIVITY 2: INITIAL IDEAS

### Initial ideas

Look back at any of the initial ideas you have noted down from previous chapters.

Select one of these and put some of your ideas down on paper? Convert them into a mind map or spider diagram.

What questions evolve as you put down your ideas? What further research should you do?

Go back to your original ideas and refine them based on the further research.

### Confirm the topic

Once your initial ideas have been developed, you should have a working research question to begin your research. You will then be ready for the next stage in the process.

An example of an extended essay topic is:

*Conduct an in-depth study of how algorithmic bias is impacting decision-making in businesses.*

## ACTIVITY 4: PHRASING THE RESEARCH QUESTION

Once you have converted the ideas into a topic, it is time to narrow the topic into a research question. Do you need to do any more research in order to do this? Write down a few research questions. They may not be perfect at this point. Perhaps you need more research to find out how feasible the question is.

For example, the following research question would be too broad:

*To what extent is the evolution of computing impacting the environment?*

How can research help narrow this down? Which aspects of evolution and the environment could you focus on? Why would this be an interesting investigation?

Keep in mind that it is mandatory that the research question must be a question and not a statement.

You should also avoid using a yes/no question (a question that can be answered with a simple 'yes' or 'no', such as 'Did the grades of the high school students at XXX school improve during the COVID-19 pandemic, when their classes were carried only online?').

## ACTIVITY 5: CREATE AN EXTENDED ESSAY OUTLINE

Creating an outline will help you to organize your thought processes and take the mind map or spider diagram from Activity 2 to the next level. Review the 'Outline of a successful digital society extended essay' in Chapter 9.1 and the example in the beginning of this chapter.

Your extended essay outline may include:

- an introduction (the research topic, rationale for the topic and research question)
- methodological approach to the essay
- proposed chapters for the digital technology and discussion (analysis and evaluation): contexts, digital technologies, impacts, issues, dilemmas and relevant approaches that have been used to address issues
- conclusion (brings the essay to a close, answers the research question)
- bibliography
- appendix.

## ACTIVITY 6: CREATE AN ANNOTATED BIBLIOGRAPHY

Creating an annotated bibliography will help your supervisor determine if you are ready to start writing the extended essay.

It is advisable to use online tools for making citations and bibliography entries in an accepted format. Include additional information for each source:

- some background information about the author
- the intended audience of the original source
- the reliability of the source
- a brief outline of the main argument and conclusion made
- the relevance of the source to the concepts, content and contexts in the essay.

## ACTIVITY 7: CONDUCT PRIMARY RESEARCH

As part of the investigation stage of the extended essay, consider what types of primary research would support the findings from the secondary research.

For example, suppose your topic is 'the impact of robots in health care' and your research question is 'to what extent does the Da Vinci Surgical System impact on the health care provided by XXX hospital in the city of YYY?'. Identify one or more suitable persons to interview for primary research.

- Who would you choose and why?
- What questions could you ask them?
- How might they help further your research into your chosen topic?
- What other type of primary research could you use to further your investigation?

Once you have completed each of these activities, you should now be ready to write your extended essay.

## ACTIVITY 8: WRITE A DRAFT OF EACH OF YOUR REFLECTIONS ON THE RPPF

This activity is actually three activities. Before you work on them, make sure to review the section 'Formal reflection sessions and the RPPF' in Chapter 9.1. Do not work on any of these activities until you have met with your supervisor for your formal reflection sessions. After you have formally met with your supervisor, make sure to work on the activity that applies to the required reflection.

- Write a draft of your initial reflection.
- Write a draft of your interim reflection.
- Complete the *viva voce* with your supervisor and then write a draft of your final session reflection.
- After writing each reflection, read it and ask yourself the following questions:
  - Is this reflection evaluative or descriptive?
  - Does it include reference to my capacity to consider my actions and ideas in response to the challenges I experienced during this process?
- If your answer to the first question was 'descriptive' and/or for the second question was 'no', rewrite your reflection and, after reading what you wrote, ask yourself the same questions again.



## Reflection



Now that you have completed this chapter, consider this inquiry process checklist for developing the digital society extended essay.

### Checklist: Inquiry process for developing the extended essay

<b>Determine inquiry focus</b>	<ul style="list-style-type: none"><li>Have you selected a suitable digital society research question for your extended essay?</li><li>Have you decided on an appropriate methodology to carry out the inquiry process for your topic?</li></ul>
<b>Explore</b>	<ul style="list-style-type: none"><li>Have you identified at least 25 relevant secondary sources for the development of your essay?</li><li>Have you collected relevant evidence from your secondary sources that will enable you to write your essay and help you to further narrow your investigation focus as necessary?</li><li>Have you selected relevant images to be used in the essay?</li></ul>
<b>Explore</b>	<ul style="list-style-type: none"><li>Have you selected the method(s) to be used for your primary investigation and data collection based on the findings from your secondary research?</li></ul> <p><b>Survey(s)</b></p> <ul style="list-style-type: none"><li>If you decided to collect data from survey(s), have you selected participants so that the sample is a true representation of the members of the community you are investigating?</li><li>Have you developed a strategy to collect and analyse the information collected?</li><li>Have you prepared meaningful questions for your survey?</li></ul> <p><b>Interview(s)</b></p> <ul style="list-style-type: none"><li>If you decided to use one or more interviews, have you selected the people to be interviewed, so that their answers reflect the thoughts of experts in the area or of those whose knowledge in the area will be very meaningful to the outcomes of the investigation?</li><li>Have you developed a strategy to approach the people you selected for the interviews?</li><li>Have you prepared meaningful questions for your interviews?</li></ul>
<b>Analyse</b>	<ul style="list-style-type: none"><li>Have you drafted the arguments that you are going to make in the essay?</li><li>Have you drafted an analysis and evaluation of the findings:<ul style="list-style-type: none"><li>from your secondary sources?</li><li>from your primary research?</li><li>from your findings from the secondary research as they relate to the primary research?</li></ul></li></ul>
<b>Evaluate</b>	<ul style="list-style-type: none"><li>Have you determined the arguments you will use in the conclusion for answering the research question?</li><li>Have you set up an extended essay outline as preparation for the table of contents?</li></ul>
<b>Reflect</b>	

## Checklist: Extended essay document and RPPF

As you write your extended essay, be sure to refer back to the questions above and to the additional checklist below.

### Reflect

- Have you written an introduction that clearly states the research question and the reasons why you selected the topic, using supportive evidence as needed?
- Does the table of contents indicate the logical development of the extended essay?
- Are the relevant concepts, content and contexts for the research question presented in the body of the extended essay?
- Have you described and explained, in as much depth as necessary, the main digital systems involved in the topic?
- Have you used appropriate images, diagrams and screenshots in your essay? Have you labelled all the images, diagrams and screenshots, properly citing the sources and referring to each one of them in the paragraph before or after it?
- In the body of the essay, have you identified the methods used for primary data collection, including the details on how interviews/surveys/observations were conducted?
- Have you compared the findings from secondary sources/authors?

### Communicate

- Have you analysed the findings from primary research, for example, compared the outcomes of interviews, surveys, observations and/or examination of original material?
- Have you analysed the claims from secondary sources and compared them with outcomes from primary research?
- Have you included a suitable conclusion that clearly answers the research question?
- Have you cited the sources throughout the essay properly using an accepted format?
- Have you included a bibliography with a complete list of the sources in an accepted format? Do all citations in the essay correspond to entries in the bibliography?
- Have you included evidence in the appendices from primary data collection and results, such as formal transcript from interview(s), survey and sample responses, survey results (tables, graphs), formal observations and original material as appropriate?
- Are the pages numbered?
- Is the word count for the body of the extended essay within 4000 words?

### Reflect

- Have you written a suitable initial, interim and final reflections in the RPPF?

### Communicate

- Have you written an overall maximum of 500 words in the three sections of the RPPF?
- Have you made sure to write evaluative reflections, not descriptive ones?

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## Section 10

# What's next?

This course provides an opportunity to investigate and study the real world we live in. Specifically, the focus is on the use of digital technologies in our changing world and their impacts and implications. Digital technologies are transforming how we think, communicate, collaborate and create, both at a personal level and in a range of contexts from local to global levels.

The course develops ATL skills and attributes of the IB learner profile and prepares you for further study in a variety of fields and professions. Your passions, interests and experiences are at the centre of the course, which aims to empower you as citizens who not only participate in digital society but take responsible action as well.

This course enables you to better understand this changing digital world and to imagine where we, individually and as communities, might go next. Throughout the Digital Society course, the approach has been to direct you to investigate your own real-world examples, rather than rely on using specific examples given in this book.

## Lifelong learning for academic life and for careers that do not exist now

If you continue your studies beyond your IB Diploma Programme, there are many university courses that include topics relating to digital society, and specific degree programmes in digital society studies.

While all future academic studies are likely to involve digital technologies, possible areas for further investigation include:

- computer science and innovation for change in a digital society
- governance and law in digital society
- organizations and relationships
- digital media
- digital sociology and digital culture
- sustainable future
- robotics and automation
- cyber security
- data science.

As well as possibly continuing your studies into the impact and implications of digital technologies in society, you can use your knowledge and understandings in most areas of your life. During this course, you have investigated many of these in your study of digital technologies in a wide range of contexts.

## Work life

In the business world, the use of digital technologies is essential at all levels and for many purposes. The Digital Society course has enabled you to investigate a number of contexts in the area of business, and to explore these using the seven concepts. The most important of these is the ethical concept, as all actions in business – both passive and active – can produce positive and negative outcomes for people and communities. Your studies will have prepared you to understand diverse perspectives, the ethical and practical use of digital technologies, and the development of innovative new technologies.

## Social life

The study of the use of digital technologies in this course has provided an opportunity for you to reflect on your own use of digital technologies, and how they impact you, your friends and family, and local and other communities of differing sizes and make-up. Reflecting on your and others' uses provides an opportunity for you to develop as a person, especially if you use the IB learner profile as a lens to become a more empathetic and principled digital citizen.

## Political life

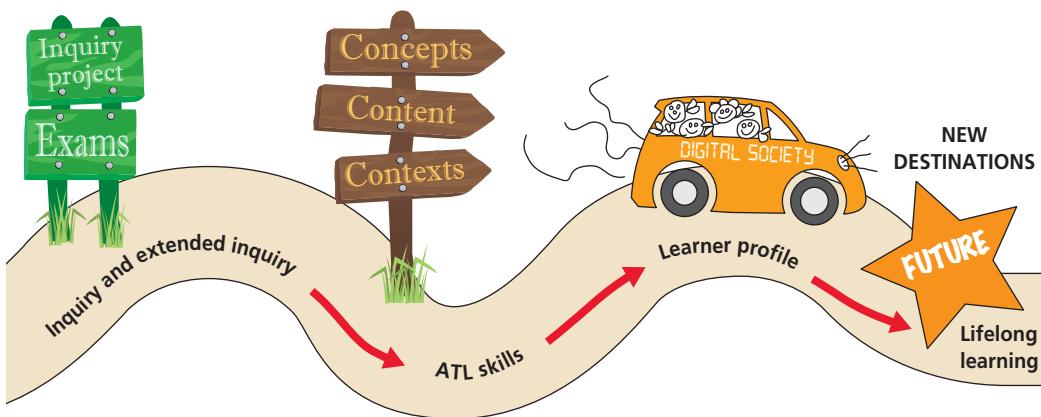
This course has provided you with a window into how the political life of the societies you live in operate in digital contexts. 'Societies', more than one society, has been used here as you will now be capable of being curious and engaged observers and thinkers in the many places you will most likely have the privilege to live in. This course has equipped you to be a force for balanced truth, a genuine digital citizen, in a world of often toxic social media, the dissemination of misinformation, and often purposeful disinformation.

## Creative life

Digital technologies are changing our cultural worlds at all levels, not just in our business, social and political cultures but in our creative cultures as well. Our recreational lives now involve extensive use of digital technologies, with both positive and negative impacts. They are also changing our reality, as the virtual world has real impacts in the same way that the real world does. This course has enabled you to investigate some of them, and to be able to analyse, evaluate and make recommendations for future actions, so that you can enhance your creative endeavours with digital technologies in practical and responsible ways.

## Path to the future

Wherever you might go next in this changing world, this course equips you to be citizens, decision-makers and leaders in our digital society. The course has shown you how to be reflective, think ethically and be empathetic as you investigated, analysed, evaluated and made recommendations for the future about the use of digital technologies for individuals and communities. Along with the knowledge, skills and personal attributes you have developed, you have also gained an understanding of the necessity to take action in our digital society.



■ Digital society – path to the future

# Glossary

**Accessibility:** The quality of being easy to use.

**Accountability:** A person is accountable for the consequences arising from a decision that has been made. Accountability is a concept that is focused on what has happened. A person can be responsible for getting items done, and then can be accountable for the consequences.

**Actuator:** A device that moves or controls some form of mechanism.

**Additive manufacturing:** Adds raw materials layer by layer to build an object or product, as in 3D printing.

**Air pollution:** Pollution released into the air either through exposure to heat or burning.

**Algorithm:** A procedure or formula for solving a problem that is based on a sequence of steps.

**Analogue:** Continuous physical quantities and signals.

**Anonymity:** The use of digital technology to conceal a person's true identity.

**Anthropomorphism:** Attributing human characteristics to non-human entities.

**Application software:** Software that serves a specific purpose, such as a word processor or video editor.

**Assembly language:** Used by programmers to write code for special hardware or so that a task can be performed very quickly.

**Assistive technology:** Any item, equipment, programme or product that enhances the life for people living with disabilities.

**Association rule:** Uncovers how items are associated with each other and reveals relationships between items in large databases.

**Asynchronous:** Remote learning that can happen at any time using pre-recorded content.

**Augmented reality (AR):** Digital content overlaid on to a real-world experience.

**Automation:** The increased use of technology in a process, which reduces the need for human involvement.

**Autonomous vehicle:** A vehicle with the ability to drive itself and operate without human intervention.

**Bandwidth:** The maximum rate of data transfer at any one time, measured in hertz (Hz).

**Behavioural competencies:** The interpersonal skills required to do a job well.

**Big data:** Term used to describe large volumes of data, which may be both structured or unstructured.

**Binary:** A system used to convert verbal logic statements into mathematical ones.

**Biodiversity:** The variety in animal and plant life in a particular community or ecosystem.

**Bio-hacking:** Any activity that helps you gain control over your own biology.

**Biometric information:** Physiological details about a person that cannot change, such as their fingerprints.

**Biometric passport:** A passport that contains an electronic microprocessor chip biometric information about the passport holder.

**Bioprinting:** The 3D printing of tissues using a combination of cells, proteins or biocompatible plastic that simulates the skeleton.

**Bit:** A binary digit – either a 0 or a 1.

**Black box algorithm:** An algorithm that provides insight without clarity on how the conclusions were reached from the data input.

**Blockchain:** A digital ledger of transactions that is duplicated and distributed across a network of computers

**Borderless selling:** The process of selling goods across national borders.

**Brick and mortar store:** A retail outlet with a physical building.

**Byte:** A group of binary digits (usually eight).

**Cache:** The small amount of memory built into the CPU that stores data while it is being processed.

**Cancel culture:** Public backlash on social media when a person or organization says or does something that is considered objectionable or offensive.

**Carbon footprint:** The total greenhouse gas emissions caused by a person, place or product.

**Cashless society:** A society in which all transactions are carried out electronically.

**Celebrations:** Important events and milestones that are honoured and observed within a culture.

**Censorship:** The suppression or banning of certain content, speech or other information.

- Central processing unit (CPU):** The part of a computer that carries out and controls the computer's instructions.
- Citizen scientists:** Ordinary people who want to become involved in scientific research with the aim of increasing scientific knowledge.
- Client-server network:** A type of network where data is stored centrally on a server and access is given to each device (client) connected to the network.
- Climate change:** Long-term shifts in the global or regional climate, such as temperature and weather patterns.
- Cloud network:** Incorporates some or all of the network capabilities on a public or private cloud platform.
- Cobot:** Robot designed to work alongside humans and augment their capabilities.
- Code of conduct:** A set of rules outlining the standards that must be followed within an organization.
- Competency development:** The practice of developing competencies in particular skills.
- Computer:** A machine or device that processes data, performs calculations and conducts operations based on algorithms provided by software and hardware programs; it can input data, process it, store it and produce an output.
- Concentric diversification:** When a business adjusts their existing product lines to meet a wider customer audience.
- Concepts:** In digital society, these are powerful, widespread ideas that open up different perspectives and provide insight during inquiries into the real-world use of digital technologies.
- Confirmation bias:** The tendency to accept news and facts that confirm our existing beliefs.
- Conglomerate diversification:** When a business adds new products that are completely separate from their existing operations.
- Content:** In digital society, this is the study of the digital technologies used.
- Contexts:** In digital society, this is the study of digital technologies in a variety of real-life examples.
- Copyleft:** When owners of original work allow others to use their copyrighted property freely under specific conditions.
- Copyright:** Legal protection for the creators of literary and artistic works including books, music, paintings, films and computer programs, which may also be digital.
- Counterfeit:** To imitate fraudulently.
- Creative computing:** The interdisciplinary area at the cross-over of the arts and computing.
- Critical-thinking skills:** The process of conceptualizing, applying, analysing, synthesizing, and/or evaluating information.
- Crowdfunding:** Collecting money over the internet to support start-ups, charities and other causes.
- Crowdsourcing:** Collecting information/ideas/work from a large group of people, usually over the internet.
- Cryptocurrency:** A digital currency that uses blockchain technology to create a decentralized encrypted ledger.
- Customer review:** Is the evaluation of particular items posted by previous customers or users.
- Customs:** Traditional ways of behaving or doing things.
- Cyberbullying:** Bullying carried out online, for example, on social media.
- Cybernetics:** The study of communication and control in both living things and machines, especially automatic control systems such as the human nervous system, and mechanical-electrical communication systems.
- Data:** Raw and unorganized facts and figures, which may be in the form of numbers, letters, characters or images.
- Data broker:** A company that collects and stores information about users and sells it on to companies or advertisers.
- Data deletion:** The sending of the file to the recycle bin, which removes the file icon and pathway of its location.
- Data compression:** Is a process that reduces the size of a file by re-encoding it to use fewer bits of storage than the original file.
- Data erasure:** The destruction of data at the end of the data life cycle.
- Data integrity:** Refers to the trustworthiness of the data and whether it has been compromised.
- Data masking:** The process of replacing confidential data with functional fictitious data, ultimately anonymizing the data.
- Data matching:** The process of comparing two different sets of data with the aim of finding data about the same entity.
- Data mining:** The process of finding patterns and correlations, as well as anomalies, within large sets of data.
- Data privacy:** The ability for individuals to control their personal information.
- Data reliability:** Refers to data that is complete and accurate.
- Data visualization:** The process of converting large sets of data into charts, graphs or other visual presentations.
- Deepfake:** Synthetic media created with the use of deep learning/artificial intelligence.
- Demographic components:** Statistical data points that are used to characterize or label groups of people.
- Digital:** Discrete signals with a finite set of values.
- Digital activism:** Activism that uses the internet and digital media as key platforms for mass mobilization and political action.

**Digital citizenship:** The responsible use of digital technology.

**Digital divide:** The gaps between members of society who have uneven access to computers or the internet, and those who do have access.

**Digital health care records:** Online databases that store patient information.

**Digital literacy:** The ability to use various digital platforms.

**Digital media:** Video, audio, images and other content that is created, encoded and stored before sharing to the user(s). Encoding is the process of converting the media into a computer-readable format.

**Digital medication:** Prescription medicine that contain an ingestible sensor; also known as 'smart pills'.

**Digital nomad:** A person who works remotely and is not tied down to any particular location.

**Digital pedagogies:** Approaches to teaching that integrate digital tools into the learning environment.

**Digital preservation:** The process of ensuring that source material is stored and accessible in a digital format regardless of technological changes that may take place over time.

**Digital redlining:** The systemic denial of digital services to specific communities.

**Digital revolution:** The advancement of technology from analogue electronic and mechanical devices to digital.

**Digital surveillance:** The collection of data about a person's online communications, connections, finances and other available information.

**Digital warfare:** the use of digital technology to disrupt or impact vital computer and warfare systems.

**Digitalization:** The use of digital systems to change the structure and/or operation of a business, institution or organization.

**Digitization:** Changing analogue data and information to digital.

**Disability:** A conditions that limits a person's movement or senses.

**Discriminate:** The unjust treatment of people based on gender, social identity, race or disability.

**Disinformation:** False information that is deliberately created and spread with the intent of influencing public opinion or obscuring the truth.

**Distribution:** The movement of products from farmers and growers to customers.

**Distributed denial of service (DDOS) attacks:** Overwhelming a site or service so that it is not available to its intended users.

**Diversification:** When a business enters into a new market or industry.

**Diversity:** In business, this refers to the inclusion of people from a range of demographic indicators.

**Domain name server (DNS):** A server that translates domain names into IP addresses.

**Domain-specific AI:** Artificial intelligence that perform tasks better than humans in certain domains.

**Dominant culture:** A culture that has established its own norms and values as the standard for the entire group.

**Doxing:** The publication of personal and/or private information such as addresses, phone numbers and photos.

**Drone:** A remote controlled or autonomous flying robot.

**Echo chamber:** An environment in which people only hear beliefs and opinions that echo their own.

**E-commerce:** The buying and selling of goods and services online.

**Ecosystem:** A community of living organisms and the physical environment that they live in.

**Electronic voting system:** A digital system designed to count votes the moment they are cast.

**Embedded computer:** A combination of hardware and software designed to perform a specific task and incorporated into an electronic or mechanical system.

**Encryption:** The process of converting readable data into unreadable characters to prevent unauthorized access.

**End effector:** A mechanical or electromechanical peripheral device that can be used to grip objects.

**Ergonomic design:** Designing workplaces, products and systems so that they meet the physical and emotional needs of the user.

**Ethnicity:** The cultural expression and identity shared by people with a common racial, national, religious, or any other identity marker.

**E-trading:** The trading of financial products, such as stocks, bonds or other assets, online.

**E-waste service:** A business that collects obsolete electronic devices and sorts them into recyclable and non-recyclable elements.

**E-waste:** Discarded electronic and electrical devices.

**Exoskeleton:** A wearable robotic tool that supports/strengthens the human body.

**Expert system:** A computer system that acts like a human expert in a specific subject area.

**Fake news:** False or misleading information presented as news.

**False positive:** A test result that incorrectly suggests a condition is present.

**Filter bubble:** When information only comes from a narrow range of sources due to algorithms designed to personalize your online experience.

**Firewall:** Hardware or software designed to block unauthorized access to a network by inspecting incoming and outgoing network traffic.

**Flowchart:** A visual representation of an algorithm showing an overview from start to end.

**Fluidity:** The ease with which people can join/leave digital subcultures.

**Food security:** Reliable access to sufficient amounts of safe and nutritious food.

**Form:** The physical nature of a work of art, for example painting, graphic design, sculpture, literature, film, music, theatre, fashion and architecture.

**Forum:** Online discussion sites that allow users to post and reply to messages.

**Functional competencies:** The knowledge required to do a job well.

**Gamification:** Applying elements of game playing to other activities to encourage participation or efficiency.

**GDPR (General Data Protection Regulation):** Legislation designed to harmonize data privacy laws across the EU.

**Genre:** A category of art.

**Geographic information system (GIS):** A system that connects data to a map.

**Gig economy:** Labour market in which individuals and organizations exchange short-term/task-based services using digital platforms.

**Global positioning system (GPS):** A satellite-based navigation system.

**Global sourcing:** Buying materials, goods and services from all over the world; the supply-side equivalent of global selling.

**Green computing:** The study and adaptation of computer design, engineering, manufacturing, use and disposal to reduce their negative environmental impact.

**Guidelines:** Norms and rules for membership and participation.

**Hacking:** Unauthorized access to a computer or network.

**Hacktivism:** Hacking into a computer system for socially or politically motivated purposes.

**Hashtag:** A word or phrase preceded by the symbol # to classify or categorize the accompanying text.

**Heritage:** The objects and qualities that are passed down from generation to generation.

**Horizontal diversification:** When a business adds on products/services that are complementary to their core business.

**Hub:** A networking device that broadcasts data to all devices on the network.

**Identity theft:** When someone steals your personal information with the intention of committing fraud. They may use your information to apply for a credit card or gain access to medical services.

**Inclusive:** In business, this refers to an environment in which people of all backgrounds feel valued, safe and respected.

**Inference engine:** The part of an expert systems that uses programmed rules to interpret and evaluate the facts in the knowledge base.

**Influencer:** Social media celebrities with large numbers of followers.

**Information:** The output after data has been processed, organized or structured, to convert it into something that is ready to visualize or analyse; it provides context for the data.

**Infrastructure:** The structures and facilities, such as roads, buildings or power supply, that allow a place to operate effectively.

**Insourcing:** The practice of finding existing employees to complete a task rather than outsourcing it.

**Intellectual property:** The outcome of thought or intellectual effort, for example a new invention or an original design. It also refers to the legal protection of that work.

**International-mindedness:** A mindset in which one sees their connection to the global community and has a sense of responsibility to its members.

**Internet:** The global collection of networks and networking technologies that link billions of users worldwide.

**Internet connectivity:** The ability to connect to the internet.

**Internet of things (IoT):** Internet-connected devices that collect and share data.

**Internet service provider (ISP):** A company that provides internet access and other related services to its customers.

**Internet trolls:** People who leave intentionally provocative or offensive messages online in order to get attention, cause trouble or upset someone.

**Interoperability:** Allows different digital technologies or systems to connect and exchange data with one another without restrictions.

**Intersectionality:** The overlap and interconnection that a specific and unique set of identity markers may create.

**Intervention:** A digitally-based solution and/or innovation that addresses the impacts and implications for people and communities in the challenge topics.

**IP (internet protocol) address:** A logical numeric address that is assigned to every node on a network.

**Knowledge base:** Facts and rules in an expert system.

- Knowledge:** Meaning can be derived from information and applied to achieve a set goal.
- Light pollution:** Excessive light in the environment.
- Local area network (LAN):** A group of computers or devices that are connected on a single site.
- Loot box:** A virtual consumable that contains a random/mystery item. These can be purchased or won in games/apps.
- MAC address:** A unique identifier assigned to every piece of hardware.
- Machine code:** Sometimes called object code, machine code is written in binary (0s and 1s) or hexadecimal instructions that the computer can respond to directly. Each type of computer has its own machine language.
- Mainframe:** A large computer used by businesses to host databases, servers used for transactions and business applications. Mainframe computers require high-level security measures.
- Malicious software (malware):** Software designed to steal data or damage computers/IT systems.
- Massive open online course (MOOC):** An online course that available for a nearly unlimited number of students to participate in.
- Medical diagnostics:** The equipment, tools and processes that professional medical personnel use to make a diagnosis.
- Meme:** An image, video, piece of text – typically humorous in nature – that it copied and spread rapidly by internet users, often with slight variations.
- Metadata:** A set of data that describes and gives information about other data.
- Metropolitan area network (MAN):** A network that covers a larger geographical area, such as a city.
- Microchip implant:** Implanting an RFID transponder under the skin.
- Microtargeting:** The strategy of using consumer data and information to create personalized content and advertisements.
- Micro-transactions (mtx):** The purchase of virtual goods for small sums of money in games/apps.
- Microwork:** Short-term projects completed quickly for payment.
- Misinformation:** False or inaccurate information that is mistakenly or inadvertently created or spread; the intent is not to deceive.
- Mixed reality (MR):** Blending the real world and digital world to create new experiences.
- Mobile service provider (MSP):** A company that offers cellular connection to mobile phone subscribers.
- Modem:** A device that converts digital data into analogue data so that it can be transmitted over a telephone line.
- Moderation:** A system designed to ensure messages posted online comply with the rules set by the online community.
- Moore's Law:** The number of transistors in a dense integrated circuit doubles every two years.
- Motherboard:** A circuit board that allows data to travel to the different components in a computer.
- Multi-factor authentication:** The use of multiple methods of authentication to verify a user's identity.
- Multiplicity:** A future in which artificial intelligence and robots are developed to work alongside people, rather than to replace them.
- Nearsourcing:** The practice of establishing operations as close to where the end-products are sold as possible.
- Net neutrality:** The concept that all data requests on the internet should be treated equally by the internet service providers (ISPs).
- Netiquette:** Rules that apply to your online behaviour to ensure the proper use of data, apps and programs.
- Netizen:** A person who uses the internet in a socially responsible way.
- Network:** A series of interconnected nodes (connection points) that are able to transmit, receive and exchange data. The data may have various formats including text, sound, images and video. Examples of nodes include computers, servers and routers.
- Network interface card:** Device responsible for converting data into a digital signal and communicating this data to a network.
- Network protocol:** A set of agreed rules that state how to format, send and receive data.
- Noise pollution:** Excessive noise in the environment.
- Non-fungible token (NFT):** A unique digital artifact (usually drawings, music or art) combined with blockchain technology to allow a unique identification and authentication of the artifact.
- Non-governmental organization (NGO):** Transnational organization that operates independently of government agencies.
- Office automation system:** A system designed to centralize and organize data, improve communication between workers and departments, manage calendars and facilitate collaboration in businesses.
- Office design:** The functional and decorative components of the working environment.
- Offshoring:** The practice of moving corporate operations overseas.
- Online community:** A group of people united by a shared interest or purpose who use digital tools to communicate with each other.
- Online exhibition:** An exhibition in a virtual venue (cyberspace).

**Online forum:** Any platform where people can post and discuss messages.

**Online marketplace:** A digital platform that allows individual sellers and buyers to trade.

**Online voting:** A system that allows voters to cast their ballot online.

**Open innovation:** When organization incorporate external sources into their research and development strategy.

**Open-source software:** Is free of charge and free of copyright, allowing the source code to be modified, often by an open-source community. However, there is no guarantee that the software will be bug free or support readily available.

**Operating system:** Software that manages the hardware, software and memory of a computer as well as providing a user interface.

**Organ printing:** The 3D printing of organs using a combination of cells, proteins or biocompatible plastic that simulates the skeleton.

**Outsourcing:** The practice of moving corporate operations to another local company.

**Paywall:** A method of restricting access to digital content unless a subscription is paid.

**Pedagogy:** An approach to teaching.

**Peer-to-peer network (P2P):** A decentralized network in which each computer is equally responsible for storing and sharing data.

**Personal area network (PAN):** The smallest type of network, consisting of the connected devices that are in close proximity to an individual.

**Personal computer (PC):** A general purpose computer designed for individual use.

**Phishing:** A type of social engineering that involves sending fraudulent messages designed to trick users into revealing sensitive information.

**Planned obsolescence:** The development of products with intentionally short lifespans so that companies can get repeat sales as devices are replaced or upgraded.

**Pollution:** The introduction of substances or energy into the natural environment that cause a negative impact.

**Popular culture:** The music, dances, movies, performances, art and other forms of expressive media enjoyed by a society.

**Predictive policing:** The use of algorithms in an attempt to forecast criminal activities.

**Primary data:** Original data collected for the first time for a specific purpose.

**Primary research:** First-hand research in which you collect original data.

**Prioritization algorithm:** A sorting algorithm used to prioritize tasks.

**Privacy:** The ability of individuals and groups to determine for themselves when, how and to what extent information about themselves is shared with others.

**Professional service robot:** Semi-autonomous or fully autonomous robots developed to assist humans in commercial settings.

**Propaganda:** Biased or one-sided information.

**Proprietary software:** Is often downloaded after paying for a license or subscription. In return for payment, users can expect updates and help from the company. Proprietary software is copyrighted which denies users access to the source code (so that it cannot be modified) and restricts the sharing of the software.

**Proxy discrimination:** Discrimination that occurs due to correlations to indicators such as race, disabilities or socio-economic status.

**Proxy server:** Computer system that acts as an intermediary between the client on the network and the internet, providing an additional layer of security.

**Psychographic analysis:** An analysis of people based on their activities, interests and opinions.

**Psychometric survey:** A survey designed to measure an individual's mental capabilities and behavioural style.

**Qualitative:** Descriptive, non-numerical data.

**Quantitative:** Data that can be measured and converted into numbers.

**Quantum computing:** The technology that uses quantum mechanics to create powerful quantum hardware which can solve complex problems faster than existing supercomputers.

**Race:** A social construct based on people's physical traits and characteristics.

**Radicalization:** The use of the internet to share ideas and resources that are radically different from those in mainstream society.

**RAM (Random Access Memory):** Short-term memory where data is stored temporarily while it is being processed or viewed on screen.

**Ranking system:** The assignment of a number or short description to data to indicate first to the last in a data set.

**Ransomware:** Malware that infects a computer and effectively locks the user out of their own device and demands a payment to unlock it.

**Real-time:** Happening now or live.

**Recidivism:** The tendency to reoffend.

**Recycle:** The process of converting waste into reusable materials.

**Relational database:** A database that has more than one table.

**Remote learning:** Education that occurs over a network connection, for example, using video-conferencing software.

**Remote working:** Conducting business and completing tasks from anywhere that employees are able to connect to the essential networks from, for example, working from home.

**Research and development (R&D):** Work on innovating, improving and introducing new services or products.

**Reshoring:** The practice of bringing previously outsourced jobs back from overseas, also called 'inshoring'.

**Responsibility:** A person is responsible for a decision that needs to be made and its implementation. Responsibility is a concept that is focused on future actions that need to be taken.

**RFID:** Radio-frequency identification.

**Rite of passage:** A ceremony or tradition that marks when an individual leaves one group and enters another, for example a birth, marriage or death.

**Robot:** A programmable machine that can complete a set task with little or no human intervention.

**Robotic surgery:** Surgery carried out using robotic systems, for example mechanical arms controlled by a surgeon.

**Router:** A networking technology that transfers data from one network to another by the most efficient route available.

**SaaS:** Software as a service; a software distribution model in which a third-party provider hosts the applications with end-users accessing the software through the internet.

**Sabotage:** The disruption of computers and systems that operate military, economic infrastructure or other vulnerable networks.

**SAMR model:** A framework for analysing educational technology.

**Secondary data:** Data that has already been collected by someone else for a different purpose.

**Secondary research:** Research carried out by someone else.

**Secondary storage:** Is non-volatile, long-term memory, used to store programs and data until they are required.

**Secure Socket Layer (SSL):** Is a protocol developed for sending information securely over the Internet by using an encrypted link between a web server and a browser.

**Self-guided learning:** A strategy that allows students to direct their own learning.

**Server:** A large computer dedicated to managing network resources. They can use specialized server hardware or can be a regular computer with a server-specific operating system capable of managing network resources.

**Service robot:** Robot developed to assist humans in completing tasks that are less desirable, such as dull, dirty or dangerous jobs.

**Sharing economy:** Assets or services that are shared between individuals, often using an online booking system.

**Singularity:** The hypothetical future where artificial intelligence becomes so advanced that it is superior to human intelligence.

**Smart city:** A city that integrates sensors, voice recognition and other new technologies to better manage transportation, energy distribution and other services.

**Smart home:** Home equipped with internet-connected lighting, heating and other electronic devices.

**Social class:** A method of classifying people and communities according to their social status.

**Social engineering:** In internet security, this means tricking a user into sharing their username and password with a fraudster.

**Social media addiction:** Psychological or behavioural dependence on social media to the detriment of other important parts of life.

**Social-emotional learning:** The integration of social and emotional skills into the curriculum.

**Solid pollution:** Solid waste material.

**Spamming:** Sending unsolicited emails, mainly for the purpose of advertising.

**Speed:** The length of time it takes for data to be transferred, measured in megabits per second (Mbps).

**Stratification:** The unequal distribution of resources between people/nations.

**Streaming:** Multimedia (especially video and audio) that is delivered digitally with little or no intermediate storage.

**Strong AI:** Artificial intelligence that can develop consciousness and make decisions better than humans.

**Subculture:** Smaller cultural groups that exist within a larger culture.

**Subtractive manufacturing:** Creating an object by cutting or carving a larger material into the desired shape.

**Super AI:** Artificial intelligence that surpasses human intelligence.

**Supercomputers:** Refers to high-performance computers capable of high-speed calculations that are required in scientific and engineering fields.

**Surveillance:** Is undertaken to collect information about people which can be used for a variety of purposes, both positive and negative, even though surveillance has mainly negative connotations. Surveillance can be conducted using technology, or through observations by people. The information collected can be used to control and influence those being observed and others.

**Sustainable development:** The ability to meet human development goals without depleting the natural resources that we depend on.

**Switch:** A networking device that forwards data packets more efficiently than a hub.

**Synchronous:** Remote learning that happens in real time with a live teacher.

**Systems thinking:** A way to think about structure and order in human, natural and built environments.

**Technique:** The way an artist uses their technical skills to create their art.

**Telemedicine:** The remote treatment of patients.

**Terrorism:** The unauthorized use of violence/force to create fear and coerce a government or its people toward a political or social cause.

**Transaction processing system:** A system designed to incorporate all of the resources, software and hardware needed to manage sales, purchases and other transactions.

**Transhumanism:** A movement that aims to use technology to evolve and augment the human experience.

**Translation app:** An app that translates one language into another allowing communication in real time.

**Transmission control protocol/internet protocol (TCP/IP):** Protocol that defines where data is to be sent to and from (IP), and how the data is to be broken down into smaller sections before sending (TCP).

**Transparency in algorithms:** the ability to understand and be able to explain the inner workings of the algorithm.

**Transport Layer Security (TLS):** Is an improved version of SSL and is a protocol that provides security between client and server applications communicating over the Internet.

**Trending:** A topic that experiences a sudden surge in popularity on social media platforms for a limited period of time.

**Trilateration:** Technology that uses three satellites to pinpoint our phone's location.

**User interface:** The means by which human users interact with a digital technology. The intent is to make the user's experience straight forward, intuitive, and requiring minimum effort to achieve the desired outcome.

**Utility software:** Software designed to perform specific useful tasks that either help to analyse, configure or maintain the computer.

**Validation:** In databases, this means that only valid (suitable) data can be entered.

**Verification:** In databases, these are checks that the data entered is the actual data that you want, or that the data entered matches the original source of data.

**Vertical diversification:** When a business takes over a new part of their supply or production chain.

**Video game addiction:** Psychological or behavioural dependence on playing video games to the detriment of other important parts of life.

**Virtual conferencing platform:** Digital platform that allows multiple users to video chat at the same time, for example Zoom or Google Meet.

**Virtual personal assistant:** Voice-controlled helper mainly found in smart speakers or mobile phones.

**Virtual reality (VR):** A simulation that provides a completely immersive environment for the user.

**Virtual reality exposure therapy (VRET):** Therapy designed to reduce a person's fear and anxiety by confronting the experiences in a computer-generated virtual environment.

**Virus:** A type of malicious software comprised of small pieces of code, often attached to legitimate programs or emails.

**VoIP (voice over internet protocol):** Allows users to make voice calls using a broadband Internet connection instead of an analogue phone line.

**Water pollution:** Pollution released into water.

**Wayfinding:** The technologies and systems that give directions to people as they navigate a physical space.

**Weak/narrow AI:** Artificial intelligence that has a limited function or can only perform a specific task.

**Wearable medical device:** A device that can be worn to provide continuous, real-time data to improve the treatment, diagnosis and monitoring of patients.

**Wide area network (WAN):** A national or international network; the largest example is the internet.

**Wireless access point (WAP):** A device that creates a wireless local area network to improve coverage throughout a building.

**Wireless networks:** Use of wireless technologies to connect the different nodes to form a network.

**Wisdom:** The application of knowledge.

**World Wide Web (WWW):** The websites and web services that are hosted on web servers and identified by their URL (uniform resource locator).

**Youth culture:** The culture and social norms of teenagers and young adults.

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## Section 1 Understanding digital society

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## Section 7 How to approach external assessments

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