

OCR Computer Science A Level

1.5.2 Moral and Ethical Issues

Concise Notes



Specification:

1.5.2

- **Moral, social, ethical and cultural opportunities and risks of digital technology:**
 - Computers in the workforce.
 - Automated decision making.
 - Artificial intelligence.
 - Environmental effects.
 - Censorship and the Internet.
 - Monitor behaviour.
 - Analyse personal information.
 - Piracy and offensive communications.
 - Layout, colour paradigms and character sets.



Computers in the Workforce

- Computers are used to **increase efficiency** and productivity in the workforce.
- Examples include **reducing delivery times** and **shortening manufacturing processes**.
- Higher productivity reduces **unit labour costs** meaning **lower prices for consumers**.
- Computerisation removes the need to work in a **repetitive and tedious environment**.
- However, it has contributed to rising **structural unemployment**.
 - Middle-income manufacturing jobs have been hit the hardest so there has been a **shift towards low-income service jobs**.
- There has been a rise in the **services being offered exclusively online**.
 - Examples include online shopping and online banking services.
 - This has **reduced costs of renting** and **cut labour costs** for businesses.

Automated Decision Making

- Used to decide what users should be displayed on their **social media feeds**.
 - May create a **dangerous bubble**, leading to a **close-minded society**.
- Automated decision-making is used in **various application processes**, sometimes with life-changing consequences.
 - Examples include application processes for mortgages, loans and jobs.
 - Also used in **power distribution systems**.
- Relying entirely on these algorithms could result in people being **treated unfairly**.
- Automated decision-making in driverless cars allows for faster reactions to certain scenarios. However, there are ethical considerations to make:
 - **Who should be harmed** if a scenario arises in which either a pedestrian or the driver must be harmed?
 - **Who is responsible** for the consequences of this decision?
- Algorithms must be **thoroughly tested** to produce software which is **free of bias**.

Artificial Intelligence

- The ability of a computer to **replicate human intelligence**.
- Used in **expert systems** which replicate the knowledge of an expert in a subject
 - Made up of a **knowledge base** which is interrogated to find diagnoses.
 - Used in medicine to draw **links between illnesses and form diagnoses**.
- Used in **neural networks** for **pattern detection** and identifying **financial fraud**.
- AI is used in **voice recognition systems** such as in **smart home systems**.
 - Provide convenience for people but raise concerns about **privacy**.



- AI raises questions about **accountability**:
 - Who is responsible when things go wrong?
 - What rights should sentient AI have?

Environmental Effects

- People throw away more devices than ever before as technology has become more affordable and widely accessible.
- Computers components are **toxic** and can **contaminate water supplies**.
 - **E-waste** is sometimes shipped to **third world countries with lower environmental standards** to be disposed which is considered immoral.
- **Electricity** to power our device requires using up **fossil fuels** which **emit greenhouse gases** into the atmosphere, contributing to **global warming**.
- **Impact future generations** and harm **biodiversity**.
- In parallel, there has been a growth in **environmentally-friendly technologies**.
 - Examples include **smart home systems** which use sensors to determine when heating and lighting should be switched.
 - Devices offer 'Sleep' and 'Stand-by' features.

Censorship and the Internet

- The act of **suppressing the content that people are able to view, publish and access**.
- ISPs block content associated with **terrorism and extremist political beliefs**.
- People worry that censorship may be misused to **push a certain ideology**.
- Some people believe in the idea of a '**Free Internet**', where **nothing is filtered at all**.
- Censorship can exist on a smaller level, such as within a school or workplace.
- Censorship may be used to **maintain productivity and prevent distractions**.

Monitor Behaviour

- Computers are used to monitor people's behaviour in various environments.
- **Employers monitor productivity** by tracking the websites workers are accessing.
- **Surveillance systems**, such as CCTV cameras, are used to **detect crime**.
- Ankle monitors are used to track people under house arrest.
- Some argue that this is unethical and contravenes basic human rights.
- Others argue that this is essential to put people off committing crime.



Analyse Personal Information

- Data can **reveal key insights about people and their behaviours**.
- **Large amounts of data from a number of sources**, called **big data**, can **identify connections between two variables** in a process called **data mining**.
- Ethical concerns about whether companies have a responsibility to feedback trends they uncover to the people involved.
- There is pressure on large firms to be more transparent about the data they collect.

Piracy and Offensive Communications

- The **unauthorised copying of content**, such as software or media and is a **form of theft**, though the Internet has made it easy to source these types of content online.
- The Internet provides a **seemingly anonymous front** for offensive communication.
- Offensive communication includes **online harassment, cyber-bullying or stalking**.
- The **Malicious Communications Act** introduced in 1998 makes it a **criminal offence to send indecent or offensive messages to anyone online**.

Layout, Colour Paradigms and Character Sets

Layout

- Web developers must consider **who will be viewing websites** when designing them.
- The **Equality Act** introduced in 2010 makes it **illegal to discriminate against providing a service to a certain group of people**.
- It must be **easy for users to navigate between pages**.
- Menus must be displayed on the appropriate side of the page depending on how the language is read.
- People with **visual impairments** may need to **enlarge text or alter the contrast**. Websites should provide **alt text** for images and provide a **screen magnifier option**.
- **Transcripts** of audio files should be provided for those with hearing impairments.

Colour Paradigms

- Web designers must consider **how colours are interpreted** around the world.
- Some colours are regarded as unlucky in certain cultures.

Character Sets

- Websites should be accessible to as wide an audience as possible.



- Website content needs to be **translated into multiple languages**.
- **Unicode is the preferred character set** for this as it is able to represent **over a million characters**.

