

Chapter 8

Effects of using ICT

8.1 Copyright

Copyright legislation definition:

Legal protection of specific content/work from being downloaded, copied, or borrowed without the owner's permission.



Importance of copyright legislation:

- To ensure people are rewarded for their efforts
- Prevents theft of intellectual material
- Prevents **plagiarism**
- Protects the copyright of the owner of the software

Principles of software copyright:

- Users must not lend/rent/sell the software to other people
- User must not install the software on a network unless it is a network version
- Users must not modify/plagiarise the software
- Must not use coding from the software in your own software

How to make sure not to break a software copyright:

- Must contact the copyright holders
- Must ask permission to use the material
- Should acknowledge the sources for the material

How software manufacturers attempt to prevent copyright being broken:

- Requesting to input a unique **product key** when software is being installed
- The user will be asked to agree to the **license agreement** before the software continues to install
- If supplied with a hardcopy, a form of **hologram** is used to indicate that the software is a genuine copy
- Software will only run if the CD, DVD, or memory stick is in the drive
- Software will only run if a **dongle** is plugged into one of the USB ports



A dongle is a small device, usually plugged into one of the computer's USB ports

8.2 Effects of microprocessor-controlled devices (smart devices) in the home

Using microprocessor-controlled devices in home can have positive and negative effects on our:

- Lifestyle
- Leisure time
- Physical fitness
- Data security
- Social interaction

Lifestyle, leisure time, and physical fitness

Positive effects:

- They reduce the need for people to do manual tasks at home
- Can be set **remotely** using a smartphone
- Can be used for physical fitness tracking in the home
- They give people more time for leisure activities, hobbies, shopping, and socializing
- Cookers can be switched on whilst we are out so that we arrive home to a cooked meal
- Automated burglar alarms give people a sense of security
- Smart fridges can be used to improve a healthy lifestyle

Negative effects:

- They can lead to unhealthy lifestyles if the dependency on ready meals is high
- They tend to make people rather **lazy** because there is a dependence on the devices
- Lack of exercise will result in becoming less fit
- Potential loss of household skills
- There is the risk of cybersecurity threats as the internet can be used in smart devices
- Possible health issues from the devices, e.g., microwave leakage

Security of data

Advantages of using a smart security system:

- Increased sense of security
- Cameras can be viewed from the smartphone, so intruders can be seen/reported
- You receive immediate alerts if there is a security breach

Disadvantages of using a smart security system:

- Malware can be installed to sabotage the smart devices
- Hackers can communicate remotely with smart devices in your home
- You may not be able to deal with the intruders if you are a long way away
- If access to the internet is lost, then control of the system is lost
- Hackers can gain personal data about you by hacking smart devices

How to protect against security issues when using smart devices:

- Use different passwords for each device
- Install software updates, which often contain new security features

Social interactions

Positive effects:

- Easier to make new friends using chat rooms
- Easier to find people who share similar interests/hobbies
- Less expensive to keep in touch using VoIP technology

Negative effects:

- Social isolation as people do not meet face-to-face as much
- A lack of social interaction may make people more anxious about meeting people in real life
- People behave differently when interacting online (they can be ruder or more aggressive)
- Cyberbullying

8.3 Effects of microprocessor-controlled devices (smart devices) in controlling transport

Uses:

- Monitoring/Controlling of traffic on motorways
- Congestion zone monitoring
- Automatic number plate recognition (ANPR)
- Automatic control of traffic lights
- Air traffic control systems



Positive effects:

- Controlling traffic will reduce traffic jams and minimize everyone's journey time
- Transport systems are more efficient (as more transport vehicles can use the transport network, allowing for more regular services)
- Traffic offenses can be automatically penalized using ANPR
- Stolen cars and criminals can be spotted using ANPR
- Computerized control systems minimize human error, which reduces the rate of accidents

Negative effects:

- A hacker could gain access to the computerized system and cause disruption
- If the computer system fails, then the whole transport system could be brought to a standstill
- Poorly designed systems could compromise safety
- ANPR systems mean that innocent people's movements can easily be tracked, which violates privacy

Autonomous (Driverless) vehicles**Definition:**

- Vehicles that rely on sensors, cameras, microprocessor, and actuators to control their movement
- Microprocessors process the data received from cameras and sensors and send signals to actuators to perform physical actions, such as:
 - Change gear
 - Apply the brakes
 - Turn the steering wheel

Positive effects:

- Safer because human error is removed, leading to fewer accidents
- Better for the environment because vehicles will operate more efficiently
- Can reduce traffic congestion
- Increased lane capacity (due to better braking and acceleration responses together with optimized distance between vehicles)
- Can reduce travel time
- Can self-park so it reduces the time to find a parking spot

Negative effects:

- Very expensive system to set up
- Possibility of hacking into the vehicle's control system
- Software glitches could lead to potential disasters
- Cameras need to be kept clean so that they do not give false results
- Sensors could fail to function in heavy snowfall or blizzard conditions
- Reduction in the need for taxis could lead to unemployment
- Driver and passenger reluctance of the new technology

Autonomous flying vehicles (Drones)

Advantages:

- Safer to use than human life being risked
- Drones can be used in areas that would be inaccessible to humans
- Drones can cover a greater area than a human in the time available
- They are portable and can be transported from place to place easily
- Cheaper to use a drone rather than a helicopter

Disadvantages:

- More difficult to fix camera problems as no humans present
- The range of the drone may be small
- It can fly out of range and lose control of the signal

8.4 Effects of ICT on health

Health risks are caused due to the **prolonged use of ICT equipment**.

Eye strain / Headache

Caused by:

- Staring at a computer screen for a long time
- Having incorrect lighting in the room
- Sitting too close to a screen
- Using dirty screens
- Using flickering screens (CRT)



Ways of minimizing the health risk:

- Take regular breaks
- Make use of an anti-glare screen
- Use flat screens (TFT/LCD/LED) to reduce the flicker
- Improve the lighting in the room to match the brightness of the screen
- Turn the brightness down on the screen
- Keep the screen clear of dust and dirt
- Test eyesight regularly

Back and neck aches

Caused by:

- Sitting in front of a computer screen for a long time in the same position
- Sitting in front of a computer for a long time in the wrong posture

Ways of minimizing the health risk:

- Take regular breaks
- Sit with the correct posture
- Use **ergonomic chairs** to give the correct posture
- Do back and neck exercises
- Use footrests to improve posture
- Use monitors that can tilt to reduce neck problems



Repetitive Strain Injury (RSI)

Definition:

Painful swelling of the wrist and fingers.

Caused by:

- Constant typing on a keyboard
- Holing a mouse with repetitive clicking on buttons

Ways of minimizing the health risk:

- Take regular breaks
- Use an **ergonomic keyboard/mouse**
- Use a wrist rest
- Use a mouse rest
- Exercise the hand and fingers
- Use voice-activated software



Mouse rest



Wrist rest



Ergonomic keyboard

8.5 Effects of ICT on physical safety

Physical safety risks are caused by the **wrong use of ICT equipment**.

Safety risk	Caused by	Ways of protection
Electrocution	<ul style="list-style-type: none"> ● Touching bare wires ● Spilling liquids near electrical equipment 	<ul style="list-style-type: none"> ● Check insulation on wires regularly ● Don't allow liquids or drinks near computers ● Use RCB
Tripping and falling over trailing wires and causing injury	<ul style="list-style-type: none"> ● Presence of many trailing cables 	<ul style="list-style-type: none"> ● Use cable ducts to make the wires safe ● Fix wires along walls and under carpets to prevent any contact between people and wires ● Use wireless connections wherever possible
Heavy equipment falling and causing injury	<ul style="list-style-type: none"> ● Placing devices near the edge of tables ● Placing heavy equipment on weak tables or shelves 	<ul style="list-style-type: none"> ● Use strong desks and tables to support heavy hardware ● Place devices in the middle of a table ● Use large and sturdy desks
Fire risk	<ul style="list-style-type: none"> ● Overloading of powersockets ● Overheating of equipment 	<ul style="list-style-type: none"> ● Have a fully tested CO₂ fire extinguisher nearby ● Don't overload sockets with too many plugs ● Don't cover equipment ● Use a cooling system

8.6 E-safety

Personal data

Definition:

Data relating to a living person who can be identified by this data.

Examples of personal data:

- Name
- Address or email address
- Date of birth
- Banking account number
- Photographs of the individual
- Gender



Examples of sensitive personal data:

- Racial origins
- Political views
- Religion
- Criminal activity
- Medical record
- DNA
- Biometric data

Why personal data should be confidential and secure:

- As it links directly to a person
- If someone gets access to the data, then they can use the information to attack the person
- To protect sensitive personal data
- If not kept confidential and secure, it could lead to home burglaries as people post holiday details on social media
- Can lead to identity theft

Data Protection Acts/Legislation

Definition:

Legislation designed to protect individuals and to prevent incorrect or inaccurate data being stored.

Data Protection Acts/Legislation principles:

- Data must be fairly and lawfully processed
- Data can only be processed for the stated purpose
- Data must be sufficient, relevant, and not excessive
- Data must be accurate
- Data must not be kept longer than necessary
- Data must be processed according to the individual's rights
- Data must be kept secure
- Data should not be transferred outside the area of the act unless sufficient protection exists



Data Protection Act 1998

Importance of Data Protection Acts/Legislation:

- It provides guidance/best practice rules for organisations to follow on how to use personal data
- Regulates the processing of personal data
- Protects the rights of the data subject
- Helps to prevent personal data being misused by third parties
- Protects personal data

Definition of e-safety

The need to take precautions to **keep personal data safe when using the internet**.



Measures to maintain e-safety

When using the internet:

- Never give out any personal information to people who are unknown to you online
 - Never send people photos of yourself
 - Always maintain your privacy settings on
 - Only use websites recommended by teachers
 - Only use learner-friendly search engine
 - Use appropriate search conditions when using search engines

When using email:

- Only open emails or attachments from known sources
 - Only reply to an email if you know the person who sent it
 - Never include any personal data in emails
 - Never send photos of yourself in any email
 - Avoid clicking on hyperlinks within emails because it could be part of a phishing scam
 - Use spam filters to stop spam emails

When using social networking sites:

- Block or report unwanted users
 - Never arrange to meet anyone alone
 - Always tell an adult first and meet in a public place
 - Always meet in a public place
 - Keep private and personal data secret
 - Avoid the misuse of images
 - Avoid giving your address or school name
 - Check profiles before contacting people
 - Verify the person's contact details with other trusted friends

When playing games online:

- Use a nickname and never your real name
 - Don't give your personal or financial data to any player
 - Report and block cyberbullies
 - Turn on privacy settings
 - Check game ratings for age
 - Reduce the amount of time spent gaming

8.7 Internet developments

Search engines

Definition:

A piece of software used to **find information on the internet**.



Why are internet searches to find relevant information not always fast?

- The search might be too general, giving irrelevant information
- Search providers add marketing advertisements to the search results
- Computer might be infected with a virus taking up memory and slowing down data transfer speed over the internet
- If the computer's memory is close to full, data transfer speed over the internet can slow down significantly

Why is it NOT always easy to find reliable information on the internet?

- Anyone can post information on the internet
- Websites may contain incorrect information
- Similar websites may have conflicting data on the same topic
- Search engines do not necessarily give the most reliable searches at the top of the list
- Data on some websites may be outdated
- The search engines tend to be generalized

How to evaluate the reliability of information found on the internet?

- Check information from different sources
- Check the author's credentials
- If the date of the last update was a long time ago, it is likely to be an unreliable website
- Websites that have excessive advertising tend to be unreliable
- Commercial websites tend to be biased
- Check if responsible bodies have endorsed the website
- Check if the website links to other reliable websites or to unreliable websites
- Check spelling and grammar, as too many spelling errors mean that website is not reliable
- Use the final part of the URL to identify the website's reliability. For example, websites ending with: **.edu**, **.org**, **.ac** and **.gov** are more likely to be reliable.

Advantages of searching the internet for information:

- The internet has a vast amount of information
- Fast to find the information needed
- Information on the internet is free
- Pages on the internet can have multimedia files to make learning more interesting

Disadvantages of searching the internet for information:

- Information may not be reliable as the internet is not regulated
- There is always the risk of accessing inappropriate sites when using search engines
- It is too easy to be distracted when searching on the internet
- Easy to **plagiarise** when using the internet
- Losing research skills when using the search engines as it does all the work for you

Plagiarism is the action of using ideas or words of others without citing the source.

Disadvantages of using a search engine to find information rather than typing in a web address:

- Information overload
- Websites at the top of the list may not be relevant
- Risk of accessing inappropriate websites if search words are not specific
- Search engines may not include all web pages
- Search engine companies may be paid to display certain web pages

Methods to protect against risks when using the internet to search for information:

- ISP control can prevent users from accessing certain websites
- Parental control over what websites to be accessed by children
- Schools and textbooks can be used to educate users about the correct use of the internet
- Checking with teachers first to see if it is safe to access a website

Blogs

Definition:

- Short for **web log**
- **A personal website** where the blogger types in their opinion on some topic

Features of a blog:

- Website where data entered by a single author
- Visitors can only read and comment on the material on blogs
- Based on the author's personal observations
- Usually organized in reverse chronological order (most recent to least recent entry)



Wikis

Definition:

Software/websites that allow users to create and edit web pages using a web browser.

Features of a wiki:

- A wiki has many authors
- Any user can edit, delete, or modify the content
- Its structure is determined by its users and the content
- Uses links to websites
- Allows large documents to be seen by many people



Social networking sites

Definition:

Public websites that allow users to interact and communicate with each other.

Features of social networking sites:

- Can create and share personal profile
- Can upload content such as photos and videos
- Can arrange events with a whole group
- Can write comments on other's posts
- Can invite people to become friends



Advantages of social networking:

- Make new friends worldwide
- Communicating with friends and colleagues all over the world
- Easy to find other people with common interests
- Allows the exchange of content or documents
- Easier to advertise to a larger number of people
- Can be used more easily for analytics and market research
- Develops social skills
- Allows people to share knowledge
- It can help in community projects

Disadvantages of social networking:

- Reduces face-to-face communication
- Cyber-bullying increases
- Invasion of privacy increases
- Needs the internet and a computer
- Risks of fraud increases
- Addiction to social networking

Forums

Definition:

Online discussion boards where users can hold conversations in the form of posted messages.



Benefits of using a forum rather than a blog:

- In forum posts are in chronological order therefore, it makes it easier to find data
- In forums, it is easier for students to start new topics/ask questions
- Topics cannot be created in a blog by the student
- Forums are moderated by an administrator
- In blogs, only the content creator writes the blog, whereas the readers can only comment on a blog
- A forum would allow private messaging as well as to all the group