

Impacts of Computing

S.L.O. # 6

Sub Topics: 7 Total SLO: 20

MCQ: (7) 7 Marks CRQ: (0) 0 Marks ERQ: (1) 7 Marks

(ERQ Marks Shared With S.L.O # 5)

6.1 Information Sources

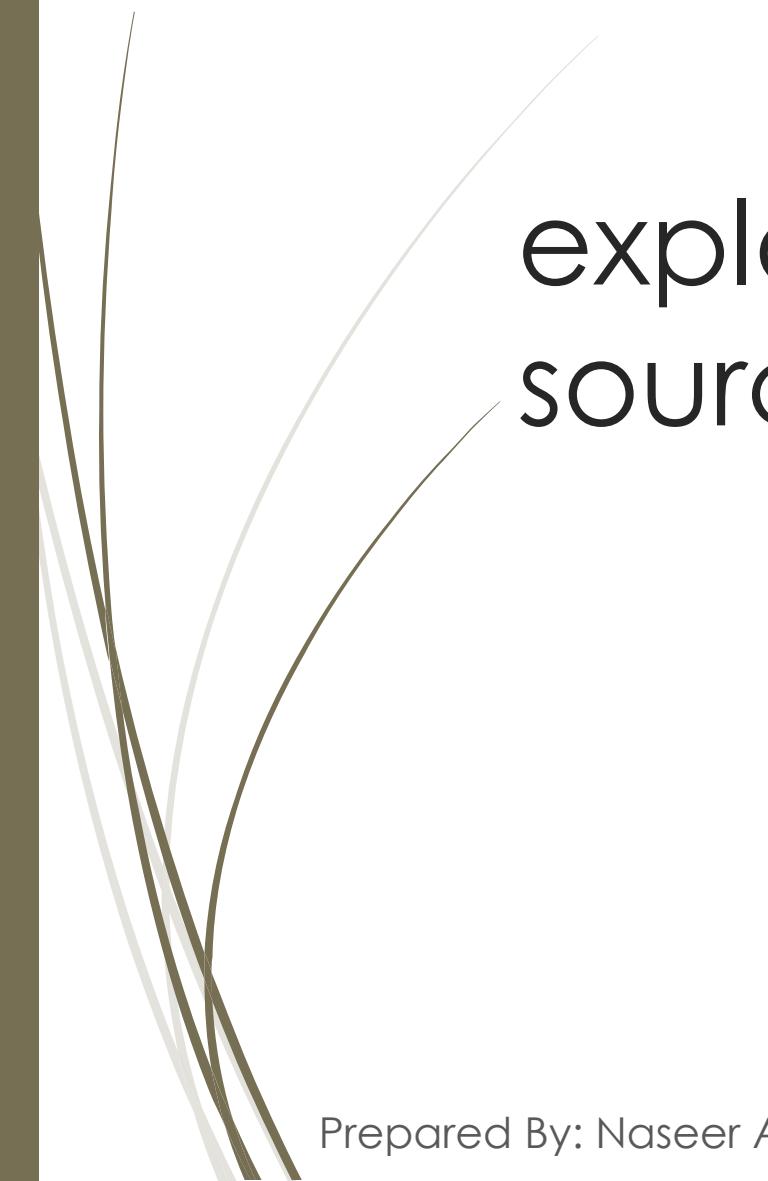
SLO	Students should be able to	Cognitive Level
6.1.1	define the following types of information sources: a. books, b. articles, c. websites;	R
6.1.2	explain reliable and unreliable sources of information;	U
6.1.3	explain the use of search engines and databases to find reliable information;	U
6.1.4	discuss the responsible and critical use of social media to access and share information;	E

define the following types of information sources:

- a. books,
- b. articles,
- c. websites;

Types of Information Sources:

- a. Books: Books are long-form written works that provide comprehensive information on a particular subject or topic. They can be academic, literary, or general in nature and are often written by experts or authors with deep knowledge in the subject area. Books may be printed or available digitally (e-books), and they typically go through a formal publishing process, making them reliable and credible sources for in-depth research.
- b. Articles: Articles are shorter pieces of writing that appear in journals, magazines, newspapers, or online platforms. They focus on specific topics and can be scholarly (peer-reviewed academic journals), professional (industry magazines), or popular (general-interest publications). Articles are useful for current information, expert opinions, or ongoing research findings.
- c. Websites: Websites are digital platforms hosted on the internet that present information in various formats such as text, images, videos, or interactive tools. They can be created by individuals, organizations, businesses, or governments. The reliability of websites varies greatly depending on their authorship, purpose, and credibility, so it's important to evaluate them carefully when using them as sources.



explain reliable and unreliable sources of information;

Reliable Sources of Information

SLO 6.1.2 U

Reliable sources are those that provide accurate, well-researched, and trustworthy information. These sources are typically created by experts, reviewed by professionals, and supported with evidence.

- ▶ Characteristics of Reliable Sources:

- ▶ Written or produced by subject matter experts or credible institutions (e.g., universities, government agencies) Peer-reviewed or edited for accuracy
- ▶ Cites evidence, references, or data to support claims
- ▶ Objective and unbiased in tone
- ▶ Up-to-date and regularly maintained (especially for online sources)

- ▶ Examples:

- ▶ Academic journals (e.g., Nature, The Lancet)
- ▶ Books published by reputable publishers
- ▶ Government websites (e.g., WHO, NASA, NIH)
- ▶ News organizations with strong editorial standards (e.g., BBC, Reuters)
- ▶ Educational websites (e.g., university portals, online encyclopedias like Britannica)

Unreliable Sources of Information

SLO 6.1.2 U

Unreliable sources provide information that may be false, misleading, biased, or unsupported by facts. These sources often lack credibility and should be used with caution.

- ▶ Characteristics of Unreliable Sources:
 - ▶ No author or unknown author with no credentials
 - ▶ Lacks citations or uses false/misleading references
 - ▶ Displays bias, opinion, or promotional language
 - ▶ Contains outdated, sensational, or exaggerated content
 - ▶ Poor grammar, spelling, or formatting
- ▶ Examples:
 - ▶ Personal blogs or opinion-based websites
 - ▶ Social media posts without verification
 - ▶ Questionable news sites with known biases or conspiracy content
 - ▶ Anonymous or unverified Wikipedia entries
 - ▶ Advertisements or sponsored content posing as news

explain the use of search engines and databases to find reliable information;

Use of Search Engines and Databases to Find Reliable Information

1. Search Engines

- ▶ Definition: Search engines (like Google, Bing, or Yahoo) are tools that help users locate information on the internet by typing keywords or queries.
- ▶ How They Help Find Reliable Information:
 - ▶ Quick Access: Provide instant access to a vast amount of information.
 - ▶ Advanced Features: Offer filters (date, region, type of content) to narrow down results.
 - ▶ Specialized Tools: Google Scholar is a search engine that specifically finds scholarly and peer-reviewed articles.

Use of Search Engines and Databases to Find Reliable Information

2. Databases

- ▶ Definition: Databases are organized collections of academic and scholarly information, such as journal articles, research papers, reports, and ebooks. Access is often provided by schools, libraries, or institutions.
- ▶ Examples of Reliable Databases:
 - ▶ JSTOR
 - ▶ PubMed
 - ▶ ScienceDirect
 - ▶ ProQuest
 - ▶ EBSCOhost
 - ▶ Google Scholar (hybrid between search engine and database)

Use of Search Engines and Databases to Find Reliable Information

2. Databases

- ▶ How Databases Ensure Reliable Information:
 - ▶ Contain peer-reviewed and scholarly sources.
 - ▶ Provide publication details, author credentials, and citations.
 - ▶ Include filters to sort by date, subject, publication type, etc.
- ▶ Benefits of Using Databases:
 - ▶ Higher quality and credibility of information.
 - ▶ Focused academic content.
 - ▶ Saves time by removing unreliable or non-academic material.



discuss the responsible and critical use of social media to access and share information;

Responsible and Critical Use of Social Media to Access and Share Information

- ▶ Social media platforms like Facebook, Twitter (X), Instagram, TikTok, and YouTube have become powerful tools for accessing and sharing information.
- ▶ However, using them responsibly and critically is essential to avoid spreading misinformation and to ensure informed engagement.

Responsible and Critical Use of Social Media to Access and Share Information

1. Accessing Information Responsibly:

- ▶ Verify the Source: Always check who is sharing the information. Is it a credible organization, a verified expert, or just an anonymous user?
- ▶ Cross-Check Facts: Before accepting information as true, verify it with trusted sources such as government websites, reputable news outlets, or academic journals.
- ▶ Be Aware of Bias: Social media content often reflects personal opinions or political bias. Use critical thinking to differentiate between fact and opinion.
- ▶ Beware of Misinformation: Look out for sensational headlines, edited images, or out-of-context videos.

Responsible and Critical Use of Social Media to Access and Share Information

2. Sharing Information Responsibly:

- ▶ Share Verified Content Only: Do not forward or repost information unless you are sure it is accurate and from a credible source.
- ▶ Add Context: When sharing sensitive or complex topics, provide a clear caption or explanation so others understand the message correctly.
- ▶ Avoid Harmful Content: Do not share hate speech, personal attacks, or content that promotes violence, discrimination, or false claims.
- ▶ Respect Privacy: Avoid sharing personal details of others without their consent. Be cautious with screenshots or recordings.

6.2 Information Privacy and Security

SLO	Students should be able to	Cognitive Level
6.2.1	define privacy and security;	R
6.2.2	describe the importance of protecting personal information online;	U
6.2.3	suggest strategies for safeguarding personal data while accessing information sources;	E
6.2.4	evaluate the impact of data breaches and the misuse of information on individuals, organisations, and society;	E

define privacy and security;

Definition of Privacy and Security

SLO 6.2.1 R

1. Privacy: Privacy refers to the right of individuals to control their personal information and how it is collected, used, shared, or stored. It involves protecting sensitive data such as names, addresses, phone numbers, financial details, and online behavior.

► Examples:

- Keeping your social media profiles private
- Not sharing your passwords with others
- Controlling who can access your personal photos or messages

Definition of Privacy and Security

SLO 6.2.1 R

2. Security: Security refers to the measures and technologies used to protect data, devices, and systems from unauthorized access, theft, damage, or cyberattacks. It ensures the integrity, confidentiality, and availability of information.

► Examples:

- Using strong passwords and two-factor authentication
- Installing antivirus software
- Encrypting data during online transactions

describe the importance of
protecting personal information
online;

Importance of Protecting Personal Information Online

Protecting personal information online is essential in today's digital world, where data is constantly being collected, shared, and stored. Failing to protect this information can lead to serious consequences.

1. Prevents Identity Theft: Hackers can use personal details like your name, address, ID numbers, or credit card information to impersonate you, open bank accounts, or make unauthorized purchases.
2. Maintains Privacy: Keeping your information safe helps you control who sees your photos, messages, location, or browsing habits, ensuring your personal life stays private.
3. Protects Financial Security: Personal data linked to banking or payment apps can be exploited for fraud or unauthorized transactions if not properly secured.

Importance of Protecting Personal Information Online

4. Avoids Cyberbullying and Harassment: Sharing too much online can make you a target for cyberbullying, scams, or unwanted attention.
5. Safeguards Reputation: Inappropriate or personal content shared publicly can harm your reputation, affect job prospects, or create long-term embarrassment.
6. Complies with Laws and Policies: Many countries have laws (like GDPR, HIPAA) that protect personal data. Understanding and respecting these rules is important for legal and ethical reasons.



suggest strategies for
safeguarding personal data
while accessing information
sources;

Strategies for Safeguarding Personal Data

SLO 6.2.3 E

1. Use Strong, Unique Passwords
 - ▶ Create complex passwords using a mix of letters, numbers, and symbols.
 - ▶ Avoid using the same password across multiple accounts.
 - ▶ Consider using a password manager to securely store and manage your credentials.
2. Enable Two-Factor Authentication (2FA)
 - ▶ Add an extra layer of protection to your accounts by enabling 2FA.
 - ▶ This requires a second verification step (e.g., a code sent to your phone) in addition to your password.
3. Avoid Public Wi-Fi for Sensitive Tasks
 - ▶ Public Wi-Fi networks are not secure.
 - ▶ Avoid logging into bank accounts or entering personal data while using open networks unless using a VPN (Virtual Private Network).

Strategies for Safeguarding Personal Data

SLO 6.2.3 E

4. Use Secure Websites (HTTPS)

- ▶ Ensure the websites you visit begin with https:// and show a padlock symbol in the browser address bar.
- ▶ These indicate encrypted connections that protect your data.

5. Be Cautious of Phishing and Fake Websites

- ▶ Do not click on suspicious links or email attachments.
- ▶ Always verify the authenticity of the source before entering personal information.

6. Limit the Information You Share

- ▶ Only provide the minimum required personal information.
- ▶ Avoid oversharing details like your date of birth, location, or phone number on forums, surveys, or social media.

Strategies for Safeguarding Personal Data

SLO 6.2.3 E

6. Keep Software Updated

- ▶ Regularly update your browser, antivirus software, and operating system to protect against the latest security threats.

7. Review App and Website Permissions

- ▶ Check what information apps and websites are accessing from your device.
- ▶ Revoke unnecessary permissions like access to contacts, camera, or location.

8. Log Out of Shared Devices

- ▶ Always log out of your accounts when using public or shared computers to prevent unauthorized access.

9. Educate Yourself on Privacy Policies

- ▶ Read the privacy policies of websites and apps to understand how your data will be used or shared.



evaluate the impact of data breaches and the misuse of information on individuals, organisations, and society;

Evaluation of the Impact of Data Breaches

SLO 6.2.4 E

1. Impact on Individuals:

- a. Identity Theft: Personal information such as names, addresses, Social Security numbers, and banking details can be used by cybercriminals to impersonate victims and commit fraud.
- b. Financial Loss: Victims may lose money through unauthorized transactions, loans taken in their name, or scams resulting from leaked information.
- c. Emotional Distress: Data breaches can lead to anxiety, stress, and a sense of vulnerability, especially when sensitive or private details (e.g., medical or personal records) are exposed.
- d. Damage to Reputation: Photos, messages, or other private content made public can harm a person's social or professional life.

Evaluation of the Impact of Data Breaches

SLO 6.2.4 E

2. Impact on Organizations:

- a. Financial Damage: Organizations may face fines, legal costs, and compensation claims. Reputational damage can also result in lost customers and reduced profits.
- b. Loss of Customer Trust: A breach can severely damage a company's image. Customers may stop doing business with a company that failed to protect their data.
- c. Business Disruption: Breaches may force companies to shut down temporarily or reconfigure systems, affecting productivity and operations.
- d. Legal and Regulatory Consequences: Companies may face lawsuits or penalties under data protection laws such as GDPR or HIPAA.

Evaluation of the Impact of Data Breaches

SLO 6.2.4 E

3. Impact on Society:

- a. a. Erosion of Public Trust: Repeated data breaches can reduce trust in digital systems, governments, institutions, and technology in general.
- b. Increase in Cybercrime: Misused data fuels a black market for stolen identities and can empower organized crime networks.
- c. National Security Risks: In cases where government or critical infrastructure data is compromised, national security can be at risk.
- d. Inequality and Exploitation: Data misuse can disproportionately harm vulnerable groups, such as children or marginalized communities, by enabling targeted manipulation or discrimination.

6.3 Ethical Use of Information

SLO	Students should be able to	Cognitive Level
6.3.1	explain the ethical use of information and intellectual property;	U
6.3.2	explain the consequences of misinformation and unethical information practices;	U
6.3.3	discuss real-world cases that involve ethical dilemmas related to the use of information and their effects on individuals, organisations, and society;	E



explain the ethical use of
information and intellectual
property;

Ethical Use of Information and Intellectual Property

SLO 6.3.1 U

Ethical use of information means using data, ideas, images, and written content honestly, legally, and respectfully, giving proper credit to the original creators. It also involves respecting the rights of individuals and organizations to control how their work is used.

1. Understanding Intellectual Property (IP): Intellectual Property refers to creations of the mind, such as:

- ▶ Books, articles, music, and videos
- ▶ Inventions and designs
- ▶ Trademarks, logos, and brand names
- ▶ Software and digital content

Creators have legal and moral rights to control how their work is used, shared, or reproduced.

Ethical Use of Information and Intellectual Property

SLO 6.3.1 U

2. Ethical Use of Information Involves:

- a. Giving Proper Credit (Attribution): Always acknowledge the original author or creator when using their work, whether in writing, presentations, or projects.
- b. Avoiding Plagiarism: Do not copy or present someone else's work, ideas, or words as your own. This is dishonest and can have academic, professional, and legal consequences.
- c. Respecting Copyright Laws: Only use content (text, images, music, videos) that you have permission to use or that falls under "fair use," "public domain," or is licensed for free use (like Creative Commons).
- d. Using Accurate and Honest Information: Do not alter or misrepresent facts or data to mislead others. Ethical use includes using information truthfully and in proper context.
- e. Seeking Permission When Required: If you want to use someone else's work for public or commercial purposes, get their permission first.



explain the consequences of
misinformation and unethical
information practices;

Consequences of Misinformation and Unethical Information Practices

- ▶ Misinformation and unethical handling of information can have serious negative effects on individuals, organizations, and society. These practices involve spreading false or misleading content, plagiarism, data manipulation, and misusing someone else's intellectual property.

Consequences of Misinformation and Unethical Information Practices

1. Consequences for Individuals:

- a. Misleading Decisions: People may make poor life, health, or financial choices based on false or incomplete information (e.g., believing fake health advice).
- b. Reputational Damage: Sharing or creating misinformation can harm a person's image and credibility, especially on public platforms like social media.
- c. Legal Penalties: Plagiarizing or misusing copyrighted content may lead to legal consequences, fines, or academic penalties.
- d. Emotional Harm: False accusations, fake news, or unethical posts can cause stress, harassment, or mental health issues.

Consequences of Misinformation and Unethical Information Practices

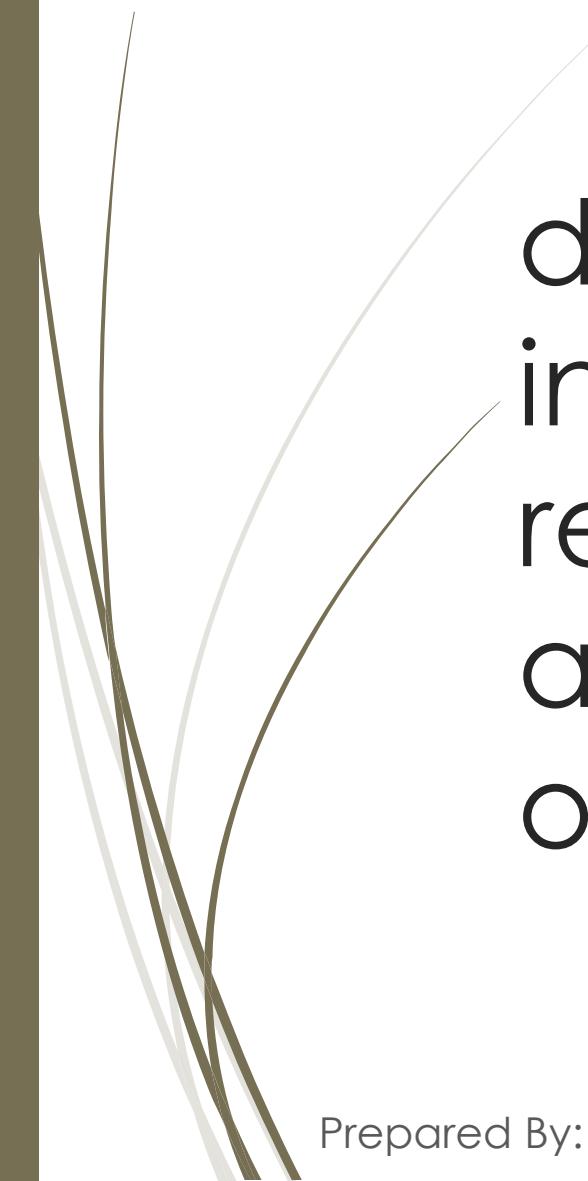
2. Consequences for Organizations:

- a. Loss of Trust: If a company spreads misinformation or handles data unethically, customers and partners may lose confidence in the brand.
- b. Financial Damage: Companies may face lawsuits, fines, or revenue loss due to unethical marketing or data misuse.
- c. Legal Consequences: Breaches of data protection laws, copyright violations, or false advertising can lead to legal action and strict penalties.
- d. Internal Conflict: Misinformation within organizations can lead to confusion, poor decision-making, and conflict among employees.

Consequences of Misinformation and Unethical Information Practices

3. Consequences for Society:

- a. Spread of False Beliefs: Misinformation about health, science, politics, or social issues can cause widespread misunderstanding and public harm (e.g., during pandemics or elections).
- b. Social Division and Conflict: Unethical content, rumors, or manipulated information can provoke hate, fear, or division among communities.
- c. Weakening of Democracy: Fake news and propaganda can influence public opinion, disrupt fair elections, and reduce trust in media and government.
- d. Harming Vulnerable Groups: Marginalized communities may be especially affected by targeted misinformation, scams, or unethical use of their data.



discuss real-world cases that involve ethical dilemmas related to the use of information and their effects on individuals, organisations, and society;

Real-World Cases Involving Ethical Dilemmas in the Use of Information

SLO 6.3.3 E

- Ethical dilemmas arise when decisions about information use involve conflicting values such as privacy vs. transparency, or profit vs. responsibility.

Real-World Cases Involving Ethical Dilemmas in the Use of Information

1. Facebook–Cambridge Analytica Scandal (2018)

- ▶ Issue: Cambridge Analytica harvested data from over 87 million Facebook users without consent to influence voter behavior in political campaigns, including the 2016 U.S. Presidential election.
- ▶ Ethical Dilemma: Should personal data be used for political gain, even if people didn't agree to it?
- ▶ Impact:
 - ▶ Individuals: Personal data was exploited without users' knowledge, violating privacy.
 - ▶ Organizations: Facebook faced severe backlash, congressional hearings, and a \$5 billion fine from the U.S. Federal Trade Commission.
 - ▶ Society: Trust in social media platforms declined. Concerns about democracy and election manipulation increased globally.

Real-World Cases Involving Ethical Dilemmas in the Use of Information

2. Edward Snowden and the NSA Leaks (2013)

- ▶ Issue: Edward Snowden, a former NSA contractor, leaked classified documents revealing mass surveillance of global internet and phone data by the U.S. government.
- ▶ Ethical Dilemma: Was Snowden's action a betrayal of national security or a defense of public rights to privacy and transparency?
- ▶ Impact:
 - ▶ Individuals: Citizens learned their private communications were being monitored without consent.
 - ▶ Organizations: Tech companies were forced to reevaluate their cooperation with government surveillance.
 - ▶ Society: Sparked international debates on privacy, surveillance, whistleblowing, and government accountability.

Real-World Cases Involving Ethical Dilemmas in the Use of Information

3. WikiLeaks and the Release of Classified Documents

- ▶ Issue: WikiLeaks published thousands of confidential government documents, including military logs and diplomatic cables.
- ▶ Ethical Dilemma: Does the public's right to know justify releasing information that could endanger lives or national security?
- ▶ Impact:
 - ▶ Individuals: Some informants and journalists were placed at risk due to leaked identities.
 - ▶ Organizations: Governments and military operations were disrupted; diplomatic relationships strained.
 - ▶ Society: Raised awareness of war crimes and government secrecy, but also sparked concern about transparency vs. security.

Real-World Cases Involving Ethical Dilemmas in the Use of Information

4. Google Street View Data Collection (2010)

- ▶ Issue: Google admitted that its Street View cars had accidentally collected personal data (like emails and passwords) from unsecured Wi-Fi networks.
- ▶ Ethical Dilemma: Should a company be allowed to gather any data accessible in public spaces, even if unintentionally?
- ▶ Impact:
 - ▶ Individuals: Private data was collected without knowledge or consent.
 - ▶ Organizations: Google faced lawsuits and government investigations in several countries.
 - ▶ Society: Highlighted the need for stricter data privacy laws and clearer boundaries for data collection.

Real-World Cases Involving Ethical Dilemmas in the Use of Information

5. Sony Pictures Hack (2014)

- ▶ Issue: Hackers leaked confidential data from Sony Pictures, including employee emails, salaries, and unreleased films—possibly due to the release of a controversial movie.
- ▶ Ethical Dilemma: Is it ethical to expose corporate secrets as a form of protest or retaliation?
- ▶ Impact:
 - ▶ Individuals: Employees' personal and financial data was exposed.
 - ▶ Organizations: Sony faced operational disruptions, reputational harm, and financial loss.
 - ▶ Society: Sparked debates on cybersecurity, censorship, and corporate responsibility.

6.4 Connectivity in Computing

SLO	Students should be able to	Cognitive Level
6.4.1	define the term 'connectivity' in the context of computing;	R
6.4.2	describe the following components involved in achieving connectivity: a. devices, b. networks, c. protocols, d. internet;	U
6.4.3	describe the following communication technologies enabled by computing: a. social media platforms, b. email, c. instant messaging, d. video conferencing;	U

define the term ‘connectivity’ in
the context of computing;

Definition of 'Connectivity' in Computing:

SLO 6.4.1 R

- ▶ Connectivity in computing refers to the ability of computers, devices, and systems to connect and communicate with each other to exchange data and information.
- ▶ It involves both hardware (e.g., cables, routers, network cards) and software (e.g., protocols, operating systems, applications) that enable seamless interaction across local and global networks.

describe the following components involved in achieving connectivity:

- a. devices,
- b. networks,
- c. protocols,
- d. internet;

Components Involved in Achieving Connectivity

SLO 6.4.2 U

a. Devices:

- ▶ Definition: Devices are the hardware tools used to access, send, receive, or process information over a network.
- ▶ Examples:
 - ▶ Computers, laptops, and smartphones
 - ▶ Tablets, servers, routers, modems
 - ▶ Smart TVs, IoT devices (e.g., smart bulbs, watches)
- ▶ Role in Connectivity: Devices act as endpoints that generate or use data. They connect to networks to communicate with each other or access shared resources like the internet or printers.

Components Involved in Achieving Connectivity

SLO 6.4.2 U

b. Networks:

- ▶ Definition: A network is a group of interconnected devices that can share data and resources.
- ▶ Types of Networks:
 - ▶ LAN (Local Area Network): Covers a small area like a home or office
 - ▶ WAN (Wide Area Network): Covers a large area, often using the internet
 - ▶ Wi-Fi Networks: Wireless networks that connect devices within a local range
- ▶ Role in Connectivity: Networks enable data transmission between devices, allowing them to collaborate, share files, and access internet services.

Components Involved in Achieving Connectivity

SLO 6.4.2 U

c. Protocols:

- ▶ Definition: Protocols are rules and standards that define how data is transmitted and received across networks.
- ▶ Common Protocols:
 - ▶ TCP/IP (Transmission Control Protocol/Internet Protocol): Foundation of internet communication
 - ▶ HTTP/HTTPS (HyperText Transfer Protocol): Used for accessing websites
 - ▶ FTP (File Transfer Protocol): Transfers files between devices
 - ▶ Wi-Fi (IEEE 802.11): Manages wireless connections
- ▶ Role in Connectivity: Protocols ensure that data is transferred correctly, securely, and efficiently between devices and across networks.

Components Involved in Achieving Connectivity

SLO 6.4.2 U

d. Internet:

- ▶ Definition: The internet is a global network of interconnected computers and servers that provides access to information, communication tools, and online services.
- ▶ Services Provided:
 - ▶ Email, web browsing, file sharing
 - ▶ Online collaboration, cloud computing
 - ▶ Social media, e-commerce, streaming
- ▶ Role in Connectivity: The internet acts as the ultimate backbone for global connectivity, enabling users and devices to access and share data anytime, anywhere.

describe the following communication technologies enabled by computing:

- a. social media platforms,
- b. email,
- c. instant messaging,
- d. video conferencing;

Communication Technologies Enabled by Computing

a. Social Media Platforms:

- ▶ Definition: Social media platforms are online services that allow users to create, share, and interact with content and connect with others globally.
- ▶ Examples: Facebook, Instagram, Twitter (X), TikTok, LinkedIn
- ▶ Features:
 - ▶ Profile creation and networking
 - ▶ Posting text, images, and videos
 - ▶ Comments, likes, shares, and messaging
 - ▶ Live streaming and stories
- ▶ Purpose: To facilitate public and private communication, community building, information sharing, and entertainment.

Communication Technologies Enabled by Computing

b. Email (Electronic Mail):

- ▶ Definition: Email is a digital messaging system that allows users to send and receive text messages, documents, images, and other files over the internet.
- ▶ Examples: Gmail, Outlook, Yahoo Mail
- ▶ Features:
 - ▶ Inbox, sent, and draft folders
 - ▶ Attachments and links
 - ▶ Address book and contact management
 - ▶ Spam filters and security features
- ▶ Purpose: Used for formal and informal communication in both personal and professional settings. Ideal for longer, non-real-time communication.

Communication Technologies Enabled by Computing

c. Instant Messaging:

- ▶ Definition: Instant messaging (IM) is a real-time communication tool that allows users to send short text messages instantly over the internet.
- ▶ Examples: WhatsApp, Telegram, Facebook Messenger, Slack
- ▶ Features:
 - ▶ Text chats with read receipts
 - ▶ Multimedia sharing (images, videos, files)
 - ▶ Emojis, stickers, and GIFs
 - ▶ Group chats and voice notes
- ▶ Purpose: To enable quick, casual, and efficient conversations between individuals or groups, often used in both social and work environments.

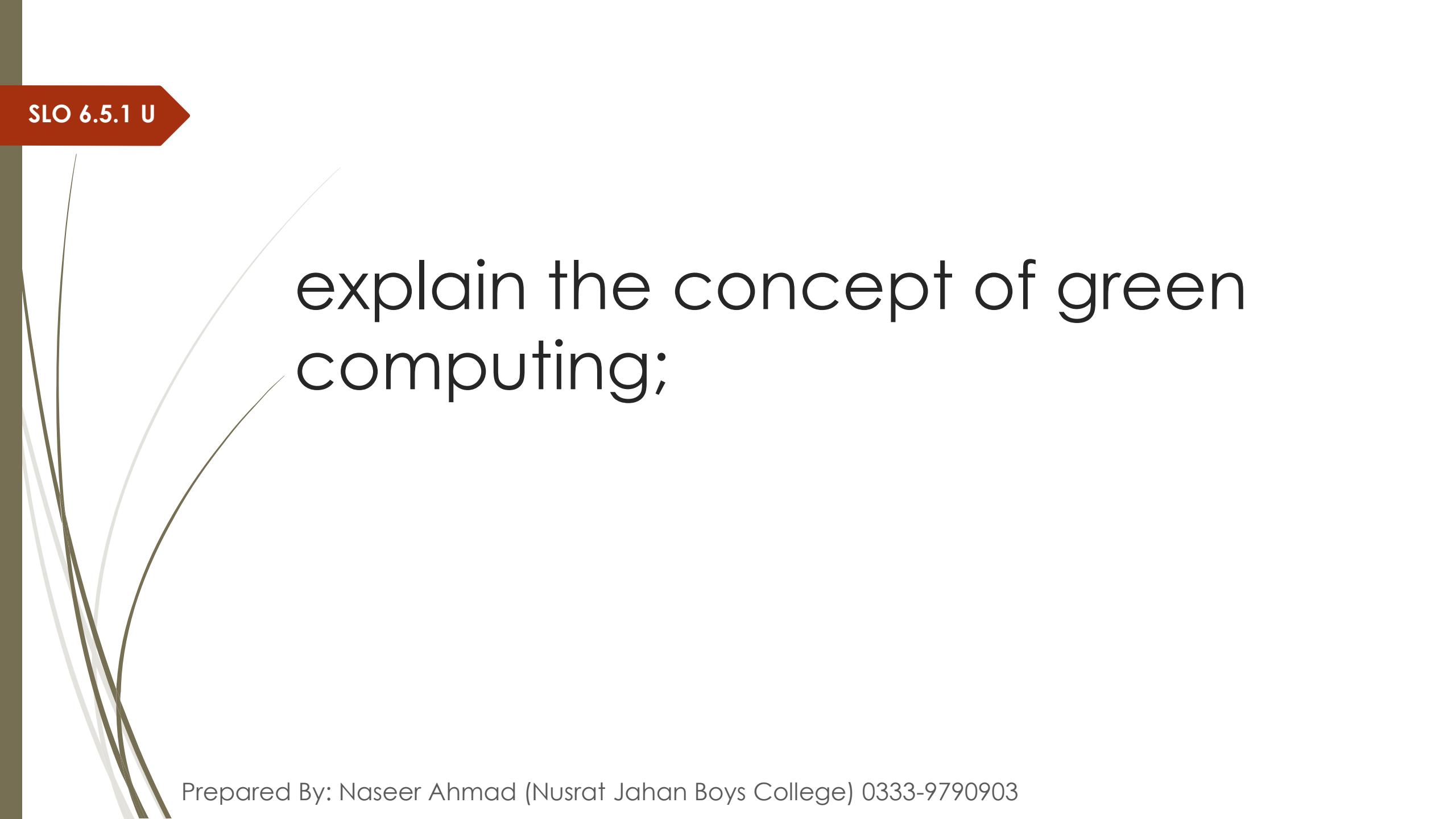
Communication Technologies Enabled by Computing

d. Video Conferencing:

- ▶ Definition: Video conferencing is a technology that allows people in different locations to hold face-to-face meetings using video and audio over the internet.
- ▶ Examples: Zoom, Microsoft Teams, Google Meet, Skype
- ▶ Features:
 - ▶ Real-time video and audio communication
 - ▶ Screen sharing and file sharing
 - ▶ Virtual backgrounds and meeting recording
 - ▶ Chat during calls and breakout rooms
- ▶ Purpose: Widely used for remote meetings, online education, webinars, and virtual events, especially in professional and academic settings.

6.5 Environmental Impacts of Connectivity in Computing

SLO	Students should be able to	Cognitive Level
6.5.1	explain the concept of green computing;	U
6.5.2	analyse the positive and negative environmental impacts of connectivity in computing across fields such as cloud computing and smart devices;	An
6.5.3	examine the environmental impact of data centres, considering factors such as energy consumption and e-waste;	An



explain the concept of green computing;

Concept of Green Computing

SLO 6.5.1 U

Green computing refers to the environmentally responsible use of computers and related technologies. It involves designing, using, and disposing of computing devices and systems in ways that reduce their impact on the environment.

- Key Goals of Green Computing:
 - Reduce energy consumption
 - Minimize electronic waste (e-waste)
 - Use eco-friendly materials
 - Promote recycling and reusability
 - Lower the carbon footprint of IT systems



analyse the positive and negative environmental impacts of connectivity in computing across fields such as cloud computing and smart devices;

Analysis of the Environmental Impacts of Connectivity in Computing

Positive Environmental Impacts

- ▶ Reduced Need for Physical Resources:
 - ▶ Cloud computing allows data storage and processing without relying on personal hardware or printed documents.
 - ▶ This leads to less production of paper, CDs, USB drives, and other physical storage media.
- ▶ Energy Efficiency through Centralization:
 - ▶ Cloud data centers use virtualization and efficient cooling systems to manage computing resources more effectively than individual devices.
 - ▶ Smart systems can optimize electricity use, such as turning off lights or regulating temperature based on usage patterns.

Analysis of the Environmental Impacts of Connectivity in Computing

Positive Environmental Impacts

- ▶ Decreased Transportation Emissions:
 - ▶ Remote work and video conferencing reduce the need for travel, lowering vehicle emissions and fuel use.
 - ▶ Digital document sharing and collaboration tools eliminate the need for shipping paper files.
- ▶ Smart Resource Management:
 - ▶ Smart agriculture uses IoT sensors to optimize water and fertilizer use.
 - ▶ Smart grids improve the efficiency of electricity distribution, reducing waste.

Analysis of the Environmental Impacts of Connectivity in Computing

Negative Environmental Impacts

- ▶ High Energy Consumption:
 - ▶ Large-scale data centers that power cloud services consume significant electricity—often equivalent to small cities.
 - ▶ The demand is rising with the growth of AI, streaming, and 24/7 connected services.
- ▶ Electronic Waste (E-Waste):
 - ▶ Smartphones, smart appliances, and IoT devices have short life spans and are replaced frequently.
 - ▶ Improper disposal of e-waste leads to toxic pollution and resource waste.

Analysis of the Environmental Impacts of Connectivity in Computing

Negative Environmental Impacts

► Resource Extraction:

- The production of smart devices requires rare earth metals and minerals, which are mined through environmentally damaging processes.
- Battery production for wireless and portable devices contributes to water pollution and ecosystem destruction.

► Carbon Emissions from Manufacturing and Infrastructure:

- Manufacturing computers, smartphones, routers, and servers produces a large carbon footprint.
- Even renewable-powered data centers may still indirectly rely on fossil fuels in some regions.



examine the environmental impact of data centres, considering factors such as energy consumption and e-waste;

Environmental Impact of Data Centres

SLO 6.5.3 An

- ▶ Data centres are essential to the digital world, powering everything from websites and cloud services to artificial intelligence and smart devices.
- ▶ However, their operation has a significant environmental footprint, particularly in terms of energy consumption and electronic waste (e-waste).
- ▶ Sustainable practices like renewable energy adoption, efficient cooling, virtualization, and responsible recycling are key to minimizing their environmental impact while supporting the demands of a connected world

Environmental Impact of Data Centres

SLO 6.5.3 An

1. Energy Consumption

- ▶ High Power Usage:
 - ▶ Data centres run 24/7, supporting millions of servers, storage systems, and networking equipment.
 - ▶ They consume vast amounts of electricity—some equivalent to small cities.
 - ▶ Globally, data centres account for about 1–2% of total electricity use, with demand rising each year.
- ▶ Cooling Systems:
 - ▶ Servers generate heat and require constant cooling.
 - ▶ Traditional air conditioning systems consume almost half of a data centre's total energy.
 - ▶ In warmer climates, cooling becomes even more energy-intensive.

Environmental Impact of Data Centres

SLO 6.5.3 An

1. Energy Consumption

- ▶ Carbon Emissions:
 - ▶ If powered by fossil fuels, data centres contribute significantly to greenhouse gas emissions.
 - ▶ Even renewable-powered centres often rely on non-renewable backup systems (e.g., diesel generators).
- ▶ Efforts to Reduce Energy Impact:
 - ▶ Using liquid cooling, AI-powered energy optimization, and renewable energy sources
 - ▶ Designing hyperscale data centres that are more efficient than smaller operations

Environmental Impact of Data Centres

SLO 6.5.3 An

2. Electronic Waste (E-Waste)

► Short Hardware Lifespan:

- Servers and storage devices are upgraded or replaced frequently—every 3–5 years—generating large volumes of e-waste.
- Much of this equipment becomes obsolete even if still functional.

► Disposal Challenges:

- Discarded hardware contains toxic substances like lead, mercury, and cadmium.
- Improper disposal contaminates soil, air, and water, posing serious health risks.

Environmental Impact of Data Centres

SLO 6.5.3 An

2. Electronic Waste (E-Waste)

► Recycling and Reuse Barriers:

- Many components are difficult to recycle due to complex materials and lack of infrastructure.
- Secure data destruction requirements often lead to physical destruction rather than reuse.

Environmental Impact of Data Centres

SLO 6.5.3 An

► **Sustainable Alternatives and Practices:**

- Green Data Centres: Use renewable energy, efficient cooling, and modular hardware to reduce impact.
- Server Virtualization: Reduces the number of physical machines needed.
- Recycling Programs: Some tech companies now offer take-back and recycling services.
- Circular Economy Approaches: Emphasize refurbishing, reusing, and repurposing components instead of discarding them.

6.6 Cultural Impacts of Connectivity

SLO	Students should be able to	Cognitive Level
6.6.1	analyse the role of enhanced connectivity in facilitating global cultural exchange;	An
6.6.2	discuss the preservation or loss of local cultures in the digital age;	E



analyse the role of enhanced connectivity in facilitating global cultural exchange;

Analysis of the Role of Enhanced Connectivity in Facilitating Global Cultural Exchange

Enhanced connectivity—through the internet, social media, digital communication tools, and mobile technologies—has significantly accelerated the global exchange of culture, ideas, and values. It enables people from different parts of the world to interact, learn, and influence one another like never before.

► Access to Diverse Cultural Content

- People can now access music, films, literature, art, and news from across the globe instantly.
- Streaming platforms (e.g., Netflix, YouTube, Spotify) and digital libraries promote cross-cultural appreciation.
- Languages, traditions, and customs are more visible and accessible to international audiences.

Analysis of the Role of Enhanced Connectivity in Facilitating Global Cultural Exchange

- ▶ Real-Time Communication and Collaboration
 - ▶ Social media platforms (e.g., Instagram, TikTok, Twitter) allow users to engage in global conversations.
 - ▶ Individuals can share personal stories, celebrations, and traditions with a worldwide audience.
 - ▶ Online forums and communities connect people with shared interests, regardless of nationality or background.
- ▶ Educational and Language Exchange Opportunities
 - ▶ Online learning platforms (like Coursera or Duolingo) provide opportunities to study foreign languages and cultural studies.
 - ▶ Students and teachers participate in virtual exchange programs, webinars, and global classrooms.
 - ▶ Broader exposure leads to greater intercultural understanding and tolerance.

Analysis of the Role of Enhanced Connectivity in Facilitating Global Cultural Exchange

- ▶ Global Markets and Cultural Products
 - ▶ Enhanced connectivity allows local artisans, creators, and entrepreneurs to share their culture through e-commerce.
 - ▶ International fashion, cuisine, crafts, and traditional goods reach global consumers.
 - ▶ Cultural exports strengthen economic ties and cultural recognition.
- ▶ Promotion of Diversity and Inclusion
 - ▶ Underrepresented communities find a voice through digital platforms.
 - ▶ Movements advocating for social justice, indigenous rights, and cultural preservation gain global support.
 - ▶ Shared digital spaces foster solidarity and mutual respect among cultures.



discuss the preservation or loss
of local cultures in the digital
age;

Preservation or Loss of Local Cultures in the Digital Age

SLO 6.6.2 E

- The digital age has transformed how cultures are expressed, shared, and preserved. While technology has enabled the preservation of many local traditions and languages, it also poses a risk of cultural loss or dilution. The impact is complex, involving both benefits and challenges.

Preservation or Loss of Local Cultures in the Digital Age

SLO 6.6.2 E

Preservation of Local Cultures

- ▶ Digital Archiving and Documentation
 - ▶ Communities can record and store traditional songs, stories, rituals, and languages in digital formats.
 - ▶ Museums, universities, and cultural organizations use online platforms to digitize artifacts and oral histories for future generations.
- ▶ Cultural Promotion Through Social Media
 - ▶ Local festivals, food, dress, and crafts can reach a global audience through platforms like Instagram, TikTok, and YouTube.
 - ▶ Indigenous and minority communities gain visibility and recognition by sharing their narratives.
- ▶ Language Preservation
 - ▶ Apps and online courses (e.g., Duolingo, YouTube language channels) help teach and revive endangered languages.
 - ▶ Digital dictionaries and text-to-speech tools support language learning and translation.

Preservation or Loss of Local Cultures in the Digital Age

Preservation of Local Cultures

- ▶ E-commerce for Cultural Products
 - ▶ Online marketplaces allow artisans and local producers to sell traditional goods globally, preserving cultural industries.
- ▶ Education and Awareness
 - ▶ Schools and cultural centers use digital tools to teach local history and traditions, even to diaspora communities.

Preservation or Loss of Local Cultures in the Digital Age

Loss of Local Cultures

► Cultural Homogenization

- Global digital media is often dominated by Western content, leading to the adoption of foreign values and lifestyles.

- Youth may prioritize global trends over traditional practices, causing a decline in cultural uniqueness.

► Displacement of Indigenous Knowledge

- Fast-paced digital content often overlooks deep, context-rich local knowledge and wisdom traditions.

- Local stories and customs may be pushed aside by more "viral" or popular global content.

Preservation or Loss of Local Cultures in the Digital Age

Loss of Local Cultures

- ▶ Erosion of Native Languages
 - ▶ Many online platforms primarily support global languages like English, reducing incentives to use or learn local tongues.
 - ▶ Some local dialects are underrepresented or entirely absent in digital spaces.
- ▶ Cultural Appropriation
 - ▶ Elements of local culture (like clothing, music, or art) may be copied or commercialized without respect or credit, leading to misuse and loss of meaning.

6.7 Human Impact of Connectivity

SLO	Students should be able to	Cognitive Level
6.7.1	discuss the positive and negative impacts of digital connectivity on human behaviour and society, including work and employment.	E



discuss the positive and negative impacts of digital connectivity on human behaviour and society, including work and employment.

Positive and Negative Impacts of Digital Connectivity on Human Behaviour and Society (Including Work and Employment)

- ▶ Digital connectivity—the ability to access, share, and exchange information instantly via the internet and digital devices—has profoundly reshaped how people live, work, and interact.
- ▶ While it has brought many benefits, it also introduces new challenges for individuals and society.

Positive and Negative Impacts of Digital Connectivity

Positive Impacts

- ▶ Enhanced Communication and Social Interaction
 - ▶ People can connect with family, friends, and colleagues worldwide through social media, messaging apps, and video calls.
 - ▶ Facilitates community building, global collaboration, and cultural exchange.
- ▶ Remote Work and Flexibility
 - ▶ Digital connectivity enables work-from-home opportunities, offering more flexibility and better work-life balance.
 - ▶ Reduces commuting time and associated carbon emissions.
- ▶ Access to Information and Learning
 - ▶ Individuals can access online education, tutorials, news, and resources at any time.
 - ▶ Encourages self-learning, skill development, and global awareness.
- ▶ Economic Opportunities and Employment
 - ▶ Opens doors for freelancing, e-commerce, gig work, and remote jobs.
 - ▶ Empowers individuals in rural or developing areas to participate in the global economy.
- ▶ Innovation and Productivity
 - ▶ Real-time communication and digital tools enhance workplace efficiency and creativity.
 - ▶ Cloud computing and collaboration platforms enable teamwork across time zones.

Positive and Negative Impacts of Digital Connectivity

Negative Impacts

- ▶ Reduced Face-to-Face Interaction
 - ▶ Overdependence on digital communication can weaken personal relationships and social skills.
 - ▶ Can lead to feelings of isolation or loneliness, especially among young people.
- ▶ Work-Life Imbalance
 - ▶ Constant connectivity often leads to blurred boundaries between work and personal life.
 - ▶ Employees may feel pressured to respond to messages or emails outside working hours, causing burnout.
- ▶ Job Displacement and Inequality
 - ▶ Automation and AI technologies can replace certain job roles, leading to unemployment or reskilling challenges.
 - ▶ Digital divides (lack of access to technology) widen social and economic inequality, especially in rural or low-income areas.

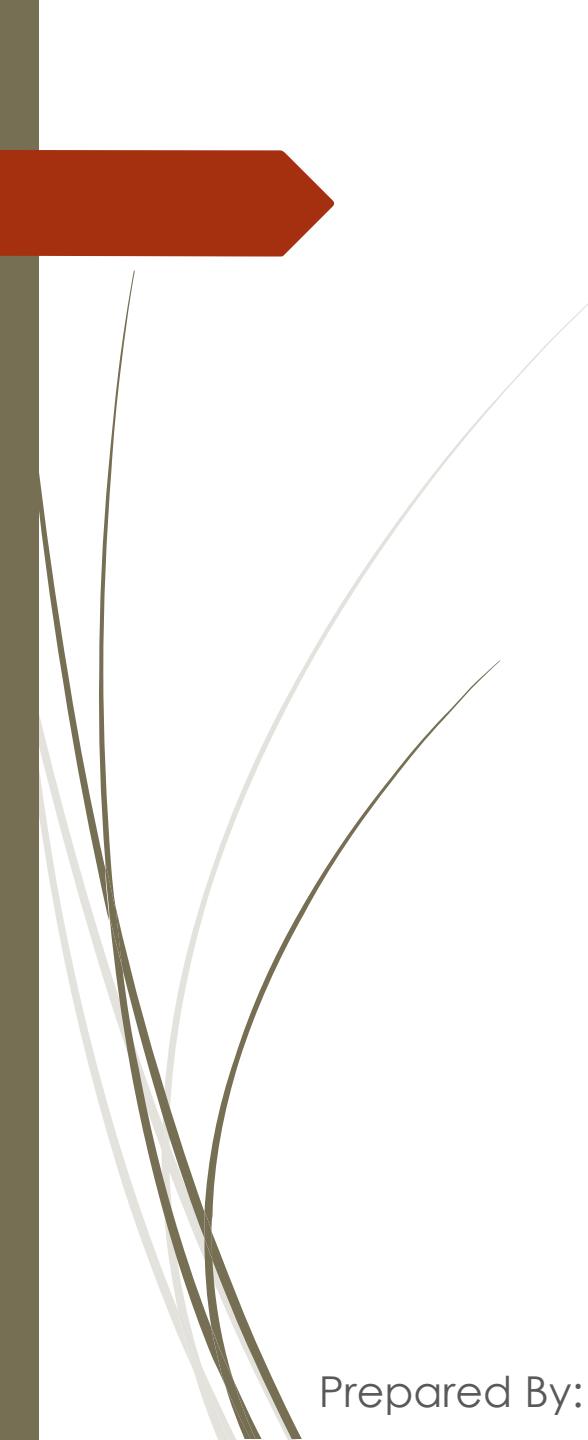
Positive and Negative Impacts of Digital Connectivity

Negative Impacts

- ▶ Distraction and Reduced Focus
 - ▶ Notifications, social media, and multitasking tools can reduce concentration and productivity at work or in study.
 - ▶ Excessive screen time can impact mental well-being and attention span.
- ▶ Privacy and Security Concerns
 - ▶ Increased digital activity leads to data collection and surveillance, raising concerns about privacy.
 - ▶ Cyberbullying, misinformation, and identity theft are growing risks in digitally connected societies.



ANY
Questions?



Thank You!

