Chapter 4

Cyberspace

I alone exist in this monitor of mine
In the Cyberspace that infinitely grows
On this solitary journey into alien universe
Leaving this earth of mine.

Cybermoon
(Alamcode Leelakrishnan)

How about exploring the world described in the poem?

Nowadays, the internet is widely used for various purposes, including education, entertainment, and business, rather than just communication. With this advancement, people have embraced a collaborative culture, working together across distances. The internet has become an essential part of modern civilization.

Haven't these continuous advancements in information technology shaped many aspects of our relationships and habits? Write them down in your notebook.

- Goods being delivered to homes without visiting shops has become common.

- Entertainment like movies, music, and sports is now just a click or tap away.
- .....
- .....
- New types of crimes have emerged.

The way we handle money transactions has changed, and now we can communicate with people across any distance through sight and sound. Amazing, isn't it?

You know how deeply the internet has become a part of our lives. Whenever we transact online, we step into a unique digital space. This virtual space where the computers, phones, servers, other digital devices, networks, and the information transferred through them are all linked together is called **cyberspace.**

Whenever we interact on the internet, whether it's performing a search, liking a favorite post, or any other activity, our footprint is imprinted there. This is known as a **digital footprint**. In cyberspace, there are friendships, quarrels, and conflicts, just like in real life. Everyone who engages there creates a **cyber identity**.

Digital Footprint

Digital footprint is the set of information (trace of information) created while using the Internet. This includes the websites we visit, the posts and photos we share on social media, the apps we use, and the data we provide for online services. A digital footprint is any trace of our online activity that can be seen or followed by others.

Cyber Identity

A person's identity in the cyber world is their digital representation. It is not confined to a single ID but is shaped by the information and activities linked to their online presence. Numerous factors contribute to digital identity, including social media profiles, search engine activity, visited websites, phone numbers, gaming IDs, the identification number of the device used, location, and more.

Have you ever stepped into cyberspace?

Table 4.1 gives some of the contexts in which we interact with the cyber world. Consider the tools and information involved in these interactions. Add the missing items to the list.

Contexts	Relationship with the Cyber world
Purchase and recording of goods from ration shop.	E-POS device, Fingerprint.
The information being printed in the passbook using the printer installed in the bank.	Printer and account details connected to the network.
Watching online class.	
Searching for routes on map software while travelling.	
Requesting your favourite music and controlling of home appliances with voice command.	Home appliances, voice messaging, Internet of Things.
Playing online games with a distant friend.	
Smartwatch that tracks health information such as heart rate, sleep patterns etc.	Smart watch and mobile connected with it, Internet and health data.

Table 4.1 Some Cyber interactions in everyday life.

Internet of Things (IoT)

The Internet of Things (IoT) refers to a network of physical objects connected to the Internet. These objects are equipped with sensors and software, enabling them to collect data, communicate with each other and interact with their environment

Does the list cover all of your interactions in cyberspace? In what ways do we access the cyber world? Mobile phones, smartwatches, passbooks, printers, and IoT devices serve as both direct and indirect gateways to cyberspace, don't they?

We've frequently mentioned the terms **internet**, **cyberspace** and **cyberworld** in many occasions. While these are interconnected, it's important to understand that they are not the same.

Cyberspace is an imaginary digital realm where online activities and interactions occur. Similar to the universe with its stars, galaxies, and planets, cyberspace encompasses the internet, digital systems, and exchanges of ideas. As we know that the **internet** is a global network of interconnected computers that communicate using various protocols. It relies on physical infrastructure such as servers, routers, and data centers, connected by cables and satellite links. The internet is a component of the broader concept of cyberspace.

The ***cyberworld*** is a unique environment within cyberspace. It refers to specific virtual spaces such as *virtual reality platforms*, *online multiplayer games*, or *immersive simulations*. When we log into an online game or a virtual reality platform, we enter the cyberworld created within cyberspace.

What else can we explore about cyberspace? Let's find out!

Belongings in Cyberspace

We have understood that a person establishes a relationship with cyberspace through his interactions there. Now let's check what are the belongings in cyber space.

Cyberspace is bounded with many things, such as the Internet, different hardware, network protocols, information, databases that store it, web pages, and security systems. These are called **Cyber Infrastructure**. In short, we, the contributors of digital data, actively engaged in an uncontrollably growing cyberspace, are both its nurturers and beneficiaries.

There are many studies going on to make the experience of the real world possible in the cyber world. As a result of this, the **Metaverse** came into existence with the help of artificial intelligence technology.

Let's Learn through Games

What if learning mathematics like playing a video game? As you get the correct answers, you can proceed to the next level. You can get your friends to help.

Gamification refers to the integration of game design elements into learning environments. By introducing elements like points, badges, leader boards and challenges, it can turn conventional style of learning into a fun and interactive process. Metaverse can make gaming experiences more engaging and realistic.

Avatars in Cyberspace

Avatars are digital representations of users often used in virtual environments such as online games, social media platforms, and virtual reality experiences. In the digital world, people can communicate and interact each other with their avatars.

Metaverse

Think of a the character you've read in your life that sticks out in your mind, or from your favourite cartoon/gaming experience.

- What if this character could tell us stories from the cyber world?
- What if this character could come directly into our classrooms?
- What if we could take a virtual tour of a historic site while sitting in our school lab?

Metaverse is the system that provides us with such an experience.

The Metaverse is an immersive platform used for gaming, social media, shopping, education, and much more. It functions as a vast virtual world where you can explore, meet others, play games, and work—all through the internet. The Metaverse integrates advanced technologies like *Augmented Reality* (AR), *Virtual Reality* (VR), *Artificial Intelligence* (AI), and *Blockchain* to create an artificial world similar to the real world. Avatars represent the user's presence in the Metaverse.

The Story of the Word

There is a famous story about cyberspace.

Cyber experts Bobby and Jack try to extort money from the powerful Chrome of the cyber underworld. Chrome is a woman who has achieved fame and fortune through illegal activities. Moreover, they have a robust computer network. Bobby and Jack use a sophisticated ***hacking*** *tool to infiltrate Chrome's computer network.*

*Hacking is like breaking into someone's house without their permission. In the story, Jack and Bobby manage to steal a lot of **digital assets** from Chrome. But soon, Chrome gets caught by the police. Meanwhile, Bobby and Jack face big problems because of their actions in cyberspace. As they go deeper into the dangerous world of hacking, they learn some important lessons. The story is full of interesting events and characters that make it exciting to follow.*

The story is not being detailed in full here as it may become a **Spoiler**.

Have you heard of Spoiler?

A spoiler is a term that refers to information that reveals the climax or main plot of a movie or novel. When introducing works in cyberspace as videos, blogs, or podcasts, warnings called 'spoiler alerts' are used.

Hacking

Hacking refers to unauthorized access to a computer or network, often considered a cybercrime. It can involve stealing sensitive information, damaging computer systems, or exploiting systems for malicious purposes.

On the other hand, ethical hacking involves using hacking techniques to identify vulnerabilities in computer systems or networks, but only with the owner's permission. The goal of ethical hacking is to enhance security and prevent cyberattacks. Unlike unauthorized hacking, ethical hacking is legal and not considered a crime under current laws.

The story of Burning Chrome, mentioned above, was written by William Gibson in 1982. Following this, he published another novel in 1984 titled Neuromancer, which popularized the term "cyberspace." This science fiction (Cyberpunk) work explores futuristic cities dominated by advanced computer technology.

Have you understood the concept of Digital Assets mentioned in the story?

Digital Asset*s* refer to financial assets that exist only in digital form and do not have a physical existence. Despite being intangible, they hold value equivalent to money and can be traded. Examples of digital assets include digital currencies, digital wallets, points earned through online shopping, NFTs, domain names, and software.

NFT

The full form of **NFT** is Non-Fungible Token. It refers the valuable things in the cyber world. Such objects are proprietary. You can buy them for money and sell them to someone else. Some examples are digital art, digital versions of music, paintings, photographs, videos, and rare in-game items or characters.

Cryptocurrency

Cryptocurrency is a digital currency. Transactions in this are secured using a technology called cryptography. Blockchain technology is also employed to record transactions, and making them transparent and secure. Unlike traditional currencies such as the rupee, dollar, or euro, which are issued and regulated by governments, cryptocurrencies operate on decentralized networks powered by advanced technology. Examples of cryptocurrencies include Bitcoin, Ethereum, and Litecoin.

Let's Prepare a Table of Digital Assets

We now understand what digital assets are. We all deal with various digital assets in our daily lives. Table 4.2 contains details about some of these digital assets. Review the table and fill in the missing information.

Digital Assets	Type	Purpose
Audacity	Digital Media	
Khan Academy	Online Educational Platform	Free online learning resources
Krita	Digital Art	
OpenSea		NFT online market
www.samagra.kite.kerala.gov.in	Domain name	
	e-Books	

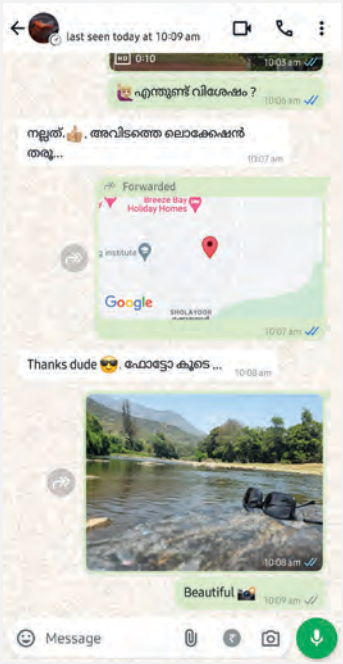
Table 4.2 Digital assets and types

Expand the list by finding more digital assets you manage.

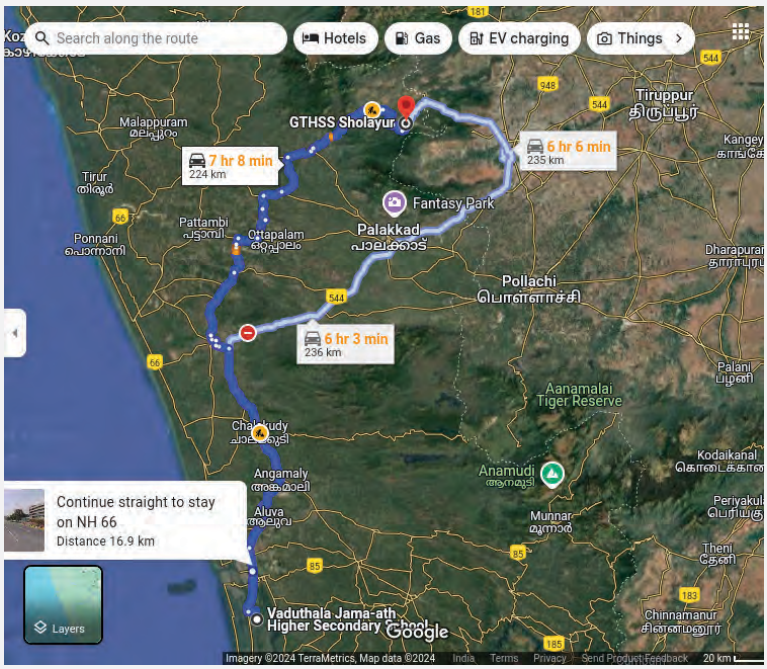
Information diversity in cyberspace

You have learned about the diversity of information in cyberspace from previous classes. In the early days, most of us were consumers of cyberspace information, but today, we all are producers of information. Each one of us is participating in the creation of information in cyberspace through different interactions in every moment.

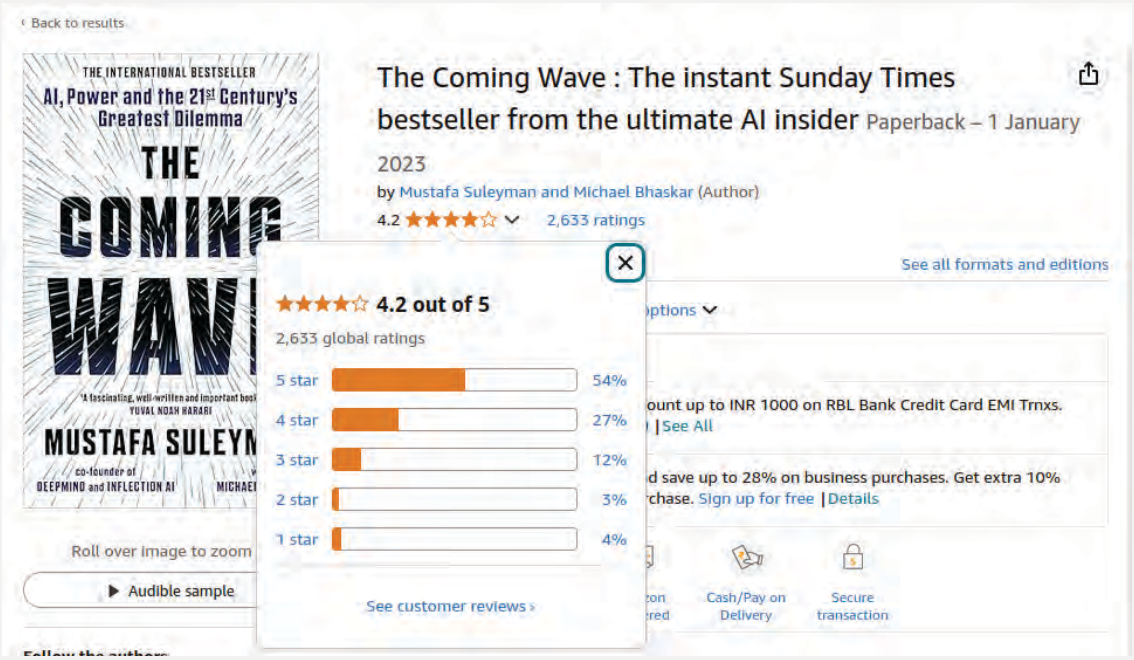
Fig 4.1 provides some examples of how information is produced in cyberspace. Examine the figure and find out the types of information in these cases and record it in the notebook.



a) Chat Including Different Types of Data.



b) Information in Online Map.



c) Review of a Product in a Shopping Site.

Fig 4.1 Different Data Created in Cyberspace

Data Collection

Explicit data collection occurs when a user knowingly provides their information, such as by filling out forms, signing up for accounts, or giving consent for data collection.

Implicit data collection refers to information gathered without the user explicitly providing it. This includes data like browsing history, location information, and details about devices connected to the internet

(a) : Location, Text, Image, Emoji

(b) : Information created while using online map.

(c) : .....

Data is often described as the currency of the 21st century or the oil of digital wealth. The image, voice and video files that we send through email and other messaging apps, information generated by **IoT** devices and various sensors are all added to cyberspace. The comments, likes, shares and reviews we give on shopping sites are also data.

Notice the map data in Fig 4.1 (b). We all use online maps while travelling. The places visited on the way, the time we spent, the places where the vehicles were going slower... all such information can be indirectly generated by the apps we use.

Due to the advancement of technology, the amount of digital data around the world is growing rapidly. Studies published in 2024 indicate that the amount of digital-based data generated by social media, e-commerce, and the Internet of Things (IoT) will be approximately 2.5 quintillion bytes (2,500,000,000,000,000,000 bytes) per day. The interesting fact is that the major share of this data has been created within the last few years only. The information that is being produced in such a large quantity, quickly and in a reliable manner is called **Big Data**. Big data refers to very large and complex datasets that traditional data processing software cannot handle efficiently.

While Using the Information from Cyberspace

If you were asked to write an essay on a topic related to a lesson, where would you search for additional information?

- Library Books
- Newspaper
- Periodicals
- Wikipedia
- ……..……..

The information gathered from these sources can be organized and used to form your essay. You can utilize one or more of these sources for this purpose. These sources are referred to as **sources of information**.

What can we do with the content available?

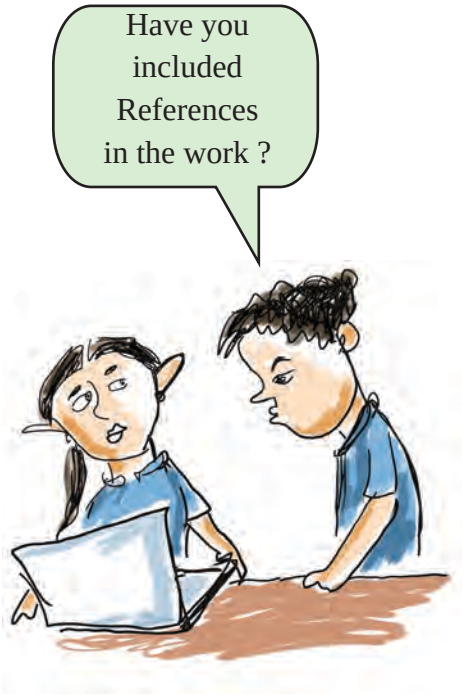
1. The essay can be completed by arranging the available information in a specific order.
2. Based on the available information (references), we can rewrite it in our own words.
3. .....

As a student, the second method is likely the best, right? This approach offers more learning opportunities, as it allows us to incorporate our own perspectives and avoid using incorrect facts. You can also create tables, graphs, and images based on the information you've gathered.

Will this complete our essay? Not yet. We must properly record the source of the information we've used. Only then will our work be complete. The original authors from whom you have got the ideas, theories, figures, and findings for the development of our work

should be acknowledged. It is actually an honour to their intellectual contributions and efforts.

The details of the sources of all the information used in our work are called **References**. The name of the author, date, place of publication, etc., provide the complete details so that readers can find and verify the exact sources of information. Publishing someone else's study or work under your own name without citing the sources is equivalent to theft. The act of presenting someone else's ideas, expressions, or work as your own is called **plagiarism**. There are efficient software tools available for detecting plagiarism. One may face disciplinary action if plagiarism is found in works submitted as part of a course or study.



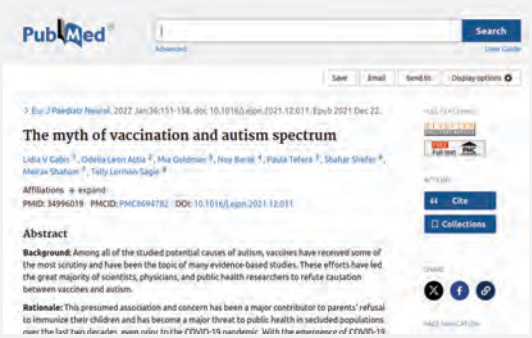
Paddy and Chaff in the Fields of Knowledge

You might already be familiar with fake news. We learned how to identify it from the textbooks of previous classes. But even beyond fake news, there are other situations in cyberspace that can spread misinformation. For example, articles about medical treatments written by people without proper expertise, or information that has become outdated due to recent discoveries or changes, can be shared wrongly. So, when sharing information online, remember:

- The information must be authentic.
- It should be from reliable sources.
- It must be up to date.

It's important to pay close attention to these things to avoid spreading wrong information.

Observe the Fig. 4.2 given below. It provides scientific explanations to counter the unreliable information being spread.



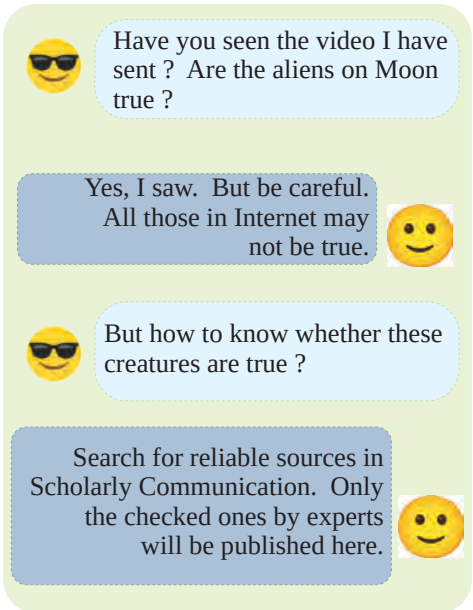
a) Scientific article against the propaganda that vaccination and autism are interrelated.

b) Message by UNICEF against the propaganda that Corona and 5G are related.

Fig 4.2 Some Scientific Explanations against Misinformation

False propaganda that vaccination and autism are related has hindered vaccination efforts in many countries and has become the reason for the spread of the disease. However, numerous studies have shown that there is no connection between vaccines and autism. Similarly, there have been false claims linking 5G technology to the Covid-19 pandemic, All these were widely circulated through social media.

What can you do at school to raise awareness about fake news ? Discuss this with your friends and come up with ideas to help spread the truth.



Reliable Sources

What do you usually do to find information quickly in cyberspace?

- Use Search engines
- Use AI systems

But is all this information accurate?

Information published on the internet can sometimes contain errors, biases, inadequate research, or outdated knowledge. To avoid these issues, it is important to rely on **reliable sources of information.**

When searching information for educational, research, scientific, or industrial purposes, it is essential to use trusted sources. Some examples of reliable sources include reports from scientific conferences, scientific journals, books, theses, and reports from recognized agencies. These are documents certified and published by experts or scientists in their respective fields.

Using websites like www.scholar.google.com and www.semanticscholar.org, you can find only credible scientific publications. You can learn more about this by scanning Fig 4.3 in the SAMAGRA Plus portal.

Now, use search engines like Google Scholar or Semantic Scholar to search for the following topics and observe the search results.

You can note down the differences in your notebook.

- Future of cryptocurrency
- Hidden figures in history

Fig 4.3 How to search for science publications - Video Link

Share Information Carefully

We have already discussed different types of data collection in cyberspace. But have you ever thought how implicit data, which is not directly collected from the user, is gathered?

This is done by tracking a person's behaviour and interactions in cyberspace. In simple terms, every action we take online is monitored using different technologies.

For example:

- Which websites do we visit?
- Who do we become friends with?
- What types of posts do we like and share?
- What products do we buy?
- .....
- .....

In this way, our likes, opinions and relationships are recorded in many places.

These surveillance systems, in turn, use these direct and indirect information about us in a variety of ways.

Although we like to share our achievements with others, we should take care to keep our passwords and personal information confidential. When sharing sensitive details like passwords, ATM PINs, etc., in the cyber world, we must be more vigilant and cautious. Below are some confidential details that should be kept private:

- Photo
- Bank details
- .....
- .....
- .....

Don't you think that we need a lot of care in our every interaction in this world of illusion?

Dangers of Excessive Use

Has the excessive use of internet bothered you in any way? Let's come back to the story of **Burning Chrome** that we met earlier. The characters in the story live in a hyper-technological society, where interactions with cyberspace (and each other) are mediated by machines. Such an intense induction with technology creates a sense of emotional and social alienation. These often create mental or physical ailments. Check figure 4.4, some of the problems with excessive cyber travels are illustrated in the figure.

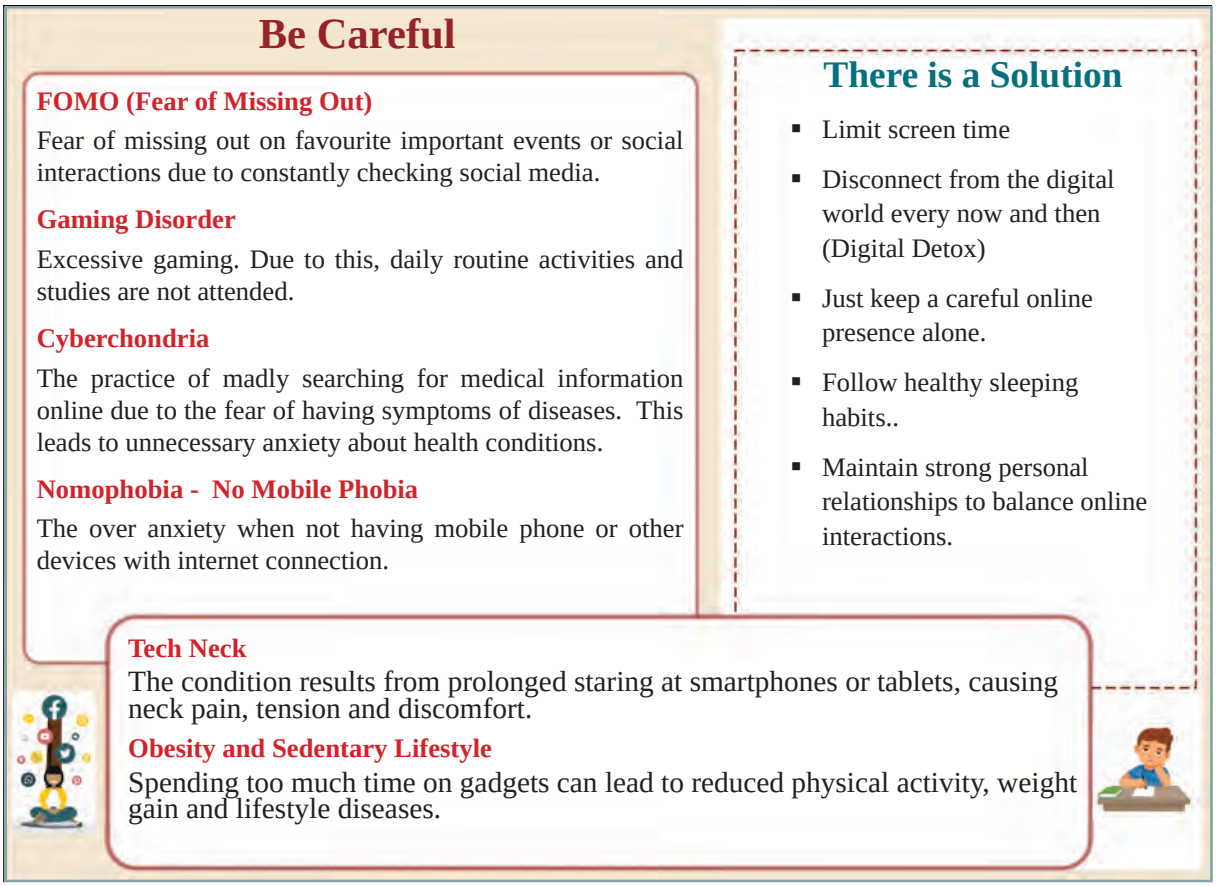


Fig 4.4 Problems Caused Due to the Excessive Use of Internet

What other problems can arise due to unrestricted internet usage? Discuss it with your friends and write it down in your notebook.

Dear Netizens, brothers,

Our etiquette in the cyber world is called Netiquette.

Cyber Etiquette

Human interactions are based on many rules, guidelines, and social norms. As citizens of the boundless cyber world, where there is a lot to give and take, we too have certain moral responsibilities.

Netiquette refers to a set of rules for good behaviour on the Internet. It's important to be as kind and respectful to others online as we are offline.

- Do not share harmful or hateful messages, comments, trolls, posts, or news with others.
- Record disagreements in a respectful manner.
- Avoid sharing other people's personal information.
- Follow the rules of the websites or forums you use.
- If you notice inappropriate content in cyberspace, report it to your teachers or the cyber police.

Let's Assess

- What is the name given to the information that is being produced in large quantities, rapidly and in different ways in cyberspace?

a) Digital Footprint
b) Bigdata
c) Cyberdata
d) Indirect information

- Identify the odd one which do not include in Digital Assets.

  a) School Computer Lab b) Software

  c) Reward point from Bank d) Digital Image

Extended Activities

1. There are many words that have taken on different meanings over time. Some examples are - *file, virus, attachment, remote, spam, selfie, hashtag, meme, Playground, troll, cyber pollution, dark web*... Find more such words. Classify which of these words are associated with cyberspace.
2. Organize a seminar in school on the dangers of excessive internet use.