



# ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

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## DEPARTMENT OF ECE

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### UNIT-I

#### DEMOCRATIC VALUES

Understanding Democratic values: Equality, Liberty, Fraternity, Freedom, Justice, Pluralism, Tolerance, Respect for All, Freedom of Expression, Citizen Participation in Governance – World Democracies: French Revolution, American Independence, Indian Freedom Movement.

#### Understanding Democratic values:

Democracy is a form of government where power is vested in the hands of the people, either directly or through elected representatives. The basic principles of democracy ensure that this power is exercised in a fair and just manner. Here are the fundamental principles of democracy in detail:

- **Rule of Law**
  - Everyone is subject to the law, including lawmakers, government officials, and citizens.
  - Laws are transparent, applied equally, and independently adjudicated by the judiciary to prevent abuses of power.
- **Separation of Powers**
  - The division of government responsibilities into distinct branches to prevent any one branch from exercising the core functions of another.
  - Typically, this includes the executive, legislative, and judicial branches.
  - Ensures a system of checks and balances where each branch can limit the powers of the others, preventing any single entity from becoming too powerful.
- **Individual Rights and Freedoms**
  - Democracies protect the rights and freedoms of individuals.

- These include freedom of speech, assembly, religion, and the press, as well as the right to a fair trial and protection against arbitrary arrest and detention.
- These rights are often enshrined in a constitution or a bill of rights, providing a legal framework to protect them.
- **Political Pluralism**
  - The existence of multiple political parties and groups that represent different interests and perspectives within society.
  - Allows for a healthy and competitive political environment where diverse opinions can be expressed and debated.
- **Citizen Participation**
  - The active engagement of citizens in the political process.
  - Voting, attending town hall meetings, participating in public debates, joining political parties, and engaging in civil society organizations.
  - Encourages a vibrant civil society and helps ensure that the government is responsive to the needs and concerns of the populace.
- **Majority Rule with Minority Rights**
  - While the majority's decision typically prevails, the rights of minority groups must be protected.
  - Mechanisms are put in place to ensure that the majority cannot infringe upon the rights and freedoms of minorities, fostering an inclusive society.
- **Equality before the Law**
  - All individuals are treated equally under the law, without discrimination.
  - Ensures that laws and policies apply uniformly to all citizens, and that there is no preferential treatment or unjust discrimination.
- **Decentralization of Power**
  - Power is distributed among various levels of government, from national to local authorities.
  - Allows for greater representation and responsiveness to local needs and concerns, fostering a more participatory and effective governance.
- **Protection of Human Rights**
  - A commitment to uphold and protect the human rights of all individuals within the state.
  - Ensures adherence to international human rights standards and treaties, providing a framework for protecting the dignity and freedom of all citizens.

## **Explain the importance and needs of democracy.**

### **Importance of Democracy**

#### **1. Protection of Human Rights**

- Democracies are structured to uphold and protect individual rights and freedoms, such as freedom of speech, assembly, religion, and the right to a fair trial.
- **Impact:** This ensures that citizens can express themselves without fear of repression and can live with dignity and autonomy.

#### **2. Promotes Equality**

- Democracy is based on the principle of political equality, meaning every citizen has an equal say in the governance of their country.
- **Impact:** This fosters a sense of inclusion and fairness, helping to bridge divides and reduce social inequality.

#### **3. Encourages Participation**

- Democracies provide mechanisms for citizen involvement in the political process, such as voting, public consultations, and civil society activities.
- **Impact:** Active citizen participation leads to more informed and responsive governance, as well as a more engaged and empowered populace.

#### **4. Ensures Accountability and Transparency**

- Democratic systems have checks and balances that hold elected officials accountable to the public and ensure transparency in government actions.
- **Impact:** This reduces corruption, increases trust in government institutions, and ensures that leaders act in the best interests of their constituents.

#### **5. Facilitates Peaceful Transfer of Power**

- Democracies provide structured processes for the regular transfer of power through free and fair elections.
- **Impact:** This minimizes the risk of power struggles and violence, promoting political stability and continuity.

### **Needs of Democracy**

#### **1. Educated and Informed Citizenry**

- **Need:** Citizens must be educated and informed about political processes, issues, and their rights and responsibilities.

- **Reason:** An informed electorate is essential for making rational decisions, participating effectively, and holding leaders accountable.
2. **Strong Institutions**
- **Need:** Robust institutions that uphold the rule of law, conduct free and fair elections, and enforce checks and balances.
  - **Reason:** Strong institutions ensure the proper functioning of democracy and prevent abuses of power.
3. **Protection of Rights and Freedoms**
- **Need:** Legal frameworks and mechanisms to protect individual rights and freedoms.
  - **Reason:** These protections are fundamental to ensuring that democracy serves all citizens and prevents tyranny.
4. **Political Pluralism**
- **Need:** The presence of multiple political parties and interest groups.
  - **Reason:** Pluralism provides diverse viewpoints and options for voters, fostering healthy competition and debate.
5. **Rule of Law**
- **Need:** Laws that are fairly and consistently applied to everyone.
  - **Reason:** Ensures justice and equality, preventing arbitrary governance and protecting citizens' rights.

## **What are the problems and challenges of democracy?**

### **1. Political Polarization**

- **Problem:** People are divided into opposing groups with extreme views.
- **Impact:** Makes it hard for the government to make decisions and pass laws.

### **2. Voter Apathy and Low Participation**

- **Problem:** Many people don't care about voting or participating in politics.
- **Impact:** Results in a government that doesn't represent everyone.

### **3. Corruption and Mismanagement**

- **Problem:** Officials may engage in dishonest or illegal activities.
- **Impact:** Leads to a lack of trust in the government and unfair use of resources.

### **4. Economic Inequality**

- **Problem:** Big differences in wealth and income.

- **Impact:** Rich people and groups have more influence over politics than poor people.

## 5. Populism and Demagoguery

- **Problem:** Leaders may use emotional appeals and promises to gain support.
- **Impact:** Can weaken democratic institutions and divide society.

## 6. Misinformation and Media Manipulation

- **Problem:** Spread of false information and manipulation of media.
- **Impact:** Misleads the public and unfairly influences elections.

## 7. Weak Institutions

- **Problem:** Government bodies are not strong enough to enforce laws and policies.
- **Impact:** Leads to instability and corruption.

## 8. Lack of Accountability

- **Problem:** Officials are not held responsible for their actions.
- **Impact:** Leads to abuse of power and inefficiency.

**Explain the concept and principles of fraternity in the Indian context.**

### Concept of Fraternity

**Fraternity** means:

- **Brotherhood:** Treating all citizens like family members.
- **Unity and Harmony:** Promoting unity and peaceful coexistence among people of different backgrounds.

### Principles of Fraternity in the Indian Context

#### 1. Respect for Diversity

- **Explanation:** India is a diverse country with many languages, religions, and cultures.
- **Principle:** Fraternity means respecting and valuing this diversity.

#### 2. Equality

- **Explanation:** Every citizen should be treated equally.
- **Principle:** Fraternity promotes equality and ensures that no one is discriminated against.

#### 3. Solidarity

- **Explanation:** Citizens should support and stand by each other.
- **Principle:** Fraternity encourages helping one another, especially in times of need.

#### 4. Mutual Respect

- **Explanation:** Everyone should respect each other's rights and beliefs.

- **Principle:** Fraternity fosters an environment where people respect and understand one another.

## 5. Common Good

- **Explanation:** Working together for the benefit of the whole community.
- **Principle:** Fraternity involves striving for the well-being and progress of society as a whole.

## Importance of Fraternity in India

### 1. National Integration

- **Explanation:** Fraternity helps bind the country together.
- **Importance:** Promotes unity among citizens from different regions and backgrounds.

### 2. Social Harmony

- **Explanation:** Reduces conflicts and promotes peaceful coexistence.
- **Importance:** Creates a stable and harmonious society.

### 3. Democratic Values

- **Explanation:** Upholds the values of democracy like justice, liberty, and equality.
- **Importance:** Ensures that democracy works effectively and inclusively.

### 4. Economic Development

- **Explanation:** A united society can work together towards common goals.
- **Importance:** Helps in achieving economic progress and reducing poverty.

## What is freedom? Explain.

Freedom, also known as liberty, is a fundamental human right and an essential component of a democratic society. It encompasses various dimensions, including personal, political, and economic freedoms.

### Concept of Freedom

Freedom refers to the power or right to act, speak, or think without hindrance or restraint. It is the condition of being free from oppressive restrictions or control by others, especially in a political context.

### Types of Freedom

#### 1. Personal Freedom

- **Explanation:** The right to live one's life without interference from the government or other individuals.
- **Includes:**

- **Freedom of Speech:** The right to express one's opinions publicly without censorship.
- **Freedom of Religion:** The right to practice any religion or none at all.
- **Freedom of Assembly:** The right to gather peacefully in groups for social, political, or religious purposes.
- **Freedom of Movement:** The right to travel freely within and outside one's country.

## 2. Political Freedom

- **Explanation:** The right to participate in the political process and have a say in how one's country is governed.
- **Includes:**
  - **Right to Vote:** The ability to choose leaders and representatives in free and fair elections.
  - **Right to Run for Office:** The opportunity to stand as a candidate in elections.
  - **Freedom of Association:** The right to join or form political parties and other organizations.

## 3. Economic Freedom

- **Explanation:** The ability to engage in economic activities without undue interference.
- **Includes:**
  - **Right to Own Property:** The ability to acquire, use, and dispose of property legally.
  - **Freedom to Work:** The right to choose one's occupation and change jobs.
  - **Freedom to Trade:** The ability to buy and sell goods and services freely.

## Importance of Freedom

### 1. Individual Development

- **Explanation:** Freedom allows individuals to pursue their own goals and develop their talents.
- **Impact:** Leads to personal growth, creativity, and fulfillment.

### 2. Social Progress

- **Explanation:** A free society encourages innovation, debate, and the exchange of ideas.
- **Impact:** Results in scientific, cultural, and economic advancements.

### 3. Political Stability

- **Explanation:** Political freedom promotes participation and accountability.

- **Impact:** Ensures that governments are responsive to the needs and desires of their citizens, reducing the likelihood of unrest and conflict.

#### 4. Economic Prosperity

- **Explanation:** Economic freedom encourages entrepreneurship and competition.
- **Impact:** Leads to economic growth, job creation, and improved standards of living.

### What are the roles of Freedom?

#### 1. Personal Growth

- **Self-Expression:** Freedom lets people share their thoughts and ideas without fear.
- **Pursuit of Happiness:** Allows individuals to follow their interests and dreams.

#### 2. Social Improvement

- **Innovation:** When people are free to think and create, new ideas and technologies develop.
- **Cultural Richness:** Freedom helps different cultures and traditions coexist and thrive.

#### 3. Political Stability

- **Participation:** Freedom lets people vote, run for office, and be involved in politics.
- **Accountability:** Ensures that leaders are transparent and responsible for their actions.

#### 4. Economic Growth

- **Entrepreneurship:** Encourages people to start businesses and create jobs.
- **Efficient Markets:** Helps markets work better by letting supply and demand set prices.

#### 5. Human Rights

- **Protection:** Safeguards people's basic rights and dignity.
- **Equality:** Ensures everyone has the same opportunities and is treated fairly.

#### 6. Education and Learning

- **Access to Information:** Guarantees people can get and share information freely.
- **Critical Thinking:** Promotes thinking critically and questioning ideas.

#### 7. Community Building

- **Forming Groups:** Lets people join or create groups based on common interests.
- **Civic Engagement:** Encourages people to help their communities and get involved.

#### 8. Security and Peace

- **Balanced Power:** Prevents too much power from being concentrated in one place.
- **Conflict Resolution:** Promotes solving disputes peacefully through discussion and rules.

#### 9. Ethical Behavior

- **Responsibility:** Encourages people to make ethical choices and be accountable for their actions.

- **Good Governance:** Helps ensure that governments and businesses act honestly and transparently.

## **View on different justice by various political thinkers and also explain kinds of justice.**

### **Views on Justice by Different Political Thinkers**

#### **1. Plato**

- Justice means everyone doing their own job and not interfering with others. In a just society, everyone should perform their role according to their abilities.
- **Example:** In Plato's ideal society, rulers' rule, warriors protect, and workers produce goods.

#### **2. Aristotle**

- Justice is about fairness and treating people according to their contribution and needs. He talked about "distributive justice" (fair distribution of resources) and "rectificatory justice" (correcting wrongs).
- **Example:** A person who works harder should receive more benefits compared to someone who doesn't.

#### **3. John Rawls**

- Justice is about fairness. His idea, the "Theory of Justice," suggests that a just society is one where rules are designed behind a "veil of ignorance," where no one knows their future position in society. This ensures fairness.
- **Example:** If you don't know if you'll be rich or poor, you'd want laws that help everyone equally, especially the least advantaged.

#### **4. Robert Nozick**

- Justice is about individual rights and freedom. He believed that as long as people acquire and transfer goods fairly, any distribution is just. He was against redistributing wealth.
- **Example:** If someone earns a lot of money fairly, it's their right to keep it without the government taking it away to give to others.

#### **5. Karl Marx**

- Justice involves addressing economic inequalities. Marx believed that a just society would eliminate class distinctions and ensure everyone has equal access to resources.
- **Example:** A society where the working class has equal ownership of the means of production, not just the wealthy few.

## **Kinds of Justice**

### **1. Distributive Justice**

- Concerns the fair allocation of resources and benefits in society. It's about how goods and wealth are distributed among people.
- **Example:** Deciding how to share public funds for education and healthcare.

### **2. Procedural Justice**

- Focuses on the fairness of the processes and procedures used to make decisions. It's about ensuring that the methods of decision-making are fair and transparent.
- **Example:** Ensuring that everyone has a fair chance to participate in legal proceedings.

### **3. Retributive Justice**

- Involves punishing those who have committed wrongdoings. It's about giving people what they deserve based on their actions.
- **Example:** A court sentencing a thief to prison for stealing.

### **4. Restorative Justice**

- Aims to repair the harm caused by criminal behavior. It involves the offender making amends with the victim and the community.
- **Example:** A program where a convicted person works to compensate their victim or engages in community service.

### **5. Social Justice**

- Focuses on creating a fair society by addressing inequalities and ensuring equal opportunities and rights for all people.
- **Example:** Advocating for equal pay for equal work, regardless of gender.

## **1. In what reasons pluralism is acceptable and not Accepted.**

### **Reasons Pluralism is Accepted**

#### **1. Diversity Enrichment**

- Different cultures and ideas bring new perspectives and creativity.
- **Example:** A diverse community can lead to more innovative solutions and richer cultural experiences.

#### **2. Tolerance and Respect**

- Pluralism promotes tolerance and respect for different beliefs and practices.
- **Example:** People learn to appreciate and understand each other's differences rather than seeing them as threats.

### 3. Social Harmony

- Encourages peaceful coexistence among various groups.
- **Example:** Communities that embrace pluralism often experience less conflict and more cooperation.

### 4. Equal Rights

- Supports the idea that all groups and individuals should have equal rights and opportunities.
- **Example:** Ensures that minority groups have the same rights as the majority.

### 5. Learning and Growth

- Exposure to different viewpoints and practices helps individuals and societies grow and adapt.
- **Example:** Learning about different cultures can broaden one's understanding and empathy.

## Reasons Pluralism is Not Accepted

### 1. Fear of Losing Identity

- Some people fear that their cultural or national identity might be diluted.
- **Example:** A group might worry that their traditions and values will be overshadowed by others.

### 2. Cultural Conflict

- Differences in beliefs and practices can lead to misunderstandings and clashes.
- **Example:** Conflicting values and practices might cause tension between groups.

### 3. Resistance to Change

- People who are comfortable with the status quo may resist changes brought by pluralism.
- **Example:** Individuals who prefer traditional ways might find it difficult to accept new ideas or practices.

### 4. Perceived Threats

- Some might view pluralism as a threat to social cohesion or stability.
- **Example:** Concerns that diverse groups might not integrate well or might challenge established norms.

### 5. Inequality Issues

- There can be concerns that pluralism might not fully address or resolve existing inequalities.
- **Example:** Even with pluralism, some groups might still face discrimination or marginalization

## **Describe religious Pluralism?**

### **What is Religious Pluralism?**

- **Definition:** It means that people of various religions (like Christianity, Islam, Hinduism, Buddhism, etc.) live together in harmony, and each religion is respected and treated equally.
- **Acceptance:** Everyone has the right to follow their own religion and practice their beliefs without being judged or discriminated against.

### **Key Points of Religious Pluralism**

#### **1. Respect for All Beliefs**

- People acknowledge and respect that others have different religious beliefs.
- **Example:** Celebrating different religious holidays or allowing places of worship for various religions.

#### **2. Freedom of Religion**

- Everyone is free to choose and practice their religion.
- **Example:** Allowing people to attend their place of worship or follow their religious customs.

#### **3. Dialogue and Understanding**

- Encourages open conversations between people of different faiths to understand each other better.
- **Example:** Interfaith meetings or community events where people from different religions discuss their beliefs.

#### **4. Equality**

- No religion is considered superior or inferior to another.
- **Example:** Equal treatment of people from different religious backgrounds in schools, workplaces, and public life.

## What are the significance and importance of Tolerance?

### Significance and Importance of Tolerance

#### 1. Promotes Harmony

- Helps people live together peacefully, even when they have different views or lifestyles.
- **Example:** Tolerance can reduce conflicts and make communities more cooperative and friendly.

#### 2. Encourages Respect

- Shows respect for others' rights to have their own beliefs and opinions.
- **Example:** Listening to others without judgment and acknowledging their perspectives, even if you disagree.

#### 3. Supports Diversity

- Allows different cultures, religions, and ideas to coexist and thrive.
- **Example:** In a tolerant society, various cultural festivals and traditions can be celebrated and enjoyed by everyone.

#### 4. Fosters Understanding

- Helps people understand and appreciate different viewpoints and backgrounds.
- **Example:** Engaging in conversations with people from different backgrounds can broaden your understanding and reduce prejudices.

#### 5. Enhances Social Stability

- Reduces tensions and conflicts that can arise from intolerance or discrimination.
- **Example:** Tolerant societies are often more stable and have fewer conflicts because people are more accepting of each other.

#### 6. Encourages Personal Growth

- Helps individuals grow by challenging their own assumptions and learning from others.
- **Example:** Encountering and accepting different viewpoints can lead to personal development and a more open-minded attitude.

#### 7. Promotes Equal Rights

- Supports the idea that everyone deserves equal treatment, regardless of their differences.
- **Example:** Ensuring that people are not treated unfairly or discriminated against based on their race, religion, or background

## **Explain the principle and importance of Respect;**

**Respect** is treating others with consideration and valuing their feelings, opinions, and rights.

### **Principle of Respect**

- **Value Others:** Acknowledge and appreciate the worth and feelings of others, regardless of differences.
- **Polite Behavior:** Use courteous and kind behavior when interacting with others.
- **Listen and Understand:** Pay attention to what others say and try to understand their point of view.

### **Importance of Respect**

#### **1. Builds Positive Relationships**

- Helps create friendly and trusting relationships with others.
- **Example:** Being respectful to friends and colleagues fosters good friendships and teamwork.

#### **2. Promotes Harmony**

- Reduces conflicts and misunderstandings by acknowledging and valuing each other's perspectives.
- **Example:** Respecting different opinions can lead to more peaceful and productive discussions.

#### **3. Encourages Cooperation**

- When people feel respected, they are more likely to work together and support each other.
- **Example:** In a team project, respect helps members collaborate effectively and achieve common goals.

#### **4. Enhances Self-Esteem**

- Feeling respected boosts individuals' self-confidence and sense of worth.
- **Example:** Complimenting and valuing someone's efforts can make them feel appreciated and motivated.

#### **5. Supports Diversity**

- Respecting people from different backgrounds and cultures promotes inclusivity and acceptance.
- **Example:** Understanding and valuing different traditions and beliefs helps create a diverse and inclusive community.

#### **6. Fosters Learning and Growth**

- Respecting others' ideas and experiences can provide new insights and opportunities for learning.
- **Example:** Being open to different viewpoints can help you learn and grow personally and professionally.

## 7. Maintains Social Order

- Respectful behavior helps keep interactions smooth and orderly, reducing conflicts and disruptions.
- **Example:** Following social norms and being polite in public spaces helps maintain a harmonious environment

## What are the advantages of respect?

### Advantages of Respect:

#### 1. Strengthens Relationships

- Builds trust and positive connections with others.
- **Example:** Being respectful helps maintain strong friendships and good family relationships.

#### 2. Reduces Conflicts

- Minimizes disagreements and misunderstandings.
- **Example:** Listening and valuing others' opinions can prevent arguments.

#### 3. Encourages Cooperation

- Makes people more willing to work together and support each other.
- **Example:** Respect in a team setting leads to better collaboration and success.

#### 4. Boosts Self-Esteem

- Makes people feel valued and appreciated.
- **Example:** Compliments and recognition make individuals feel good about themselves.

#### 5. Promotes Inclusivity

- Supports diverse backgrounds and perspectives.
- **Example:** Respecting different cultures and beliefs creates a welcoming environment.

#### 6. Enhances Communication

- Encourages open and honest dialogue.
- **Example:** Respectful listening leads to better understanding and fewer misunderstandings.

#### 7. Fosters Personal Growth

- Encourages learning from others and improving oneself.
- **Example:** Being open to different viewpoints helps you grow and learn.

## 8. Maintains Social Harmony

- Keeps interactions smooth and pleasant in various settings.
- **Example:** Following social norms and being polite helps avoid conflicts in public spaces.

## 9. Builds a Positive Environment

- Creates a supportive and encouraging atmosphere.
- **Example:** A respectful workplace or community is more productive and enjoyable for everyone

## What are the elements of Effective Citizen Governance Model?

The **Effective Citizen Governance Model** focuses on how citizens can actively participate in and influence government and community decisions.

### 1. Active Participation

- Citizens actively engage in decision-making processes.
- **Example:** Voting in elections, attending town hall meetings, or joining local committees.

### 2. Transparency

- Government actions and decisions are open and clear to the public.
- **Example:** Government websites provide information on policies and spending, and meetings are open to the public.

### 3. Accountability

- Leaders and officials are held responsible for their actions and decisions.
- **Example:** Leaders answer to citizens through regular reports and can be voted out if they don't perform well.

### 4. Responsiveness

- The government listens to and addresses citizens' concerns and needs.
- **Example:** Responding to public feedback and making changes based on citizens' suggestions.

### 5. Inclusiveness

- Ensures all groups and individuals have a voice and can participate.
- **Example:** Making sure that policies consider the needs of various community groups, including minorities and marginalized populations.

## 6. Integrity

- Government and leaders act with honesty and ethical behavior.
- **Example:** Avoiding corruption and making decisions based on public interest rather than personal gain.

## 7. Collaboration

- Working together with different groups and organizations to achieve common goals.
- **Example:** Partnerships between government, businesses, and community organizations to address local issues.

## 8. Education and Awareness

- Providing citizens with the knowledge and resources they need to participate effectively.
- **Example:** Offering civic education programs and easy access to information about how the government works.

## 9. Feedback Mechanisms

- Systems in place for citizens to provide feedback and for government to act on it.
- **Example:** Surveys, suggestion boxes, and public consultations where citizens can share their opinions.

## 10. Efficiency

- Ensuring that government processes are effective and resources are used wisely.
- **Example:** Streamlining procedures to reduce bureaucracy and improve service delivery.

## Describe the French Revolution between 1787-1779.

The **French Revolution** was a period of major change in France that started in 1789 and ended in 1799.

### Background (Before 1789)

- **Economic Problems:** France was in debt from wars and overspending. People were struggling with high taxes and food shortages.
- **Social Inequality:** Society was divided into three groups (estates) with the common people (Third Estate) facing heavy taxes and little power, while the nobles (First Estate) and clergy (Second Estate) had privileges.
- **Political Issues:** King Louis XVI was seen as ineffective, and there was widespread dissatisfaction with the absolute monarchy.

### Key Events of the Revolution (1789-1799)

#### 1. 1789 – Start of the Revolution

- **Storming of the Bastille:** On July 14, 1789, people stormed the Bastille prison in Paris, symbolizing the start of the revolution.
  - **Declaration of the Rights of Man and of the Citizen:** This document was adopted, declaring equality and rights for all men.
2. **1790 – National Assembly and Reforms**
    - **Formation of the National Assembly:** The Third Estate formed its own assembly, challenging the king’s authority.
    - **Reforms:** The Assembly began making changes, like reducing the power of the monarchy and introducing new laws.
  3. **1791 – New Constitution**
    - **Constitution of 1791:** This created a constitutional monarchy, limiting the king’s powers and establishing a new government structure.
  4. **1792-1793 – Radical Phase**
    - **End of the Monarchy:** In 1792, the monarchy was abolished, and France was declared a republic.
    - **Reign of Terror:** From 1793 to 1794, radicals like Maximilien Robespierre led a period of intense political purges and executions, known as the Reign of Terror.
  5. **1795-1799 – Directory and Instability**
    - **Directory Government:** After the fall of Robespierre, a new government called the Directory took over. It was marked by corruption and instability.
    - **Rise of Napoleon:** In 1799, a military leader named Napoleon Bonaparte took control through a coup, ending the revolution and establishing himself as the ruler.

**What are influences of the French Revolution? Explain.**

The **French Revolution** had a big impact on many aspects of society and politics, both in France and around the world.

**1. Spread of Revolutionary Ideas**

- The ideas of liberty, equality, and fraternity spread to other countries, inspiring similar movements.
- **Example:** Other nations, like those in Latin America, started their own revolutions for independence and democratic reforms.

**2. End of Absolute Monarchies**

- The idea that kings and queens should not have total power became less accepted.

- **Example:** The idea influenced the decline of absolute monarchies in Europe, leading to the rise of constitutional monarchies and republics.

### 3. Rise of Democracy

- The revolution showed that ordinary people could challenge and change their government.
- **Example:** Many countries started adopting democratic practices, like voting and creating representative governments.

### 4. Human Rights and Equality

- The revolution promoted the idea that everyone should have equal rights and be treated fairly.
- **Example:** This led to the development of human rights declarations and laws that promote equality.

### 5. Impact on Law and Government

- The French Revolution introduced new legal and political ideas, like the separation of powers and secular laws.
- **Example:** Many countries adopted new legal systems and reforms based on the principles of the revolution.

### 6. Changes in Social Structures

- The revolution challenged the traditional social hierarchies and privileges of the nobility and clergy.
- **Example:** The idea that all people should have equal social status led to reforms in class systems and social mobility.

### 7. Economic Reforms

- The revolution led to changes in how economies were managed, with more focus on fairer distribution of resources.
- **Example:** Land reforms and changes in tax systems aimed to reduce economic inequalities.

### 8. Cultural and Educational Reforms

- The revolution influenced changes in education and culture, promoting secularism and public education.
- **Example:** Education became more accessible, and there was a push for creating public schools and secular teaching.

### 9. Nationalism

- The revolution helped spread the idea of nationalism, where people feel a strong connection to their country and its values.
- **Example:** This led to the growth of national pride and the development of nation-states.

## **Describe clearly about overview of Indian national movement. [Freedom]**

### **Overview of the Indian National Movement for Freedom**

The Indian National Movement was the struggle for India's independence from British rule.

#### **Early Stages (Late 1800s - Early 1900s)**

##### **1. Formation of Indian National Congress (1885)**

- A political group called the Indian National Congress (INC) was formed to seek greater rights and reforms for Indians.
- **Key Figure:** Allan Octavian Hume, a British official, helped start it, with leaders like Dadabhai Naoroji and Bal Gangadhar Tilak being early members.

##### **2. Early Demands**

- The INC initially asked for more Indian representation in government and reforms in British policies.
- **Example:** They wanted better conditions for Indian workers and fairer treatment in administration.

#### **Struggle Intensifies (1900s - 1920s)**

##### **3. Partition of Bengal (1905)**

- The British divided Bengal to weaken Indian unity. This led to widespread protests.
- **Result:** The partition was reversed in 1911 due to strong opposition from Indians.

##### **4. Formation of Muslim League (1906)**

- The Muslim League was created to represent Muslim interests and also sought political rights.
- **Key Figure:** Mohammad Ali Jinnah played a significant role in its early years.

##### **5. Non-Cooperation Movement (1920-1922)**

- Led by Mahatma Gandhi, it involved Indians refusing to cooperate with British authorities.
- **Actions:** Boycotting British goods, schools, and courts.

##### **6. Civil Disobedience Movement (1930-1934)**

- Gandhi led this movement to peacefully disobey British laws, especially those related to taxes and salt.
- **Example:** The Salt March, where Gandhi walked to the sea to make salt, defying British laws.

#### **Towards Independence (1930s - 1940s)**

##### **7. Demand for Full Independence**

- The INC, under Gandhi's leadership, began demanding complete independence rather than just greater self-rule.
- **Example:** The "Quit India" resolution in 1942 called for the British to leave India immediately.

#### 8. World War II Impact (1939-1945)

- The British involvement in World War II without consulting Indian leaders led to increased demands for independence.
- **Result:** The British promised to grant independence after the war.

#### 9. Partition and Independence (1947)

- India gained independence on August 15, 1947, but was divided into two countries: India and Pakistan.
- **Result:** The partition led to widespread violence and mass migrations.

#### Key Figures in the Movement

- **Mahatma Gandhi:** Leader of non-violent protests and civil disobedience.
- **Jawaharlal Nehru:** First Prime Minister of India and a key leader in the INC.
- **Subhas Chandra Bose:** Leader of the Indian National Army, who sought independence through armed struggle.

### What are the causes of Indian National Movement: Influences and Catalysts?

The **Indian National Movement** for independence was driven by several causes and influences.

#### Causes

##### 1. British Rule and Exploitation

- The British controlled India and exploited its resources and people.
- **Example:** High taxes, unfair treatment, and economic policies that harmed Indian businesses and farmers.

##### 2. Social and Economic Injustice

- Many Indians faced social discrimination and economic hardship under British rule.
- **Example:** The British favored their own businesses and neglected the needs of Indian workers and farmers.

##### 3. Lack of Political Rights

- Indians had little say in their own government and were excluded from important decisions.

- **Example:** Indians were not given significant roles in the British administration or military.

#### 4. Educational and Cultural Awakening

- Education and awareness of other freedom movements inspired Indians.
- **Example:** Learning about democratic ideals and self-rule motivated Indians to seek their own independence.

### Influences

#### 1. Other Global Revolutions

- The success of other countries in gaining independence or improving their rights inspired Indians.
- **Example:** The American Revolution and the French Revolution showed that people could overthrow oppressive regimes.

#### 2. World War I Impact

- The involvement of Indians in World War I without gaining any political concessions led to increased dissatisfaction.
- **Example:** After the war, there were promises of self-rule that were not fulfilled, causing frustration.

#### 3. Rise of Nationalist Ideas

- Nationalist leaders and thinkers promoted the idea of self-rule and Indian identity.
- **Example:** Leaders like Bal Gangadhar Tilak and Mahatma Gandhi inspired people with ideas of freedom and unity.

### Catalysts

#### 1. Partition of Bengal (1905)

- The British decision to divide Bengal to weaken Indian unity led to widespread protests.
- **Result:** The partition was reversed in 1911, but it united many Indians against British policies.

#### 2. Formation of the Indian National Congress (INC)

- The INC became a key organization advocating for Indian rights and self-rule.
- **Action:** It became a major platform for political activism and protest against British rule.

#### 3. Non-Cooperation and Civil Disobedience Movements

- Mahatma Gandhi's strategies of non-violent resistance and civil disobedience mobilized millions of Indians.

- **Example:** The Salt March and other protests drew national and international attention to the cause.

#### 4. **Partition of India (1947)**

- The division of India into India and Pakistan marked the end of British rule.
- **Result:** The violence and upheaval surrounding the partition highlighted the urgent need for independence.

## Unit II Secular Values

Understanding Secular values – Interpretation of secularism in Indian context – Disassociation of state from religion – Acceptance of all faiths – Encouraging non-discriminatory practices.

### Understanding Secular values:

Secularism is freedom of choosing one's religious beliefs and practices of a religion. It has its root in Greek and Roman philosophies.

### Secularism

- Secularism focuses on religion to other 'temporal' things in consideration of nature, reason, science, and development. It is also termed as modernization of religious beliefs and traditional values and hence the term secularization.
- It ensures freedom of both believers and non-believers of secularism. Hence, it gives the right of freedom to the people. It also protects the beliefs and traditional values of religion. Secularism provides religious freedom i.e. freedom to choose the religious and individual wants. One can follow multiple religions as well.
- Secularism is often misunderstood with atheism. This is completely false. Secularism is choosing our religion and believing and following the religious practices and traditional values.
- Atheism is not believing in God at all and the force beyond. Secularism is just a framework for the society for striving equality in every aspect. Aspects of politics, education and law etc.
- Secularism is to create a society in which people of all religions or people who don't belong to any religion can live together peacefully.
- It says that no one shall be subject to discrimination by any State, institution, group of persons, or person on grounds of religion or other beliefs.
- Imagine yourself as a Hindu or Muslim living in a part of the United States of America where Christian fundamentalism is very powerful. Imagine yourself as a Hindu or Muslim living in a part of the United States of America where Christian fundamentalism is very powerful.

Suppose that despite being a US citizen, no one is willing to rent their house to you.

- How would this make you feel? Would it not make you feel resentful? What if you decided to complain against this discrimination and were told to go back to India? Would this not make you feel angry? Your anger could take two forms. First, you might react by saying that Christians should get the same treatment in places where Hindus and Muslims are in a majority.
- This is a form of retaliation. Or, you might take the view that there should be justice for all. You may fight, stating that no one should be discriminated against on grounds of their religious practices and beliefs.
- This statement rests on the assumption that all forms of domination related to religion should end. This is the essence of secularism a mentalism is very powerful. Suppose that despite being a US citizen, no one is willing to rent their house to you.
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### **Interpretation of secularism in Indian context:**

What is Indian Secularism?

The Indian Constitution mandates that the Indian State be secular. According to the Constitution, only a secular State can realize its objectives to ensure the following:

1. that one religious community does not dominate another;
2. that some members do not dominate other members of the same religious community;
3. that the State does not enforce any particular religion nor take away the religious freedom of individuals.

- The Indian State works in various ways to prevent the above domination. First, it uses a strategy of distancing itself from religion.
- The Indian State is not ruled by a religious group and nor does it support any one religion. In India, government spaces like law courts, police stations, government schools and offices are not supposed to display or promote any one religion.

### **In what way is Indian secularism different from that of other democratic countries?**

- Some of the above objectives are similar to those that have been included in the Constitutions of secular democratic countries in other parts of the world. For example, the First Amendment of the U.S. Constitution prohibits the legislature from making laws “respecting an establishment of religion” or that “prohibit the free exercise of religion”.
- What is meant by the word ‘establishment’ is that the legislature cannot declare any religion as the official religion. Nor can they give preference to one religion.
- In the U.S.A. the separation between State and religion means that neither the State nor religion can interfere in the affairs of one another.
- There is one significant way in which Indian secularism differs from the dominant understanding of secularism as practiced in the United States of America.
- This is because unlike the strict separation between religion and the State in American secularism, in Indian secularism the State can intervene in religious affairs.
- Indian Constitution intervened in Hindu religious practices in order to abolish untouchability. In Indian secularism, though the State is not strictly separate from religion it does maintain a principled distance vis-à-vis religion.
- This means that any interference in religion by the State has to be based on the ideals laid out in the Constitution.
- These ideals serve as the standard through which we can judge whether the State is or is not behaving according to secular principles. The Indian State is secular and works in various ways to prevent religious domination.
- The Indian Constitution guarantees Fundamental Rights that are based on these secular principles.

However, this is not to say that there is no violation of these rights in Indian society.

- Indeed, it is precisely because such violations happen frequently that we need a constitutional mechanism to prevent them from happening. The knowledge that such rights exist makes us sensitive to their violations and enables us to take action when these violations take place.
- In February 2004, France passed a law banning students from wearing any conspicuous religious or political signs or symbols such as the Islamic headscarf, the Jewish skullcap, or large Christian crosses.
- This law has encountered a lot of resistance from immigrants who are mainly from the former French colonies of Algeria, Tunisia and Morocco. In the 1960s, France had faced a shortage of workers and, therefore, had provided visas for these immigrants to come and work in the country. The daughters of these immigrants often wear headscarves while attending school. However, with the passing of this new law, they have been expelled from their school for wearing headscarves

### **Disassociation of state from religion:**

#### **Why is it Important to Separate Religion from the State?**

- As discussed above, the most important aspect of secularism is its separation of religion from State power. This is important for a country to function democratically. Almost all countries of the world will have more than one religious group living in them. Within these religious groups, there will most likely be one group that is in a majority.
- If this majority religious group has access to State power, then it could quite easily use this power and financial resources to discriminate against and persecute persons of other religions. This tyranny of the majority could result in the discrimination, coercion and at times even the killing of religious minorities.
- The majority could quite easily prevent minorities from practicing their religions. Any form of domination based on religion is in violation of the rights that a democratic society guarantees to each and every citizen irrespective of their religion.
- Therefore, the tyranny of the majority and the violation of Fundamental Rights that can result is one reason why it is important to separate the State and religion in democratic societies.

- Another reason that it is important to separate religion from the State in democratic societies is because we also need to protect the freedom of individuals to exit from their religion, embrace another religion or have the freedom to interpret religious teachings differently.
- To understand this, point better, let us take the practice of untouchability. You might feel that you dislike this practice within Hinduism and therefore, you want to try and reform it. However, if State power were in the hands of those Hindus who support untouchability, then do you think that you would have an easy task to try and change this? Even if you were part of the dominant religious group, you might face a lot of resistance from fellow members of your community.
- These members who have control of State power might say that there is only one interpretation of Hinduism and that you do not have the freedom to interpret this differently

### **Acceptance of all faiths**

- Once upon a time, in a small village nestled among rolling hills, there lived people of different faiths.
- The villagers held diverse beliefs and followed various religious practices. Despite their differences, they coexisted peacefully, respecting and honoring each other's faiths.
- One sunny morning, a young girl named Maya set out on a journey. She was a curious and open-minded child, always eager to learn about the world around her. As she walked along the village path, she noticed a magnificent temple standing tall, its golden spires gleaming in the sunlight.
- Intrigued, Maya entered the temple, where she discovered a group of people engaged in prayers. They wore vibrant clothes and chanted melodious hymns. Maya, although unfamiliar with their faith, watched in awe and felt a sense of reverence fill her heart.
- As she stepped out of the temple, Maya noticed a quiet mosque nearby. The melodious call to prayer resonated in the air.
- She decided to explore further and entered the mosque. Inside, she saw people bowing in unison, their faces filled with devotion and tranquility.
- Maya stood in silence, appreciating the beauty of their rituals.

- As Maya continued her journey, she stumbled upon a humble church on a hill. She entered the peaceful sanctuary and was greeted by the sound of a choir singing hymns. The atmosphere was serene and filled with a profound sense of love. Maya found herself swaying to the music, moved by the faith of those around her.
- Throughout her journey, Maya visited many other places of worship, encountering people of different faiths—Buddhism, Hinduism, Judaism, and more. Each time, she encountered unique rituals, prayers and traditions. Yet, in every sacred space, she felt a common thread—a deep respect and reverence for the divine.
- As Maya returned to her village, she carried with her a newfound understanding. She realized that although people may have different paths to seek the truth, their ultimate goal was the same—to connect with something greater than themselves.
- Inspired by her experiences, Maya decided to share her journey with the villagers. She gathered them in the village square and spoke about the beauty and wisdom she had found in each faith. She emphasized the importance of respecting and cherishing the diversity of beliefs within their community.
- The villagers listened attentively and were moved by Maya's words. They realized that their differences were not a source of division but an opportunity to learn from one another. They agreed to come together periodically, sharing their religious practices, stories and festivals. This would foster a deeper understanding and strengthen the bond among them.
- From that day forward, the village became a shining example of harmony and respect. The villagers celebrated each other's religious festivals with joy and enthusiasm. They attended each other's ceremonies, learning and appreciating the rituals and traditions of different faiths.
- Maya's journey had taught them the value of respecting and embracing diversity. It had shown them that by honoring and understanding one another's faiths, they could create a tapestry of unity, love, and acceptance.
- And so, the village thrived, becoming a beacon of tolerance and mutual respect for all who encountered it—a testament to the power of embracing and honoring other faiths.

## **5 gems of respecting other faiths**

Respecting people of other faiths is indeed important and can greatly contribute to our own spiritual journey. The story teaches us five important gems:

**1. Promoting tolerance and understanding:** Respecting people of other faiths allows us to foster an environment of tolerance and understanding. It helps us recognize that there are diverse perspectives and beliefs in the world, and that no single faith or belief system has a monopoly on truth. By embracing this understanding, we can build bridges of empathy and compassion, fostering peaceful coexistence.

**2. Expanding our worldview:** Engaging with people of different faiths opens our minds to new ideas, perspectives, and philosophies. It allows us to broaden our understanding of the human experience and the various ways people find meaning and purpose in their lives. This expansion of worldview can enrich our own spiritual journey by offering fresh insights, challenging our assumptions, and encouraging personal growth.

**3. Encouraging self-reflection:** Respecting people of other faiths prompts us to examine our own beliefs and values more closely. It invites us to question why we hold certain convictions and encourages self-reflection. This process can deepen our understanding of our own faith or belief system, helping us to develop a more nuanced and authentic spiritual path.

**4. Fostering spiritual humility:** Recognizing and respecting the beliefs of others reminds us that we do not possess all the answers. It cultivates a sense of humility within us, acknowledging that there is much we can learn from others. This humility can lead to a more open-minded and receptive attitude, allowing us to grow spiritually by being receptive to new perspectives and insights.

**5. Building meaningful relationships:** By respecting people of other faiths, we create opportunities for genuine connections and meaningful relationships. These connections can provide us with valuable support, friendship, and mutual learning. They can also challenge and inspire us, contributing to our own spiritual journey through shared experiences and dialogue.

Respecting people of other faiths is not about compromising or diluting our own beliefs, but rather about recognizing the inherent dignity and worth of every individual and their right to hold their own beliefs. It is about fostering a world where diverse spiritual paths can coexist harmoniously, contributing to the collective growth and well-being of humanity.

### **Encouraging non-discriminatory practices:**

What Is Discrimination in The First Place?

- The legal definition of discrimination is the distinction, exclusion, and unequal treatment of a person or group in comparison to others based on certain characteristics.

Individuals are protected from illegal discrimination based on the following:

- Race, color
- Ancestry, national origin
- Religion, creed
- Age (40 and over)
- Disability, mental and physical
- Sex (including pregnancy discrimination, childbirth, breastfeeding, or related medical conditions)
- Sexual orientation
- Gender identity, gender expression
- Medical condition
- Genetic information
- Marital status
- Military or veteran status

Discrimination can be in the form of unfair treatment, harassment, denial of a reasonable workplace change, improper questions, and even retaliation for complaining or having been part of an investigation/lawsuit about job discrimination. You can check out the U.S Equal Employment Opportunity Commission (EEOC) prohibited policies/practices for a better understanding of what might constitute workplace discrimination.

## **How we Can Stop Discrimination in The Workplace**

Now that you know what discrimination is, let's talk about the steps your company can take to prevent it in the workplace.

### **Develop a written policy that defines procedures and rules**

- Companies' anti-discrimination policies can vary widely depending on their culture and nature; however, it is important to highlight the employee's right to work in a professional environment where their skills, abilities, and knowledge are the most important factors in their success.
- The company work policy should have zero tolerance for any form of harassment. Encourage employees to come forward and participate in the investigation, assuring they will be kept confidential (to a reasonable extent), and people who make complaints will be protected at all times.
- Having clear procedures and rules established is also a way to make managers and employees aware of acceptable workplace behavior within your country.
- In case of misbehavior, it will be easier to point to the policy than to refer to a law the employee may not have heard of.

### **Educating all workers about discrimination**

- Some state laws require employers to conduct anti-discriminatory training programs on a regular basis. It is important to ensure that all employees are aware of potential discrimination issues in the workplace, have knowledge of your policies and procedures, and know how to report the allegation.
- It is recommended to have separate training for supervisors and managers as they are your first line of defense in preventing workplace discrimination.
- Also, you should strive to inform employees of the possible outcomes of discrimination, which include potential lawsuits.
- There are many ways to keep everybody informed and up to date about the issue, like face-to-face training, internal communications, or even using visual aids in common areas to promote anti-discriminatory practices.

### **Establish a process for resolving discrimination issues**

Any employee who feels they have been discriminated against or treated negatively should report the issue to Human Resources, their direct supervisor, manager, or director, and they should feel comfortable and safe when doing so.

In these cases, all companies must be consistent in addressing issues through a fair and reasonable investigation, even if your business is not in legal jeopardy.

This will show your company's expectations of equal and unbiased treatment among all employees. Solving workplace discrimination issues in a timely manner should be a priority, as otherwise, trust and credibility may be lost.

### **Consider more than one option for communication channels**

An important part of the complaint process is providing effective and transparent communication channels.

Ideally, have more than one option for employees to report discrimination, which will ensure that a supervisor cannot hide issues from Human Resources and upper management.

Formal communication channels like an Intranet, emails, letters, or face-to-face interactions are crucial for the employee to be able to make their complaint, and some even allow anonymous reports to be made in order to start an investigation.

You can also consider keeping a more informal type of communication, like holding lunchtime conversations and continuous collaboration among team members where you can identify potential discriminatory practices that otherwise may go unnoticed.

### **Reduce bias in your hiring process**

- Unconscious biases are stereotypes that we unintentionally have learned. They have the ability to affect our behavior and perception of others.
- This is an issue that many companies may not have in mind, but a vast body of research shows that the hiring process is biased and unfair.

- This can frustrate diversity, recruiting, promotion, and retention efforts. Awareness training is the first step to solving unconscious bias in the workplace, as it allows employees to recognize that everyone possesses them and to identify their own.
- It is also recommended to have a standardized interview process by asking candidates the same set of defined questions that allow employers to focus on the factors that have a direct impact on performance.
- Giving a work sample test can also be a great tool against unconscious bias as it forces recruiters to critique the quality of a candidate's work versus judging them based on appearance, gender, age, personality, or disability.
- Aside from the awareness training, inclusion training also helps reduce unconscious biases in the workplace.

### **Implement an anti-retaliation program**

- Retaliation is the most common workplace discrimination charge and the easiest for an employee to allege, as well as most challenging for a company to defend.
- It is common for an original discrimination charge (other than retaliation) to fail to establish a violation of the law, but the following retaliation charge will result in an actual discrimination finding.
- Therefore, you should be providing all your management staff with anti-retaliation training to make sure they have a full understanding of what this entails and how to avoid reactive behavior once an employee has engaged in the process of a complaint.
- We should also keep thorough documentation of the employment actions you take and the reasons behind them. For example, if you deny someone a promotion, you must have enough proof of the selection process to show there were valid reasons for you to select another candidate over that employee.
- If that person claims that your denial of promotion was retaliatory, you will have this data to back you up and avoid further issues.

In addition to these important practices, all companies should also have an Affirmative Action Plan not only because it's mandatory but it's a sure way to prevent any forms of discrimination in the workplace.

We can also consider some of these tips for creating a better work environment:

### **Conduct team-building activities**

- Besides holding training in a meeting environment, hold team-building exercises and events to help your employees interact and understand each other better.
- This is a great opportunity to encourage diversity and inclusion as there are many activities that can accomplish that, such as a potluck that invites everyone to bring a dish from their cultural background.

### **Focus groups**

- In an employee focus group, employees take part in a guided discussion on a particular topic, and are often used to improve employee engagement.
- They serve as an extra opportunity to communicate that you value employee feedback and are committed to positive change.
- These discussions can also help employers proactively identify workplace stressors, frequency of conflicts, and address issues to improve employee morale.

### **Provide managers and supervisors with soft skills training**

- When talking about discrimination, one may immediately think of cases where a person was denied a job or a promotion for unfair reasons or treated unequally by their direct supervisor or manager, but we need to keep in mind employees can also be discriminated against by their co-workers.
- In many cases, this includes bullying and harassment.
- Instead of immediately getting HR involved, your managerial employees should be fully qualified to deal with these issues in a prompt and effective manner.
- Providing continuous soft skills training can significantly improve their interactions with subordinates and keep problems like this from escalating to discrimination complaints.

### **A healthy workplace is a productive workplace**

- Creating a work environment free of discrimination and harassment is not an easy job, and it is important that you put in all efforts to eliminate as many gray areas as possible.
- As an employer, you may think of a satisfactory salary and numerous other financial benefits as the ultimate motivational factor for employees.

However, creating a pleasant and affirmative environment should be among your top priorities if you want to bring productive and happy employees to the organization.

**In short, we can prevent discrimination by:**

- Educating and training all your workers about what constitutes discrimination
- Train higher-ups like supervisors and managers on how to properly respond to discrimination in the workplace
- Handle any discrimination complaints confidentially and carefully
- Develop a strict workplace policy that does not allow discrimination
- Make sure the workplace policy is properly laid out and enforced
- Review your organization's policies regularly

This constitutes a step forward in the task of keeping a happy and productive workforce that is eager to contribute and increase your profit. Additionally, preventing discrimination will avoid long, complicated investigations, negative impact on company morale and culture, and even high legal bills.

## UNIT-3

### SCIENTIFIC VALUES

Scientific thinking and method: Inductive and Deductive thinking, Proposing and testing Hypothesis, validating facts using evidence-based approach – Skepticism and Empiricism – Rationalism and Scientific Temper.

#### **Scientific thinking and method:**

- The terms “inductive” and “deductive” are often used in logic, reasoning, and science. Scientists use both inductive and deductive research methods as part of the scientific method.
  - Famous fictional detectives like Sherlock Holmes are often associated with deduction, even though that’s not always what Holmes does (more on that later). Some writing classes include both inductive and deductive essays.
  - But what’s the difference between inductive vs deductive research? The difference often lies in whether the argument proceeds from the general to the specific or the specific to the general.
  - Both methods are used in different types of research, and it’s not unusual to use both in one project. In this article, we’ll describe each in simple yet defined terms.
- What is inductive research?
  - Stages of inductive research process
  - What is deductive research?
  - Stages of deductive research process
  - Difference between inductive vs deductive research
  - Conclusion

#### **What is inductive research?**

Inductive research is a method in which the researcher collects and analyzes data to develop theories, concepts, or hypotheses based on patterns and observations seen in the data.

It uses a “bottom-up” method in which the researcher starts with specific observations and then moves on to more general theories or ideas. Inductive research is often used in exploratory studies or when not much research has been done on a topic before.

### Stages of inductive research process

The three steps of the inductive research process are:

#### **1. Observation:**

The first step of inductive research is to make detailed observations of the studied phenomenon. This can be done in many ways, such as through surveys, interviews, or direct observation.

#### **2. Pattern Recognition:**

The next step is to look at the data in detail once the data has been collected. This means looking at the data for patterns, themes, and relationships. The goal is to find insights and trends that can be used to make the first categories and ideas.

#### **3. Theory Development:**

- At this stage, the researcher will start to create initial categories or concepts based on the patterns and themes from the data analysis.
- This means putting the data into groups based on their similarities and differences to make a framework for understanding the thing being studied.
- These three steps are often repeated in a cycle, so the researcher can improve their analysis and understand the phenomenon over time. Inductive research aims to develop new theories and ideas based on the data rather than testing existing theories, as in deductive research.

## What is deductive research?

- Deductive research is a type of research in which the researcher starts with a theory, hypothesis, or generalization and then tests it through observations and data collection.
- It uses a top-down method in which the researcher starts with a general idea and then tests it through specific observations. Deductive research is often used to confirm a theory or test a well-known hypothesis.

## Stages of deductive research process

The five steps in the process of deductive research are:

### **Formulation of a hypothesis:**

- The first step in deductive research is to develop a hypothesis and guess how the variables are related. Most of the time, the hypothesis is built on theories or research that have already been done.

### **Design of a research study:**

- The next step is designing a research study to test the hypothesis. This means choosing a research method, figuring out what needs to be measured, and figuring out how to collect and look at the data.

### **Collecting data:**

- Once the research design is set, different methods, such as surveys, experiments, or observational studies, are used to gather data. Usually, a standard protocol is used to collect the data to ensure it is correct and consistent.

### **Analysis of data:**

- In this step, the collected data are looked at to see if they support or disprove the hypothesis. The goal is to see if the data supports or refutes the hypothesis. You need to use statistical methods to find patterns and links between the variables to do this.

### **Drawing conclusions:**

- The last step is drawing conclusions from the analysis of the data. If the hypothesis is supported, it can be used to make generalizations about the population being studied. If the hypothesis is wrong, the researcher may need to develop a new one and start the process again.
- The five steps of deductive research are repeated, and researchers may need to return to earlier steps if they find new information or new ways of looking at things. In contrast to inductive research, deductive research aims to test theories or hypotheses that have already been made.

### **Difference between inductive vs deductive research**

- The main differences between inductive and deductive research are how the research is done, the goal, and how the data is analyzed.
- Inductive research is exploratory, flexible, and based on qualitative observation analysis.
- Deductive research, on the other hand, is about proving something and is structured and based on quantitative analysis.

Here are the main differences between inductive vs deductive research in more detail:

# DIFFERENCE BETWEEN INDUCTIVE VS DEDUCTIVE RESEARCH



## Inductive Research

1. Bottom-up approach
2. Develops theories from observations
3. Used in exploratory studies
4. Flexible and adaptable to new findings
5. Relies more on qualitative analysis



## Deductive Research

1. Top-down approach
2. Tests theories through observations
3. Used in confirmatory studies
4. Structured and systematic
5. Relies more on quantitative analysis



Topics	Inductive research	Topics	Deductive research
Bottom-up approach	In inductive research, the researcher starts with data and observations, then uses data patterns to develop theories or generalizations.	Top-down approach	In deductive research researcher starts with a theory or hypothesis, then tests it through observations and

	<p>This is a bottom-up approach in which the researcher builds from specific observations to more general theories.</p>		<p>gathering data. This is a top-down approach in which the researcher tests a theory or generalization using specific observations.</p>
<p>Develops theories from observations</p>	<p>In inductive research, theories or generalizations are made based on what has been seen and how it has been seen. The goal is to create theories explaining and making sense of the data.</p>	<p>Tests theories through observations</p>	<p>Deductive research aims to use real-world observations to test theories or hypotheses. The person doing the research gathers data to prove or disprove the theory or hypothesis.</p>
<p>Used in exploratory studies</p>	<p>Inductive research is often used to learn more about a phenomenon or area of interest when there is a limited amount of previous research on the subject. With this method, new theories and ideas can be made from the data.</p>	<p>Used in confirmatory studies</p>	<p>Researchers often use deductive research when they want to test a well-known theory or hypothesis and either prove or disprove it. This method works best when the researcher has a clear research question and wants to test a specific hypothesis.</p>

<p>Flexible and adaptable to new findings</p>	<p>Inductive research is flexible and open to new information because researchers can change their theories and hypotheses based on their findings. This method works best when the research question is unclear, or unexpected results arise.</p>	<p>Structured and systematic</p>	<p>Deductive research is structured and methodical because it uses a research design and method that have already been decided upon. This method starts with a clear plan for the research, making it easier to collect and analyze data more objectively and consistently.</p>
<p>Relies more on qualitative analysis</p>	<p>Inductive research uses more qualitative analysis, like textual or visual analysis, to find patterns and themes in the data.</p>	<p>Relies more on quantitative analysis</p>	<p>Deductive research uses more quantitative methods, like statistical analysis, to test and confirm the theory or hypothesis. This method uses numbers to test the theory or hypothesis and draw objective conclusions.</p>

- Inductive research and deductive research are two different types of research with different starting points, goals, methods, and ways of looking at the data.
- Inductive research uses specific observations and patterns to come up with new theories. On the other hand, deductive research starts with a theory or hypothesis and tests it through observations.

- Both approaches have advantages as well as disadvantages and can be used in different types of research depending on the question and goals.

### **Proposing and testing Hypothesis**

- A hypothesis is a tentative statement about the relationship between two or more variables. It is a specific, testable prediction about what you expect to happen in a study. It is a preliminary answer to your question that helps guide the research process.
- Consider a study designed to examine the relationship between sleep deprivation and test performance.
- The hypothesis might be: "This study is designed to assess the hypothesis that sleep-deprived people will perform worse on a test than individuals who are not sleep-deprived."
- A hypothesis is crucial to scientific research because it offers a clear direction for what the researchers are looking to find.
- This allows them to design experiments to test their predictions and add to our scientific knowledge about the world.
- This article explores how a hypothesis is used in psychology research, how to write a good hypothesis, and the different types of hypotheses you might use.

### **The Hypothesis in the Scientific Method**

In the scientific method, whether it involves research in psychology, biology, or some other area, a hypothesis represents what the researchers think will happen in an experiment.<sup>1</sup> The scientific method involves the following steps:

1. Forming a question
2. Performing background research
3. Creating a hypothesis
4. Designing an experiment
5. Collecting data
6. Analyzing the results
7. Drawing conclusions
8. Communicating the results

- The hypothesis is a prediction, but it involves more than a guess. Most of the time, the hypothesis begins with a question which is then explored through background research. At this point, researchers then begin to develop a testable hypothesis.
- Unless we are creating an exploratory study, our hypothesis should always explain what we *expect* to happen.
- In a study exploring the effects of a particular drug, the hypothesis might be that researchers expect the drug to have some type of effect on the symptoms of a specific illness. In psychology, the hypothesis might focus on how a certain aspect of the environment might influence a particular behavior.
- Remember, a hypothesis does not have to be correct. While the hypothesis predicts what the researchers expect to see, the goal of the research is to determine whether this guess is right or wrong. When conducting an experiment, researchers might explore numerous factors to determine which ones might contribute to the ultimate outcome.
- In many cases, researchers may find that the results of an experiment *do not* support the original hypothesis. When writing up these results, the researchers might suggest other options that should be explored in future studies.

### **Hypothesis Format**

- In many cases, researchers might draw a hypothesis from a specific theory or build on previous research.
- For example, prior research has shown that stress can impact the immune system. So, a researcher might hypothesize: "People with high-stress levels will be more likely to contract a common cold after being exposed to the virus than people who have low-stress levels."
- In other instances, researchers might look at commonly held beliefs or folk wisdom. "Birds of a feather flock together" is one example of folk adage that a psychologist might try to investigate.
- The researcher might pose a specific hypothesis that "People tend to select romantic partners who are similar to them in interests and educational level."

## Elements of a Good Hypothesis

So how do you write a good hypothesis? When trying to come up with a hypothesis for your research or experiments, ask yourself the following questions:

- Is your hypothesis based on your research on a topic?
- Can your hypothesis be tested?
- Does your hypothesis include independent and dependent variables?

Before you come up with a specific hypothesis, spend some time doing background research. Once you have completed a literature review, start thinking about potential questions you still have. Pay attention to the discussion section in the journal articles you read. Many authors will suggest questions that still need to be explored.

## How to Formulate a Good Hypothesis

To form a hypothesis, you should take these steps:

- Collect as many observations about a topic or problem as you can.
- Evaluate these observations and look for possible causes of the problem.
- Create a list of possible explanations that you might want to explore.
- After you have developed some possible hypotheses, think of ways that you could confirm or disprove each hypothesis through experimentation. This is known as falsifiability.

## Falsifiability of a Hypothesis

- In the scientific method, falsifiability is an important part of any valid hypothesis. In order to test a claim scientifically, it must be possible that the claim could be proven false.
- Students sometimes confuse the idea of falsifiability with the idea that it means that something is false, which is not the case. What falsifiability means is that *if* something was false, then it is possible to *demonstrate* that it is false.
- One of the hallmarks of pseudoscience is that it makes claims that cannot be refuted or proven false.

## **The Importance of Operational Definitions**

- A variable is a factor or element that can be changed and manipulated in ways that are observable and measurable. However, the researcher must also define how the variable will be manipulated and measured in the study.
- Operational definitions are specific definitions for all relevant factors in a study. This process helps make vague or ambiguous concepts detailed and measurable.
- For example, a researcher might operationally define the variable "test anxiety" as the results of a self-report measure of anxiety experienced during an exam. A "study habits" variable might be defined by the amount of studying that actually occurs as measured by time.
- These precise descriptions are important because many things can be measured in various ways. Clearly defining these variables and how they are measured helps ensure that other researchers can replicate your results.

## **Replicability**

- One of the basic principles of any type of scientific research is that the results must be replicable.
- Replication means repeating an experiment in the same way to produce the same results. By clearly detailing the specifics of how the variables were measured and manipulated, other researchers can better understand the results and repeat the study if needed.
- Some variables are more difficult than others to define. For example, how would you operationally define a variable such as aggression? For obvious ethical reasons, researchers cannot create a situation in which a person behaves aggressively toward others.
- To measure this variable, the researcher must devise a measurement that assesses aggressive behavior without harming others. The researcher might utilize a simulated task to measure aggressiveness in this situation.

## **Hypothesis Checklist**

- Does your hypothesis focus on something that you can actually test?
- Does your hypothesis include both an independent and dependent variable?
- Can you manipulate the variables?

- Can your hypothesis be tested without violating ethical standards?

## Hypothesis Types

The hypothesis you use will depend on what you are investigating and hoping to find. Some of the main types of hypotheses that you might use include:

- **Simple hypothesis:** This type of hypothesis suggests there is a relationship between one independent variable and one dependent variable.
- **Complex hypothesis:** This type suggests a relationship between three or more variables, such as two independent and dependent variables.
- **Null hypothesis:** This hypothesis suggests no relationship exists between two or more variables.
- **Alternative hypothesis:** This hypothesis states the opposite of the null hypothesis.
- **Statistical hypothesis:** This hypothesis uses statistical analysis to evaluate a representative population sample and then generalizes the findings to the larger group.
- **Logical hypothesis:** This hypothesis assumes a relationship between variables without collecting data or evidence.

## Hypotheses Examples

- A hypothesis often follows a basic format of "If {this happens} then {this will happen}." One way to structure your hypothesis is to describe what will happen to the dependent variable if you change the independent variable.
- The basic format might be: "If {these changes are made to a certain independent variable}, then we will observe {a change in a specific dependent variable}."

### A few examples of simple hypotheses:

- "Students who eat breakfast will perform better on a math exam than students who do not eat breakfast."
- "Students who experience test anxiety before an English exam will get lower scores than students who do not experience test anxiety."
- "Motorists who talk on the phone while driving will be more likely to make errors on a driving course than those who do not talk on the phone."

- "Children who receive a new reading intervention will have higher reading scores than students who do not receive the intervention."

**Examples of a complex hypothesis include:**

- "People with high-sugar diets and sedentary activity levels are more likely to develop depression."
- "Younger people who are regularly exposed to green, outdoor areas have better subjective well-being than older adults who have limited exposure to green spaces."

**Examples of a null hypothesis include:**

- "There is no difference in anxiety levels between people who take St. John's wort supplements and those who do not."
- "There is no difference in scores on a memory recall task between children and adults."
- "There is no difference in aggression levels between children who play first-person shooter games and those who do not."

**Examples of an alternative hypothesis:**

- "People who take St. John's wort supplements will have less anxiety than those who do not."
- "Adults will perform better on a memory task than children."
- "Children who play first-person shooter games will show higher levels of aggression than children who do not."

**Collecting Data on Your Hypothesis**

Once a researcher has formed a testable hypothesis, the next step is to select a research design and start collecting data. The research method depends largely on exactly what they are studying. There are two basic types of research methods: descriptive research and experimental research.

## Descriptive Research Methods

- Descriptive research such as case studies, naturalistic observations, and surveys are often used when conducting an experiment is difficult or impossible.<sup>5</sup> These methods are best used to describe different aspects of a behavior or psychological phenomenon.
- Once a researcher has collected data using descriptive methods, a correlational study can examine how the variables are related. This research method might be used to investigate a hypothesis that is difficult to test experimentally.

## Experimental Research Methods

- Experimental methods are used to demonstrate causal relationships between variables. In an experiment, the researcher systematically manipulates a variable of interest (known as the independent variable) and measures the effect on another variable (known as the dependent variable).
- Unlike correlational studies, which can only be used to determine if there is a relationship between two variables, experimental methods can be used to determine the actual nature of the relationship—whether changes in one variable actually *cause* another to change.
- Why and how evidence-based practice has become distorted in practice, and what to do about it.
- We present qualitative data from an action research project in policing to highlight tensions between the rhetoric and reality of evidence-based practice, and the ways in which evidence-based practice's seductive catchphrase 'what works' is being understood and applied.
- Through the lens of care ethics, we integrate 'what matters' with 'what works', and 'what matters/works here' with 'what matters/works everywhere'. This approach recognizes relational expertise, practical reasoning and critical inquiry as vital for evidence-based practice in practices of social intervention.
- Drawing on key care ethics motifs, we suggest that care is the ethical scaffolding upon which social justice relies, and hence crucial to organs of security, peacekeeping and law enforcement.

- From this position, we argue that policing might renegotiate its difficult relationship with the particular, recasting it from something uncomfortably discretionary (the maverick cop) and shameful (an individualized blame culture) into something that underpins and enhances police professionalism.
- While developed in a policing context, these reflections have a broader relevance for questions of professional legitimacy and credibility, especially within the ‘new professions’, and the costs of privileging any one type of understanding over others.

### **EBP in policing**

- Within policing, the EBP debate is especially lively. In the UK, the case for EBP is often connected with the police professionalism agenda, where this is understood to refer to the codification of practice, the value and prestige of externally-recognized qualifications, and evaluation of performance based on standards established and supported by research (Brown et al., 2018; Green and Gates, 2014).
- It is associated with the establishment in 2012 of the College of Policing, which is seen ‘as the “what works?” clearing house for “policing and crime”’.
- More skeptical voices argue that a narrow focus on ‘what works misrepresents the breadth of policing and the many ways in which police decisions both influence and are influenced by the values of society in general and individual community dynamics in particular.
- Greene suggests that the ‘why’ questions in policing are especially complex, involving legal, regulatory, cultural, geographical, political, psychological and many other factors; and ‘as a consequence, answers to the questions of “why” in policing are rarely singular.
- Therefore, when EBP is narrowly equated with methods hierarchies and the so-called ‘gold standard’ of the randomized control trial it can only reflect a sub-set of police functions and activities.
- It might be effective for evaluating crime-reduction initiatives, but it has less to contribute to the moral, ethical and psychological aspects of policing, such as its function as container for society’s unresolved anxieties, neuroses and value conflicts.

## Methods

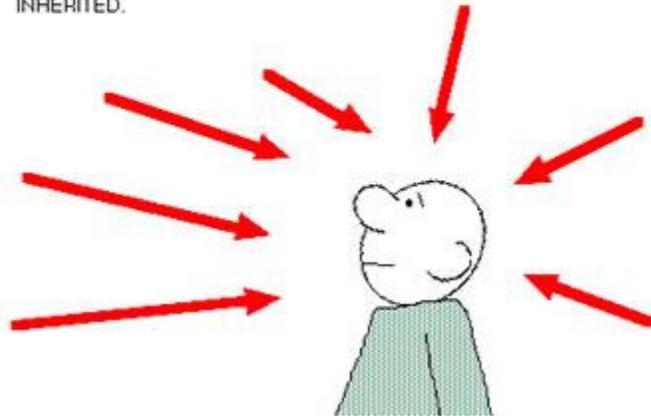
- We collected two types of qualitative data: interview and participative-ethnographic. The former consists of data from semi-structured one-to-one interviews, which lasted between 20 and 82 minutes.
- These were audio-recorded, transcribed and thematically analyzed.
- The latter comprises different data outputs and artefacts resulting from our participation in practice, from where we have observed, challenged, shaped and delivered a range of initiatives, including staff development events, board presentations, consultations with key stakeholders such as regulators and staff representatives, and the establishment of a new network of learning champions.
- The data from this participative-ethnography strand were not typically audio-recorded. Instead, we took detailed notes both during and immediately after our many meetings and research encounters.
- This was both because recording would have made these events feel stilted and because of the sheer scale of this participative-ethnography, which amounted to over 200 days of engagement over the four-year period.
- The research took place in three phases. Phase one (September to December 2017) consisted of a scoping study to identify the key interests and concerns for our main group of sponsors and members of a newly established organizational learning steering group.
- In phase two (January 2018 to June 2019), we conducted most of the field research, socializing, testing and refining our findings as we progressed.
- In phase three (July 2019 to July 2021), we supported the implementation of new ways of working with organizational learning and EBP, based on this research.
- In all three phases, the first author was a member of the new steering group, and used this position to present syntheses of the findings and to facilitate challenge and discussion.
- Developing the ideas for this article has involved working abductively between the questions and concerns identified at the outset of the project and those that emerged as the work progressed and the engagement deepened.
- Abduction is an iterative process of observing, interpreting, shaping, applying and refining.
- When deployed in the context of dialogical reflexive action research, it seeks to elicit possibilities of understanding rather than test any specific hypothesis or validate (or invalidate) any particular area of the literature on a topic.

- For this project, the topic of EBP was identified as a key research question during the initial scoping study; but the specific focus of the work we present here results from working iteratively between theoretical and empirical domains and between the letter and the spirit of organizational practice.
- In the section below, we present our findings on how EBP is being understood and enacted in practice. Sometimes these findings arise through direct questioning (e.g. ‘what does the idea of “learning from the best available evidence” mean to you?’).
- At other times, they emerge more naturalistically and inductively, highlighting patterns of association and evaluation in our participants’ own frames of reference. We focus in particular on working definitions of the key concepts of ‘what works’, ‘learning from evidence of what works’, ‘learning from the evidence’, ‘learning from the best available evidence’ and, to a lesser extent, ‘what matters.
- Skepticism is a more interrogative approach that casts immediate doubt on the proposed reasoning and always assumes there is more to be learned than that which has already been revealed. Skeptics also consider the strong possibility for deception and misleading information while naturally seeking the true information in these and all cases.
- Skepticism is also concerned with the boundaries of human knowledge or the existence of information in general, while it is also slow to form decisions and is even patient in doing so when there is a clear lack of data. One of the most important parts of philosophy with regards to skepticism is to first consider the conditions where skepticism is the best viewpoint to assume.
- For those that call themselves skeptics, of course, this is not a decision that is to be made.
- Ultimately, there is no best answer. Each view has its strong points, as empiricism relates to the human experience in attempt to best relate information, rationalism seeks for the best reasoning, and skepticism does its best to remove faulty methods of thinking and generally bad or untrue information.
- Each strength is useful, and one cannot say one is best without ignoring critical aspects of another. Knowledge is a broad subject that must be approached from many angles, and none of these viewpoints are significantly better than the other as an all-purpose solution to assimilating information.

**Key Difference:** Empiricism and Skepticism are two different concepts that have primarily to do with belief. Empiricism refers to the concept that knowledge comes only or primarily from sensory experience. Skepticism refers to someone who doubts the authenticity or veracity of something.

### **EMPIRICISM**

ALL KNOWLEDGE OBTAINED  
THROUGH SENSES - NOT  
INHERITED.



- Empiricism and Skepticism are two different concepts that have primarily to do with belief. Both are philosophies that deal with finding out the truth.
- However, they differ in the manner in which they look for and deal with the information or knowledge presented to them. Yet, they are more similar than more people realize.
- Empiricism is a philosophical concept. The term derives from the Greek word, 'empeiria', which translates to the Latin 'experiential'.
- This in turn leads to the words 'experience' and the related 'experiment' in English. Hence, empiricism refers to the concept that knowledge comes only or primarily from sensory experience, i.e. the five senses.
- According to empiricism, all knowledge is derived from what we observe and experience in the world around us. If we cannot see it, experience it, or prove it, it does not exist.
- The term skepticism has taken up place in common parlance. Here, it typically refers to someone who doubts the authenticity or veracity of something.

- For example: Adam is skeptical of the numbers in the spreadsheet. However, that is not exactly what the term means originally in the context of philosophy.
- The term skepticism comes from the classical Greek verb, ‘skeptomai’, which basically means "to search", the implication being searching, but not finding.
- Hence, there are people out there that claim that skepticism, at least in its original context, has nothing to do with doubt, disbelief, or negativity, but rather is about searching for the truth. It is the process of ‘finding a supported conclusion, not the justification of a preconceived conclusion.’
- It can be said that it is the process of applying reason and critical thinking to determine validity of something, even if it is taken by fact by the public.
- So, in summary, empiricism is a theory that states that knowledge comes only or primarily from sensory experience, which means that it emphasis proving something as fact either by experience or by experiment before believing it as fact. Skepticism, on the other hand, doubts the veracity of something and search for the truth.
- Looking their definitions, it can be said that the two terms have a lot more in common that they are often given credit for.
- While the terminology or process might differ, both empiricism and skepticism at their core are methods to look for or search for the truth.
- However, the way in which they approach to the truth differs, empiricism looks at experience, experimentation, and evidence to prove that something is true, while skepticism doubts everything until it is proven otherwise.
- Additionally, empiricism is also commonly associated with science and research, and has directly culminated into the scientific method which requires that everything be first proven though a strict scientific process that can be replicated before it is accepted as fact.
- Skepticism, on the other hand, is associated with various other fields, for example: moral skepticism, religious skepticism, skepticism of knowledge, etc.

- In each regard, it refers to doubting concepts in that field, such as moral skepticism doubts morality, religious skepticism doubts the existence of God, while skepticism of knowledge doubts the nature of knowledge.

There is also a field referred to as scientific skepticism that doubts testing beliefs for reliability and requires them to be subjected to systematic investigation using the scientific method, in order to discover empirical evidence for them.

### Comparison between Empiricism and Skepticism:

	<b>Empiricism</b>	<b>Skepticism</b>
Definition(Oxford Dictionaries)	The theory that all knowledge is based on experience derived from the senses. Stimulated by the rise of experimental science, it developed in the 17th and 18th centuries, expounded in particular by John Locke, George Berkeley, and David Hume.	A skeptical attitude; doubt as to the truth of something  The theory that certain knowledge is impossible
Description	A theory that states that knowledge comes only or primarily from sensory experience.	Any questioning attitude or doubt towards one or more items of putative knowledge or belief.
Derived From	Derives from the Greek word ἐμπειρία, empeiria, which is cognate with and translates to the Latin experientia, from which are derived the word	Derives from the classical Greek verb, skeptomai, "to search", implying searching but not finding.

	experience and the related experiment.	
Type of	Philosophical Theory	Philosophical Theory
Related Fields	Science, Research, IT	Morality, Religious, Knowledge, Science, Research

- There is a popular misconception that rationalism is just a denial of the existence of god and religion in any form. Rationalists are not just propagandists of atheism or crusaders against god. That is a negative view of rationalism.
- But rationalism is of positive attitude to do good to human beings by promoting ethics, self-knowledge, self-discipline and self-development.
- Rationalism is a battle to liberate humanity from ignorance, religious prejudice and superstition. Its main business is to make the discovered truths available to all and induce everybody to draw his own rational conclusions about the meaning, purpose and conduct of life.
- The accepted definition of rationalism evolved as early as 1899 is:- It is the mental attitude, that unreservedly accepts the supremacy of reason, and aims at establishing a system of philosophy and ethics verifiable by experience and independent of all arbitrary assumptions of authority.
- Speaking of ‘Rationalism’, Gowans Whyte states: “Rationalism”, as an intellectual movement, does not offer a ready-made creed to replace the religious creeds in which most people have been brought up.
- Was it to do so, it would be attempting to impose the same sort of official authority as the churches and to discharge the free exercise of Individual reason?
- Its proper business is to make the discovered truth available to all and to induce everybody to draw his own rational conclusions about the meaning, the purpose and conduct of life.

- Late D.M.K. Chief Annadurai says: “Rationalism does not mean repudiation of basic or fundamental truths and maxims, but the annihilation of dubious modes of thought and action”.
- Rationalism is not a system or a faith or a creed ready to be handled like a measuring rod. It is an attitude of mind. It is a movement of ideas.
- It is not an academic exercise indulged by the learned few. It is concerned with the people and community in all its aspects. Its task is to show the approach of reason to all problems of individual and his social life. It lays down the foundation of a new philosophy of life.
- It provides an alternative way of life and/ or philosophy for those who desire to throw away orthodox religion and morals based on fear of god. It is not a creed or set of dogmas, religious or philosophical.
- Its main task is the diffusion of sound knowledge. Since rationalism is mainly an attitude of mind, continuance of that attitude is essential to sustain efforts required for rationalists to keep abreast of the growth of knowledge, for that alone will prevent rationalism from getting rusty and unserviceable.
- The values that rationalism gathers are not permanent for all time to come.
- It calls for a constant and vigilant recasting of morals and other values to suit the changing pattern of society.
- Rationalism is not a negative approach:
- It is not mere denial of the existence of god, it is a philosophy by itself like Buddhism, Jainism, Confucianism as propounded by their founders. It is a struggle against injustice, inequality and slavery.
- It is a quest for truth and social reform. Rationalism and humanism are a realistic alternative to theology.
- It attempts to transcend divisive, parochial loyalties based on caste, race, religion, nationality, creed, class, or ethnicity. It strives to work together for the common good of humanity.

- It nourishes common moral excellence like altruism, integrity, honesty, truthfulness, reason, compassion etc.
- It stands for belief in optimism rather than pessimism, hope rather than despair, learning in place of dogma, truth instead of ignorance, tolerance in place of fear, love instead of hatred, compassion over selfishness, reason over blind faith. Rationalist propaganda is the only solution to liquidate blind faith.

### **Aims and objectives of Rationalism**

- Rationalism aims at the development of potentialities of the individual with freedom and independence.
- Its endeavor is to achieve the ideal of social freedom and to create a new renaissance.
- Its main objective is to liberate human thought from the limitations of caste, creed, religion, and nationality.
- Rationalism promotes an attitude of optimism, which helps to develop healthy and dynamic minds to overcome any crisis.
- It emphasizes the dignity and work of man as man and his potential capacity to build a peaceful, decent world where there is no exploitation of man and where hunger, poverty and racial prejudices do not exist.
- Aristotle was the first philosopher who defined man as a rational being. He taught that rationality differentiates man from animal.
- Animals act from instinct while human beings are endowed with the faculty of reasoning, which governs their conduct and action. Rationalism regards reason as the chief source and test of knowledge.
- Rationalism holds reason to be a faculty that can lay hold of truth, beyond the reach of sense perception.
- For example, if democracy is considered to be the best form of government, rationalism demands that it must be shown to the people how this belief stands to reason.

- Rationalism wants people to learn to govern themselves by reason, as it is a supreme and innate human quality, which can be applied to the shaping of our future.

### **How Rationalism can neutralize casteism:**

- The Caste-based social system has assigned a hierarchical position to each caste and the result of this feeling of superiority and inferiority based on birth have been deeply embedded in the minds of the people.
- This in turn has led to the disappearance of the spirit of brotherhood, oneness, and comradeship in our society.
- Rationalism affirms that humanity is one and indivisible.
- It emphasizes that, every human being is entitled to equality of status and equality of opportunity in every sphere of life irrespective of his caste or creed.
- It wages a war on the false theory of superiority and inferiority attached to birth, and declares that the unjust social order of caste must go in the interest of social justice and human solidarity.
- Rationalism can effectively take up the creation of a new social order without caste.
- How Rationalism can counter communalism and religious fundamentalism
- Religious fundamentalism in India today displays the most incendiary form of intolerance towards other religions.
- It challenges the very fundamentals of our conception of a secular state.
- It is the greatest enemy of national integration in multilingual and multi-religious country that is India. Rationalism inculcates the spirit of tolerance and promotes universal brotherhood. It promotes humanism with a natural and scientific approach to our problems.
- A rationalist by training and temperament is governed by reason. A man of reason has tolerance and understanding.
- A man of understanding can never be aggressive in his thought or action. Religious bigotry or religious intolerance has no place in the minds of rationalists.

- Hence rationalism is the best antidote to communalism and religious fundamentalism.
- If the doors, windows, ventilators of our brain are allowed to open, there will be free flow of thoughts and then we will think freely.
- First, we should make people think. When they think, they start questioning; when they start questioning reasoning commences.
- One tries to get answers. Newton could give us the theory of gravitational pull by questioning why an apple falls down on the ground instead of going up.
- Great thinkers like Periyar, Ingersoll, Bertrand Russell and others have not accepted anything for granted.
- They questioned every statement with a probing mind and realized the truth that there cannot be any supernatural power called 'god'.
- "Reason is the light, the sun of the brain. It is the compass of the mind, the ever constant northern star, the mountain peak that lifts itself above all clouds".
- Any man who stands for progress has to criticize, disbelieve and challenge every item of the old faith.
- A man who claims to be a realist has to challenge the whole of the ancient faith. Item by item he has to reason out every nook and corner of the prevailing faith. Reasoning is the guiding star of one's life.
- Mere faith and blind faith is dangerous. It dulls the brain and makes a man reactionary.
- Here is what Shaheed Bhagat Singh says, "Study was the cry that reverberated in the corridors of my mind, study to enable yourself to face the arguments advanced by the opposition. Study to arm yourself with arguments in favour of your cult.
- When I began to study, my precious faith and convictions underwent remarkable modifications."
- When reasoning commences, man arrives at the conclusion that the so-called holy books are not sacred. He no more considers them as holy.

- He no more considers them as containing the knowledge revealed by certain chosen men of god, Prophets or god's son or his angels in the language known to them.
- He no more considers that these chosen men are god's men or so-called prophets are chosen by god.
- He comes to know that they are all utterances of so-called god's men or prophets in their delusion or trance and written by human beings at various stages, at various thinking levels.
- Most of them are mystics. Saint Paul was one, Mohammed another, Chaitanya was yet another, Dostoveski a fourth, Ramakrishna a fifth and the list can easily be made much longer.
- He will come to the conclusion that religions are creations of human imagination.
- With the view to making people non-skeptic, the so-called holy men and their henchmen propagated that they contain sacred knowledge revealed by god, and therefore not subject to questioning.
- Most religions of the world do not want reason. Everyman should be allowed to investigate to the extent of his desire and his ability. There is no real investigation without freedom from the fear of gods and men.

### **Rationalism and scientific temper:**

- Rationalism is fundamentally the tendency of human beings to ask questions and look for solutions to the different aspects of reality.
- It is a phenomenon that stimulates awareness and prompts questioning. In reaction to philosophical movements, rationalism thrived.
- It places a lot of focus on applying logic to evaluate facts and concepts. Rationality is applied in the majority of domains of life.
- Although there are many various views on what rationality is? It is widely accepted that it is the capacity to learn from the failures and successes of the past.

- Rationality is the result of a critical mind. Being rational requires the ability to think critically.
- It is the capacity to assess a claim, viewpoint, or ideas critically and decide if it is true or false. Rationality requires a logical mind and the capacity for critical thought.
- Rationality promotes scientific temperament in the individual.
- Scientific temperament enables people to raise the question of what exists in the universe.
- Scientific invention, discovery and exploration are all the outcome of human rationality. Rationalism is the very fundamental essence of humanity.
- When the light of rationality illuminates the human brain, intellectualism takes birth. The rise of rationalism is the renaissance which happened during the 14<sup>th</sup> to 17<sup>th</sup> century in Europe.
- Following the Middle Ages, Europe had a passionate era of cultural, artistic, political, and economic "rebirth" during the Renaissance.
- The Renaissance, often seen as occurring between the 14th and the 17th centuries, fostered the rediscovery of ancient philosophy, literature, and art.
- The Renaissance was basically the rise of rationalism. Every intellectual perspective became more visible under the illumination of rationalism.
- Article 51 A(h), of the Fundamental Duties (FDs) which was introduced in the Indian constitution in the 42<sup>nd</sup> Constitutional Amendment Act, 1976. It is the responsibility of every Indian citizen to develop scientific temper, humanism and the spirit of inquiry and reform. The spirit of inquiry is basically promoting rationalism in human beings.
- If we want to know the reality of the universe or cosmos, then our approach should be rational. The truths about who we are, the world we live in, and the cosmos may be discovered if we think logically and rationally.
- Truth and reason go hand in hand. It is not possible to imagine one exist without the other.

- Rationality is continually looking for reality, and reality can only be found in the light of rationality.
- The Indian legal system is based on the principle of rationality. Judges attempt to make judgements based on evidence rather than preconceived notions, emotions, and sentiments. Rationality serves as the standard by which reality is evaluated.
- Rationality is continually trying to give truth the upper hand and truth is real. Thus, what is rational is also real, and vice versa.
- Rational people may attain their life objectives by having the ability to control their thoughts and conduct.
- They have the self-control to avoid engaging in unhealthy life habits such as drinking alcohol or disordered eating, and they are able to make rational judgments without letting their emotions affect them.
- A logical mind constantly thinks calmly, attentively, and objectively. It may be said that everyone with a rational mind has this as their ultimate goal.
- If you consistently participate in rational thinking, you can base your conclusions on facts and evidence. Using reason, you can recognize bad conceptions and practices.
- We may better comprehend ourselves and those of others who surround us by using rational thought.
- It can also help us succeed since we can comprehend realities regarding true desires instead of becoming sidetracked or behaving unreasonably. Although full objectivity will never exist, logical thought is still possible.
- As far as objectivity is concerned, rationality encourages individuals to make informed decisions. Setting feasible micro and macro goals is the fundamental indicator of being rational, and one should be proud of one's capacity for logical thought.
- If you want to succeed, you must be rational.

- Rational people refrain from making mistakes they'll later regret. They frequently make sound decisions because they thoroughly consider all of their possibilities.
- Rational individuals have unique and clear views on the purpose and vision of life. Arguments need to possess the quality of truthfulness.
- A belief possesses the quality of truth when it accords with reality. Similar to this, it is asserted that a belief is false when it is inconsistent with reality.
- Knowing the truth is necessary in order to tell it.
- To determine what is right and what is not, one must exercise rationality.
- However, reason and the application of reason also lead to truth. While we may experience some of the truths that exist both inside and outside of us, these truths are not reliant on our understanding or our capacity to perceive them.
- The truth exists without our intervention. We can comprehend things because we can think about them rationally.
- The seeker of truth cannot ignore the search for reason because finding based on emotions and our feelings generally ignores reality and truth.
- The ideal circumstance is one in which you are free to choose solely what is best for you, without taking into account the repercussions or any other factors. When we are logical, we may draw conclusions that are in our own best interests.
- When we act impulsively, our judgments typically reflect our emotions instead of reality or reason. We can end up making poor decisions about our finances or even our interpersonal relationships as a result of this.
- As a result of their illogical behavior, this can cause them to make one poor decision, which might cause them to experience financial insecurity.
- Financial matters need more accurate decisions.

- Accuracy in decision making depends on basic information and conceptual clarity.
- Conceptual clarity and basic information bring the ability to think and make decisions rationally.
- Poor financial choices frequently lock people in a cycle of poverty where they are unable to advance because they continue to spend more than they bring in.
- People who get into this debt trap frequently end themselves in even more debt because they use credit cards and other types of credit to pay off debts from earlier purchases while acting irrationally, which causes them to slip into the debt trap.
- The rational is real, and the real is rational. Both reality and rationality are true. It very clearly signifies how reason and reality both complement one another.
- Considering that there are two viewpoints on truth, real and rational. Both viewpoints come to the same conclusion: both reality and reason are true.
- It is essential to understand how these factors interact. Creating arguments, drawing conclusions, and identifying causes and consequences are all aspects of rational justification, which is the main focus of rationality.
- In other words, thinking and emotion are both involved in reasoning.

***Three Things cannot be Long Hidden:***

***The Sun, The Moon, and The Truth.***

## UNIT-IV

### Social Ethics

Application of ethical reasoning to social problems – Gender bias and issues – Gender violence – Social discrimination – Constitutional protection and policies – Inclusive practices

#### **Social Ethics:**

- Social ethics is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.
- It involves the application of ethical reasoning to social problems, addressing issues such as the distribution of economic goods, research on human subjects, animal rights, euthanasia, abortion, discrimination and affirmative action, pornography, crime and punishment, and war and peace.
- Social ethics examines problematic social conditions, analyzes possible actions to address these conditions, and prescribes solutions based on ethical norms and values.
- It can be understood as both focusing on the policies and practices of social institutions and recognizing the influence of social contexts on individual moral choices.
- Social ethics is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.
- Social ethics can be thought of as the application of ethical reasoning to social problems, such as the distribution of economic goods, euthanasia, abortion, discrimination, crime and punishment, and war and peace.
- Social ethicists study social conditions, analyze options for addressing problems found in those conditions, and prescribe solutions for resolving those problems.

#### **Application of ethical reasoning to social problems:**

##### **Gender bias and issues:**

- Gender bias is the tendency to give preferential treatment to one gender over another.
- It is a form of unconscious bias, which occurs when someone unconsciously attributes certain attitudes and stereotypes to a group of people.

- Bias is prevalent in every aspect of our lives. Our brains are hardwired to categorize things we encounter in order to make sense of the complicated world around us.
- However, biases can cause us to form prejudices against others, which allows for egregious inequalities to form between different demographics.
- While bias comes in many forms, this article focuses on gender bias and its role within the workplace.
- We'll cover what it is, where and when it happens, along with 14 ways you can reduce gender bias and ultimately build a more diverse and inclusive workplace.
- It should be noted that, while there is a spectrum of gender identities, due to constraints within existing literature we'll focus on the gender binary of men and women.
- Gender bias is the tendency to prefer one gender over another. It is a form of unconscious bias, or implicit bias, which occurs when one individual unconsciously attributes certain attitudes and stereotypes to another person or group of people.
- These biases can affect how the individual understands and engages with others.
- In today's society, gender bias is often used to refer to the preferential treatment men receive specifically white, heterosexual men. It's often labeled as sexism and describes the prejudice against women solely on the basis of their sex.
- Gender bias is most prominently visible within professional settings.
- Another term often used interchangeably with gender bias is gender discrimination, which is the unequal treatment of a person or group of people because of gender-based prejudice.
- In addition to gender bias, there are a number of other types of unconscious bias that disproportionately affect women's success in the workplace, which include:

### **Performance Support Bias**

- Performance support bias occurs when employers, managers and colleagues provide more resources and opportunities to one gender (typically men) over another.
- One study found that, among sales employees — who are paid based on performance and commission — women are unfairly assigned inferior accounts compared to men, even though women have proven to produce the same results when given equivalent sales opportunities.

## **Performance Review Bias**

- Performance review bias occurs when employers, managers and colleagues review an employee of one gender differently from another gender — even when the evaluations are purely merit-based.
- Harvard Business Review found that performance evaluations are inherently biased, even when companies make an effort to remove bias by making them open-ended. In fact, without structure to evaluations, people are more likely to review an individual on the basis of stereotypes related to gender and race than reviewing individuals based on merit.

## **Performance Reward Bias**

- Performance reward bias occurs when employers, managers and colleagues reward an employee of one gender differently from another gender. Rewards may be in the form of promotions, raises or other merit-based rewards.
- While it may seem like rewarding individuals on merit would help eliminate gender bias, it's not as cut-and-dry as you think.
- One study found that when women and minorities receive the same exact performance evaluation score as white men for the same job and work unit, they receive lower pay increases than white men.

## **Glass Ceiling**

- A major result of these biases have contributed to the creation of the glass ceiling. The glass ceiling is a metaphor for the evident but intangible hierarchical impediment that prevents minorities and women from achieving elevated professional success.
- Due to contributing factors, like the aforementioned types of bias, women and minorities experience a barrier that prevents them from reaching upper-level roles in leadership and the C-suite.
- With the basics of gender bias down, let's review some statistics to see where and how such biases affect women in the workplace.

## Gender Bias Statistics

To further illustrate the role gender bias plays in the office, we've gathered a number of statistics related to diversity and gender bias in the workplace:

- 42 percent of women experience gender discrimination at work.
- In 2022, 59 percent of women said they had experienced harassment or microaggressions at work in the past year.
- 93 percent of women say they fear that reporting non-inclusive behaviors at work will have a negative effect on their career.
- Globally, almost 50 percent of people believe men are better political leaders, while more than 40 percent see men as better business executives.
- In fiscal year 2022, 19,805 charges were filed with the U.S. Equal Employment Opportunity Commission for sex-based discrimination.
- Both men and women are twice as likely to hire a male candidate.
- Women are 79 times more likely to be hired when there are at least two female candidates in the finalist pool.
- Half of men believe women are well-represented at their company, when 90 percent of senior leaders are men.
- Men are 30 percent more likely to obtain managerial roles.
- Women and men ask for pay raises at the same rate, but women receive them 7 percent less often.
- Companies with executive teams in the top quartile for gender diversity are 25 percent more likely to see above-average profitability.
- 5 percent of CEOs globally are women.
- Women represent just over 28 percent of boardroom seats.
- 19.2 percent of C-suite roles are filled by women.
- 5 percent of C-suite roles are held by women of color.
- 10.4 percent of CEOs at Fortune 500 companies are women.
- As of 2023, women of color make up 1 percent of CEOs at Fortune 500 companies.

## **Examples of Gender Bias in the Workplace**

When it comes down to it, gender bias can happen at all stages of recruiting, hiring and retaining employees. In this section, we're going to break down some key areas where gender bias affects candidates and their careers.

### **Many Recruiting Strategies are Biased**

- Throughout the recruiting process, there can be traces of gender bias, starting with where and how you recruit candidates.
- Looking for a job after graduating college, Erin McKelvey didn't receive a single response from employers. When she changed her name from Erin (historically a feminine name) to Mack (considered a more masculine name) on her resume, she received a 70 percent response rate.
- Additionally, employers may unconsciously (or consciously) place open roles on platforms with predominantly male candidates or actively target men through ads. Aside from being unethical, know that this is also illegal.

### **Job Descriptions Contain Gender Bias**

- Even something as mundane as a job description contains traces of unconscious bias. Language inherently has gendered associations.
- Including words like confident, decisive, strong and outspoken have been found to attract male candidates and deter female candidates.
- Research also shows that men apply to jobs where they meet 60 percent of the qualifications while women only apply to jobs when they meet 100 percent of the qualifications.
- Meaning, if your job description has a lot of unnecessary or strict requirements, you are unintentionally weeding out women from applying to your open roles.

## **Interview Questions Can Be Gender Biased**

- When interviews are not standardized, the questions interviewers ask can be biased based on the candidate's personality, experiences and even gender.
- One study found that hiring managers tend to ask male candidates to perform more math-based interview tests and female candidates more verbal interview tests.
- Hiring managers are also more likely to ask female candidates about parental plans and responsibilities. While discriminating against parents and pregnant people is illegal, asking questions about a candidate's parental status technically isn't illegal.

## **Hiring Managers Are Unconsciously Gender Biased**

- One study found that when candidates were assessed separately by individual hiring managers, 51 percent of managers were influenced by the candidate's gender and selected the under-performing candidate.
- However, when candidates were evaluated by a hiring team together, gender didn't affect their decision, they simply hired the highest performing candidate.
- Additionally, during the interview, hiring managers tend to ask more targeted questions about a female candidate's leadership abilities and unconsciously prefer more masculine leadership styles.

## **Gender Bias Can Influence Mentors and Mentoring Opportunities**

- It's clear that gender biases play a significant role in women's ability to excel in their careers and reach upper level roles.
- It also doesn't help that 60 percent of male managers have said they are uncomfortable mentoring, socializing with or working one-on-one with female employees.
- In order to achieve upper-level positions, however, it is highly beneficial for individual contributors to have a mentor supporting them throughout their career.
- One survey revealed employees at every income level who had a mentor were more likely to be satisfied with their jobs compared to those who did not participate in mentorship.
- And for non-white women between the ages of 45 and 54, 95 percent of those who had a mentor reported satisfaction with their job compared to 82 percent of those without a mentor.

- Employees with mentors are also more likely to report that their employer gave them opportunities to advance their careers.

### **Compensation and Rewards Reflect Gender Bias**

- The gender pay gap is no joke. PayScale’s Gender Pay Gap Report shows women make 83 cents for every dollar men make, which the salary platform company refers to as the “uncontrolled gender pay gap.”
- The “controlled gender pay gap” compares men and women with the same jobs and qualifications. That metric shows women making 99 cents for every dollar men earn.
- While those numbers are substantially closer, the PayScale report argues, “This is equal pay for equal work. The gap should be zero.”
- When considering the gender pay gap, you must account for the fact that more women are segregated to lower-level jobs in low-paying industries and are unable to obtain upper-level roles due to biases and the glass ceiling.
- These disparities in opportunities, prevent women from excelling in their career and inhibits their ability to make the same amount as men.
- At every stage of their careers, women face barriers that place them at a disadvantage for career opportunities, mentorships, promotions and pay raises.

### **Perks and Benefits Affect Genders Differently**

- The perks and benefits companies offer can significantly contribute to gender bias and opportunity discrepancies between genders.
- This is especially true when it comes to benefits for working parents since women are typically assigned to act as the primary caregiver of children, which has led to a motherhood penalty.
- More than 80 percent of U.S. workers believe putting working mothers in leadership positions leads to greater success, according to a Bright Horizons survey.
- Just over 90 percent also agree mothers have unique skills they can bring to leadership.
- The Bright Horizons survey also revealed 41 percent of workers view mothers as being less committed to their jobs and 38 percent judge them for needing flexible schedules.
- Of working parents surveyed, 72 percent said “women are penalized in their careers for starting families, while men are not.”

- For working fathers, paid paternity leave is less likely to be offered by employers than maternity leave. And when the benefit is offered by companies, 23 percent of men are not taking parental leave at all.
- There is still a strong stigma that suggests taking parental leave will harm one's career, which is a serious concern to 63 percent of men.

### **Parental Status Affects Income and Career Development**

- For working mothers, inequalities are even more drastic.
- As of 2020, mothers earned 74 cents for every dollar fathers earned, according to the National Women's Law Center.
- That wage gap results in \$17,000 in yearly losses for mothers who work full-time, and women of color who have children lose out on upwards of \$30,000 each year.
- Almost one in five women who had children living in their homes said they sometimes or often could not afford enough food in the past week in July 2022.
- Federal pregnancy discrimination suits have been on the rise, according to Bloomberg Law. The number of pregnancy-related claims filed in 2020 was up by 67 percent compared to 2016, despite declines in U.S. pregnancies and births.

### **Sexual Harassment In the Workplace Affects Genders Differently**

- While both men and women experience sexual harassment, nearly 78.2 percent of EEOC sexual harassment charges between fiscal years 2018 and 2021 were filed by women.
- A staggering 70 percent of women who experience sexual harassment, experience it in the workplace.
- A 2022 Deloitte survey found that 14 percent of 5,000 women from 10 countries who responded had been harassed at work.
- More than 40 percent of these instances of "unwanted physical advances or repeated disparaging comments" went unreported, with embarrassment identified as the top reason for not speaking up. Less than a quarter of the women surveyed said their employer had "a clear process for reporting discrimination and harassment."

Whether women decide to start over somewhere else or risk retaliation from addressing the issue, they are at a constant risk of harming their careers after being sexually harassed.

## **Gender Bias Intersects with Racial Bias**

Close to 60 percent of women who responded to a 2020 survey said they had experienced discrimination based on their race or gender or obstacles to getting jobs that pay more.

That same survey also showed “roughly half of women who identify as Black and Latinx do not have enough money right now to pay for their basic needs.”

Both demographic groups were the least confident they were being paid equally at work.

The pay gap is broadest for women who identify as American Indian and Alaska Native, according to Payscale. They earn 72 cents for every dollar earned by white men.

That’s followed by Native Hawaiian and other Pacific Islander women who make 78 cents, Hispanic women who make 79 cents and Black or African American women who make 80 cents for every dollar white men make.

## **Women Are Interrupted or Talked Over More Than Men**

- One example of unconscious gender bias is the fact that men interrupt 33 percent more often when they speak with women compared to when they speak with men, according to a George Washington University study.
- This behavior can lead to situations where a woman’s voice is not amplified as well as her male counterparts and she will be more likely to be dismissed.
- Women may also find themselves in a situation where after voicing an idea to minimal fanfare, they hear that same idea amplified by a male co-worker to greater praise.

## **14 Ways to Reduce Gender Bias in the Workplace**

Now that we know where to look for gender bias in the workplace, let’s tackle some ways to actively reduce biases and create a more diverse and inclusive workplace.

### **Ways to Reduce Gender Bias in the Workplace**

- Collect and analyze employee demographic data.
- Collect and analyze employee compensation data.
- Run experiments unique to your team.

- Identify gender bias in your recruiting process.
- Utilize automation and artificial intelligence.
- Implement regular gender bias training.
- Standardize mentoring or use e-mentoring.
- Provide leadership training opportunities.
- Give everyone a seat at the table for important projects.
- Offer perks and benefits for equal opportunities.
- Create an office space for everyone.
- Diversify your boardroom.
- Review your anti-discrimination and bias policies.
- Use anonymous evaluations and standardized hiring processes.

### **1. Collect and Analyze Employee Demographic Data**

Start by collecting data about your employee demographics. Look at disparities between men and women by department, seniority and retention. You may also consider publishing this information on your careers page to remain transparent with your entire company and to hold your team accountable for moving the needle toward becoming an entirely gender diverse and equal opportunity employer.

### **2. Collect and Analyze Employee Compensation Data**

Conduct regular pay audits to identify how men and women are paid and promoted differently. Consider both the adjusted and unadjusted pay gaps that we talked about earlier in this article.

Also, it may behoove you to publish your findings for the entire company to see or even on your careers page. One survey found women who said their employer had implemented pay transparency earned between \$1 and \$1.01 on average for every \$1 a man earned.

### **3. Run Experiments Unique to Your Team**

Employee engagement surveys are a great way to gather more data about your team and identify trends in how your employees engage in their work. Keep in mind that in order to obtain the best, most unfiltered responses, you'll want to keep these surveys anonymous.

If your teams are small and not highly gender diverse, you may not want to ask for personal information like job title or even gender because if there's only one woman with a specific role on the team, she will be easily identifiable.

Additionally, you may want to implement perception surveys, which focus on the safety of your employees.

Anonymous surveys like this provide an opportunity for employees to share experiences they've encountered, like sexual harassment or gender bias, that may not have been addressed in standard employee engagement surveys.

#### **4. Identify Gender Bias in Your Recruiting Process**

To reduce gender bias in your recruiting process, start by looking at the language you use. You can use a gender decoder tool to identify biased language in your job descriptions. You could also plug in recruitment content from emails, interview questions and employer branding materials for social media and your careers page.

Make sure to attract enough great candidates, having at least two women in the finalist pool has been shown to improve a woman's chance of being hired by 79 times.

#### **5. Utilize Automation and Artificial Intelligence**

One simple way to reduce gender bias in your recruiting process is to invest in recruitment tools that utilize automation or artificial intelligence to make decisions.

Not only will this save time during the initial screening process, but it will help filter through candidates based on merit rather than gender or other characteristics that may place them at a biased and unfair disadvantage.

However, it is also important to note that artificial intelligence is a type of machine learning, so over time, if human biases are introduced, artificial intelligence can learn and perpetuate those biases, so take precautions when using such technology to reduce bias early on.

## **6. Implement Regular Gender Bias Training**

Sure, biases are a simple fact of life, but that doesn't mean they are set in stone. The best way to reduce unconscious gender bias is to learn about it and take action to alter your perception of biases for the better.

Start by informing your team of the different types of unconscious bias and then look for diversity and inclusion professionals or unconscious bias programs near you that will support your efforts with regular training.

## **7. Standardize Mentoring or Utilize E-Mentoring**

To provide all of your employees with equal opportunities, create a standardized mentoring process. Although 76 percent of people said they consider mentorship to be important, less than half actually have a mentor. More than 90 percent of people who have mentors say they're satisfied with their jobs.

If a mentor program doesn't quite work for your team, consider partnering with an e-mentoring program to connect your employees with professionals outside of your company.

## **8. Provide Leadership Training Opportunities**

First of all, individual contributors shouldn't be expected to be naturally great leaders.

Leadership training should be mandatory for everyone growing in their careers to ensure they know how to manage and lead teams, which is often a skill set that needs to be learned.

Such training is essential to reducing gender bias, closing the gender wage gap and breaking the glass ceiling.

It will also help both men and women become better mentors for females earlier in their careers.

To reach gender equality, fill the pay gap and break the glass ceiling, companies need to proactively provide women with leadership and professional development opportunities.

## **9. Give Everyone a Seat at the Table for Important projects**

When you're implementing a new project, make sure you're bringing together a diverse team with a wide variety of backgrounds and experiences to tackle it. One study found that gender diverse teams are 73 percent better at decision making than teams that are all men.

## **10. Offer Perks and Benefits for Equal Opportunities**

- When you review the perks and benefits you offer, bring your entire team in on the conversation. Provide them an opportunity to share honest feedback on the benefits they wish your team had and the benefits that would draw them to another company.
- If you have a young company, employees may value parental leave benefits, whereas if your employees are later in their careers, they may care more about retirement benefits.
- Having these conversations will help you invest in benefits that will actually support your employee's work-life balance.
- Additionally, parental leave brings a wealth of benefits, including boosting retention rates, reducing the 'motherhood penalty,' as well as improving morale at work.
- And when it comes to parental leave, it's important to include working fathers and encourage them to actually take the leave.
- One study found for every month a man takes parental leave, women's salaries increase correspondingly by 7 percent, helping to further close the gender pay gap.

## **11. Create an Office Space for Everyone**

- Believe it or not, your physical office space can play a role in how men and women interact in the workplace.
- Certain office designs have even been found to be more or less inclusive for different demographics.
- In industries that have been dominated by men, oftentimes, there aren't even bathrooms for women.
- Many companies also do not offer a mother's room, forcing working moms to breastfeed in the bathroom or other places that are less than welcoming and unhygienic.

## **12. Diversify Your Boardroom**

- Beyond managerial or even C-level leadership positions, companies also need to take a hard look at their board of directors.
- As of 2022, 28.2 percent of global boardroom seats were held by women. Though there have been steps taken to change this there is still a lot of work to do.
- A study performed at UC Berkeley Haas School of Business showed that, “Companies with more women on their board of directors are more likely to be companies that have programs, guidelines, and clear policies to avoid corrupt business dealings, have strong partnerships and have high levels of disclosure and transparency.”
- If you’re looking for ways to build a more diverse and transparent workplace and business, appointing more women to your board of directors is a perfect place to start.

## **13. Review Your Anti-Discrimination and Bias Policies**

- Review your nondiscrimination and anti-harassment policies, and make sure this information is included in job descriptions, employee handbooks and your careers page.
- In addition to your policies, provide employees with information and resources on who to reach out to in different situations.
- Include clear steps for what is going to happen so people know what to expect when they file a complaint.

## **14. Use Anonymous evaluations and standardized hiring processes**

- One way to help reduce gender bias is to standardize hiring processes, and in some cases, remove the individual’s name from the evaluation process entirely (such as when reviewing resumes of potential candidates.)
- When performing interviews, whether for a new hire or an internal promotion, all candidates should be asked the same questions, with responses assigned numerical ratings based on predetermined criteria.
- Defining clear thresholds for performance management helps standardize expectations across the organization as well.

- Setting standards for all processes at any organization provides a benchmark for every employee to work up to and reduces cases of less-qualified employees being rewarded over high performers.

### **Gender violence:**

- Gender-based violence (GBV) by definition
- Gender-based violence is violence directed against a person because of that person's gender or violence that affects persons of a particular gender disproportionately.
- Violence against women is understood as a violation of human rights and a form of discrimination against women and shall mean all acts of gender-based violence that result in, or are likely to result in
  - physical harm,
  - sexual harm,
  - psychological,
  - or economic harm
  - or suffering to women.

It can include violence against women, domestic violence against women, men or children living in the same domestic unit. Although women and girls are the main victims of GBV, it also causes severe harm to families and communities.

### **Forms of gender-based violence**

- Gender-based violence can take various forms:
- Physical: it results in injuries, distress and health problems, and may even lead to death in certain cases. Typical forms of physical violence are beating, strangling, pushing, and the use of weapons. In the EU, 31 % of women have experienced one or more acts of physical violence since the age of 15.
- Sexual: it includes unconsented sexual acts, attempts to obtain a sexual act, acts to traffic, or acts otherwise directed against a person's sexuality without the person's consent. It's estimated that one in 20 women (5 %) has been raped in EU countries since the age of 15.
- Psychological: includes psychologically abusive behaviours, such as controlling, coercion, economic violence and blackmail. 43% of women in the EU have experienced some form of psychological violence by an intimate partner.

## Examples of gender-based violence

- Domestic violence includes all acts of physical, sexual, psychological and economic violence that occur within the family, domestic unit, or between intimate partners.
- These can be former or current spouses also when they don't share the same residence. 22 % of all women who have (had) a partner has experienced physical and/or sexual violence by a partner since the age of 15.
- Sex-based harassment includes unwelcome verbal, physical or other non-verbal conduct of a sexual nature with the purpose or effect of violating the dignity of a person. Between 45% to 55% of women in the EU have experienced sexual harassment since the age of 15.
- EU law defines sex-based harassment and prohibits its practice. Find out more about the principle of equal treatment of men and women in matters of employment and occupation. The principle of equal treatment between men and women in the access to and supply of goods and services.
- The principle of equal treatment between men and women engaged in an activity in a self-employed capacity.
- Female Genital Mutilation (FGM) is the ritual cutting or removal of some or all of the external female genitalia.
- It violates women's bodies and often damages their sexuality, mental health, well-being and participation in their community. It may even lead to death.
- Today, more than 200 million girls and women alive worldwide have undergone female genital mutilation. At least 600,000 women living in the EU have undergone FGM.
- Forced marriage refers to marriage concluded under force or coercion – either physical pressure to marry or emotional and psychological pressure.
- It's closely linked to child or early marriage, when children are wed before reaching the minimum age for marriage.
- Online violence is an umbrella term used to describe all sorts of illegal or harmful behaviors against women in the online space.
- They can be linked to experiences of violence in real life, or be limited to the online environment only.
- They can include illegal threats, stalking or incitement to violence, unwanted, offensive or sexually explicit emails or messages, sharing of private images or videos without consent,

or inappropriate advances on social networking sites. One in 10 women in the EU has experienced cyber harassment since the age of 15.

- Gender-based violence (GBV) is a global public health emergency that has plagued girls and women throughout history. Defined as harmful acts directed at an individual based on their gender, GBV is a constant threat for girls and women around the world regardless of their age, race, or socioeconomic status. And they are at risk everywhere and anywhere — at work, at school, and at home.
  
- This kind of targeted violence is rooted in systemic gender inequality and can be physical, sexual, economic, or psychological. It can look like a child undergoing female genital mutilation, a student assaulted in her dorm, or a stay-at-home mom restricted from accessing financial resources.
  
- The statistics on GBV are bleak. The United Nations Office for the Coordination of Humanitarian Affairs estimates that 1 in 3 women worldwide will experience physical or sexual abuse in her lifetime. In 2020, the UN Office on Drugs and Crime found that, on average, a girl or woman is killed by someone in her own family every 11 minutes.
  
- While GBV remains a universal plague for girls and women, their collective power to help one another and overcome cannot be overlooked.

## **GIRLS AND WOMEN ARE RESILIENT**

- In every corner of the world, groups led by women are organizing, listening to, and supporting survivors of GBV while tackling gender inequality in their own communities.
- And in most cases, they're doing so with extremely limited resources. Because most grassroots organizations rely on volunteers and project-based funding, operational costs are rarely covered by donations or grants.
- This financial uncertainty ultimately endangers the sustainability and impact of this vital, lifesaving work. A recent report on global philanthropy and feminist movements found that

only 1% of gender-focused international aid was directed to women's rights organizations. Further, most women's rights organizations have never received unrestricted or multiyear funding.

- To address this dismal gap, the United Nations Foundation joined forces with the EU-led Spotlight Initiative to launch the With Her Fund. A new funding vehicle, with Her Fund provides flexible grants to local, women-led organizations working to end GBV.
- Meet the inaugural cohort of With Her Fund grantees, from Argentina to Mali, that are challenging harmful social norms and creating spaces for GBV survivors to heal and access the resources they need and deserve.

### **Social Discrimination:**

- Social discrimination is defined as sustained inequality between individuals on the basis of illness, disability, religion, sexual orientation, or any other measures of diversity.
- All human beings are born free both in dignity and in rights, so why is it that individuals who go on to develop and experience mental illness are seen as a soft target for discrimination at a number of levels and in various domains in their daily lives? This discrimination is damaging, derogatory, and demeaning, thereby making individuals with mental illness second class citizens.
- By association, such discrimination also has an impact on people who look after individuals with mental illness (whether they are professional or lay carriers).
- World Psychiatric Association (WPA) in its 2014–2017 Action Plan, decided to look at public mental health agenda along with discrimination against people with mental illness. WPA represents over 250 000 psychiatrists from 117 countries around the globe, and is therefore interested and committed to challenging discrimination. It commissioned the Centre for Mental Health Law to conduct a survey of as many countries as possible, studying their laws for discrimination in areas of employment, voting rights, funding, and other potential aspects of individual functioning.
- As has been shown in the case of racism. All human beings belong to the same species and descend from the same stock. Thus, no illness—be it mental or physical, acute or chronic—should lead to discrimination of any kind whatsoever.
- Social discrimination against people with mental illness is a global issue and it covers a range of spheres which influence daily living and daily functioning.

- Social discrimination appears to be lodged in the system and, therefore, can be pervasive and intrusive, and stop people from reaching their full potential and, more importantly, labelling them changes their identities.
- Micro-identities related to race, gender, age, religion, sexual orientation, and other components all get trumped by the label of being mentally ill.
- Social discrimination is defined as sustained inequality between individuals on the basis of illness, disability, religion, sexual orientation, or any other measures of diversity.
- Social justice is aimed at promoting a society which is just and equitable, valuing diversity, providing equal opportunities to all its members, irrespective of their disability, ethnicities, gender, age, sexual orientation or religion, and ensuring fair allocation of resources and support for their human rights. Any number of diverse factors, including those mentioned above, but also education, social class, political affiliation, beliefs, or other characteristics can lead to discriminatory behaviors, especially by those who may have a degree of power in their hands.
- Stigma is a prejudiced attitude and is readily applied to people with mental illness (especially to those with severe and serious mental illness such as schizophrenia and bipolar disorders), and widespread insidious and pervasive stigma leads to discriminatory attitudes and practices.
- Stigma can also explain widespread negative attitudes and behaviors, as well as negative cognitions and structures which create and perpetuate inequities.
- Social justice means that all institutions—structures as well as processes should be freely and equally accessible and available to all individuals, irrespective of their characteristics. Laws and legal institutions must ensure that equal opportunity be provided for education, learning, earning, and living.
- Social justice is the basis of equal and equitable distribution of resources and opportunities in which outside factors that categorize people are irrelevant. Although traditionally the term targeted poverty elimination, it has come to take on a wider meaning wherein social institutions have to take on a wider role to ensure equity of resources.
- It can be argued that all governments have a moral and ethical responsibility to ensure that all its citizens have equal rights, opportunities, and resources.

- In most countries around the globe, for example, categories of gender are not used for discrimination on a legal basis, but sexual orientation, race, and religion are often employed to base discrimination on.
- According to Rawls social justice is about fairness. Justice also depends upon giving individuals capability, which in this case will be 'capability to be healthy'. Rawls suggests fair equality of opportunity.
- Daniels criticizes Rawls for assuming that people are fully functional over a normal life span. The fair equality of opportunity account does not use the impact of disease or disability on welfare.
- Daniels points out that illness and disability (whether these are physical or mental or co-morbid) may not lead to unhappiness, even if they restrict the range of opportunities offered to or are available to the individual.
- Rawls's theory of justice as fairness, according to Daniels, was not designed to address issues of healthcare, as he assumed a completely healthy population and argued that any society which is purporting to be just must, therefore, assure that its members have equal basic liberties. Furthermore, society must not only provide a robust form of equal opportunity and limit inequalities to those who benefit and support the least advantaged. Social justice depends upon social reform.
- The principles of social justice work on individual, kinship, and population levels. The access to fair equality of opportunity depends upon public education, early childhood interventions aimed at eliminating race or class disadvantages, and equality of opportunity.
- Whereas Daniels argues for an opportunity-based view, Sen recommends a capability-based approach.
- It is possible to include both to create a model which gives people both the opportunity and the capability to be healthy. Rawls's view of justice is that of a liberal democratic political regime ensuring that its citizens' basic needs for primary goods are met and that citizens have the means to make effective use of their liberties and opportunities.
- The second principle is to ensure that citizens have a fair equality of opportunity. This is particularly where individuals with mental illness tend to lose out. Principles of social justice rely on strengthening social institutions.
- Social justice in relation to health in general (and mental health in particular) relies on the questions Daniels raised. The fundamental question is: what do we owe each other in the

protection and promotion of health? He argues that there are three subsidiary questions: whether health should be seen as special; when are the health inequalities unjust; and how can we meet competing health needs in a fair and just way when the resources are finite? Healthcare ensures that individuals remain or become healthy in order to achieve their full potential and health, thus, ensures distinct (albeit limited) contribution to the protection of equality of opportunity.

- Daniels emphasizes that healthcare is of special moral importance because it helps to preserve our status as fully functioning citizens. Unlike food or shelter, healthcare needs may be disproportionate, thereby creating an inherent inequality and discrimination. As noted elsewhere, social determinants influence mental health and it is appropriate that social inequalities are tackled.
- However, more significantly, in order to ensure greater justice to health outcomes, the focus should not be only on the traditional health sector, but also on joined up thinking across education, employment, and the criminal justice system.
- Health of the nations (including mental health) depends upon factors other than wealth, although wealth may be important. Culture, cultural values, government policies, social capital, social organizations, and social cohesion all play a role in determining health status.
- In countries around the world, there has been inadequate access to mental healthcare, for a number of reasons, including discriminatory constraints consequent upon stigma, keeping costs down and seeing mental health as purely secondary to physical health.
- Using the US as an example, these authors note that recent changes, such as vigorous (and better) advocacy, better understanding of mental disorders, more effective treatments, and the means to contain costs, have changed funding patterns.
- Mental health funding consistently lags behind that allocated to physical health. This is related to stigma and discrimination, part of which is to do with not really understanding what mental illness represents.
- The range of mental illness, its varieties across the lifespan, and varying presentations all mean that funders are not able to decide what it being funded.
- Furthermore, conditions such as depression have been seen as a sign of personal or moral weakness, thus negating the seriousness of the condition. Substance use disorders are seen as self-induced and as a sign of a lack of backbone, thereby not deserving to be taken seriously.

- Mental health needs should be seen as basic health needs, and not meeting these needs should be recognized as a failure of fundamental social justice.
- Consistent advocacy and better recognition of the symptoms of mental illness have contributed to a degree of change in attitudes and knowledge, resulting in improved funding.
- Social institutions, whether these are schools, universities, courts, or others, must be strengthened in the context of social justice in order to ensure delivery of social justice.
- The healthcare system should also be seen as an institution which must deliver social justice, not only in terms of proper accessible healthcare, but also preventive measures.
- Ruger offers ethical principles of human flourishing and these include: health capability, social choice on a dominance partial ordering of health capabilities, and relevant social decision-making; valuing central health capabilities, measuring inequalities, ethical commitment, and public moral norms; as well as to social determinants of health and joined up approach.
- What is worth bearing in mind is that at the core of social justice in health are also the ethical and moral frameworks. However, the key is also about getting the balance right between governmental responsibility and the individual's choice and responsibility for their own health and capabilities.
- Human flourishing is based on Aristotle's theory. Ruger notes that 'human flourishing' is seen as the end of all political activity and what human beings are capable of. It is the basis of 'good', which is the aim of every action and decision.
- It is also about the capability to function well if one so chooses. For individuals with mental illness, this becomes a major issue in terms of the contrast between individuals' expectations of their own functioning and that of the society at large.
- Another dimension that must be borne in mind is the one expressed by Ruger that there must be a distinction between achievement and the freedom to achieve. As Ruger goes on to explain, the capability to achieve valuable (but whose values and who defines them?) functioning also relies upon goods and circumstances needed to produce capabilities.

As capabilities become assured, then it should be left to individuals to be free to make the choices they like.

- In individuals with mental illness, there is a further tension in that different treatments or combinations of treatment may get them to a certain specific level of functioning, but their choices will depend upon a number of contextual factors.
- In theory these contexts must be the same for everyone in any given culture, but it is not true in actuality.
- Ruger points out that the individual's ability to function rather than actual resources should be the primary goal of public policy.
- However, in matters of health and healthcare, resources are the key in getting the individual to regain health and function as a fully active member of society.
- Thus, an evaluation of policy must explore how it (the policy) gives people (with mental illness) an opportunity to function fully and properly in society. Social justice equally applies to those who may not have mental illness.
- In addition, policy must focus on health. Health policy cannot be seen in isolation, as it has strong inter-connectedness with education, employment, the legal system, business, and other policies too.
- Sen puts forward the theory of capability, which basically means that everyone should have the capability to lead a worthwhile life. Capability, according to Ruger can be related to well-being in two ways: first, it is a set of functions, such as the ability to feed oneself and walk unaided constitutes a person's well-being; and second is the capability to accomplish these functions is their freedom to achieve personal well-being.
- Additionally, well-being depends upon the capability to function.
- There is no doubt that capability is also about human heterogeneity, and this is where individuals with mental illness and their capability (a) to achieve and maintain mental well-being and (b) to acquire full functioning of their mental and physical well-being come into play.
- Acknowledging heterogeneity provides a rationale for treating individuals differently under a health capability paradigm which needs to be developed further in that all individuals with mental illness are given equal status and support to ensure that they work at full capabilities. Ruger argues that the heterogeneity is also to do with positive freedoms.
- The focus is on achieving valuable functioning.
- However, in theory there is also a need to ascertain who defines valuable and whether such a definition includes capital values, individual values or societal/familial values.

- The challenges for individuals with mental illness are many. These very much depend upon what the social expectations of the individual are.
- In capitalist and individualistic or ego-centric societies, these expectations will be very different. In such conditions, individuals are expected to look after themselves and their immediate families (largely nuclear), so the capability approach will have to focus on that; unlike socio-centric or collectivist societies, where capabilities must match the needs of the kinship or the extended family.
- As noted above, health policy cannot be developed or seen in isolation, and therefore health indicators may need to be multi-dimensional too.
- Health rights in any given society are an important indicator in health policy. Yet very often these are ignored in many countries and cultures, being viewed as West-inspired interferences. Health capability must include equal access to healthcare when needed.
- There are various debates about how equal access is defined and described. For the purposes of this paper, it means being able to access good quality healthcare when needed without (undue) delay.
- Nobody who needs healthcare should be denied it, and policies must grant equal access to healthcare for all.
- Social justice in the health context also means public education about mental illness, correcting false and harmful health norms.
- These have to be developed on a culturally relativist basis. There may be minimum criteria for some of the services, as described in this issue, but these have to be seen in and set in the norms context.
- This is where perhaps the capabilities approach may enable policy-makers to take individual needs and capabilities into account.
- Ruger argues that the health capability paradigm is an integrative model of disability, requiring respect for differences (thus also creating some difficulties for evaluation).
- Barriers to good quality mental healthcare are many.
- Social discrimination is at the top of the list. These lead to poor economic investment in infrastructure, human resources, and training. Ignorance about mental illness feeds into this. Socio-cultural barriers may be another potential cause in affecting resource allocation.

- This unwittingly sets up a vicious circle where, due to a lack of resources, people seek care from alternative healthcare or faith-based practitioners; and policy-makers may see this as the preferred choice, thereby not funding the healthcare system properly.
- In countries with multiple cultural and ethnic groups and diversity, this may further create double jeopardy, thereby setting racial/ethnic prejudices in motion. Another point worth noting is the separation between physical and mental health in many countries, thereby creating difficult to overcome barriers.
- Social justice and social discrimination go hand in hand. Social discrimination can be measured in several spheres, from personal to political ones.
- There is widespread discrimination in not giving proper habilitation to individuals with mental illness and not to give them voting rights, which means that they cannot stand for elections and, therefore, are excluded from participating actively in the political democratic process.
- In this issue, some of these areas are covered.
- For each of these papers, well-known policy-makers and parliamentarians have been invited to write commentaries. These commentaries indicate that policy-makers do understand the issues and are keen and committed to support this endeavor.
- One of the major issues in the social discrimination agenda is the huge degree of variation in definitions used. Some countries use mental illness, others use mental disorder or mental derangement, whereas some use medically certified insane or medically proven total mental incapacity.
- Mental incompetence, insanity, lost his mind, demented, seriously weakened mental state, mentally deficient, insane or imbecile, certified to be insane, and mental ineptitude were some of the other terms used. Interestingly and equally frustratingly, these terms are often not described, and the interpretation is left to the person using them.
- The procedure for how a person is judged to have a mental health problem is not laid down in law. This leads to *de jure* and *de facto* discrimination.
- In many countries, the primary language is not English, so translation of the laws has been carried out.
- This may have left some gaps, in spite of careful translation and interpretation.
- One-third of 193 countries studied show that people with mental illness are deprived of their right to vote.

- In only 11% of countries there is no restriction to vote. A similar proportion cannot vote if they have been detained under the law, and nearly a quarter are not allowed under the direction of the courts.
- Thus, for various reasons more than half of individuals are not able to vote, thus making a mockery of the democratic process. Furthermore, if they cannot vote they are not eligible to stand in elections, and thus for all practical purposes are excluded from the democratic political process.
- These variations also depend upon whether the country is high income or low income—the latter are much more likely to withhold voting rights.
- For purposes of employment, one quarter of the countries surveyed do not define the term ‘disability’, and it is left open to interpretation.
- Two-thirds of the countries define disability to include mental illness, but one quarter have clear discriminatory laws against people with mental illness to enjoy protection in employment. In half the countries there are no explicit protections against dismissal/termination of employment/suspension from employment on grounds of mental health problems. One-third of the countries do not provide access to reasonable accommodation at the workplace with disabilities including mental disabilities.
- Thus, an example of good practice by BT, as shown in the paper *Mental Health for Nations*, stands out. Once again, high income countries come out better in this regard in comparison with low- and middle-income countries.
- Personal discrimination (in terms of a right to property) is highly prevalent across the globe. A right of contract of persons with mental illness is recognized by only 21% of countries. More than one-third of the countries completely deny the right to contract to persons with mental illness. Once again, there are clear differences between high income countries and low- and middle-income countries.
- In spite of the fact that many countries have ratified the Convention of Rights of Persons with Disability, there appears to be a significant gap in delivering on this.
- Interestingly, 70% of countries allow people to have succession rights, and these too vary according to income levels of the country.
- Forty-three per cent of countries do not allow people with mental illness the right even to make a will! Persons with mental illness are discriminated in a significant number of countries around the globe with respect to the right to property.

- To complicate matters further, the right to inherit property and make a will are not an effective right.
- The right to marry and options of divorce on the basis of mental illness are both limited across many countries. Once more, one of the major problems in this context is the varying, unclear definitions, which are prone to mis-interpretation.
- Discrimination against individuals with mental illness, thus, is widespread and much more common in low income countries, which in materialistic terms may make sense. However, major steps need to be taken to move this agenda forward.
- These discriminatory laws may well reflect underlying stigma against individuals with mental illness at a number of levels.
- There is no doubt that public attitudes to mental illness have varied from stigmatizing to accepting over a number of decades, especially varying among cultures.
- However, it must be remembered that positive attitudes do not lead to positive or more accepting behaviours.
- Teaching programs certainly change knowledge about mental illness, but increased, improved, or better knowledge does not get rid of stigma against mental illness or individuals with mental illness.
- The challenge for policy-makers, clinicians, and individuals with mental illness is to attack discrimination using strategies similar to civil liberties, gender equality, sexual minority (LGBT) communities, which in many parts of the world have proven to be useful. It is important, therefore, that clinicians around the globe work with patients, their careers, and their families, as well as with relevant organizations representing these groups, to challenge discrimination, change laws, and ensure that these are applied equally.
- This equity must be enshrined in law for a number of measures, including funding for research, training, and healthcare delivery, as is the case for the physical health needs of the population.
- The challenges are, first, to ensure that laws change and, second, that accurate and regular reporting of these takes place and that these are monitored by impartial observers.
- There is simply no explanation for continuing discrimination against individuals with mental illness, their families, and those who care for them, whether they are professional or lay carers.

## Constitutional protection

### What is the Status of Social Discrimination in India?

- **About:**

- **Caste**, through its **rigid social control** and networks **facilitates economic mobility for some and erects barriers for others** by mounting disadvantages on them.
- It also **shapes the ownership pattern** of land and capital and simultaneously regulates **access to political, social, and economic capital** too.
- According to the **Census (2011)**, there are an estimated **20 crore Dalits** in India.

#### National Crime Records Bureau (NCRB) Data:

- **In 2021**, 50,900 cases of crimes against Scheduled Castes (SCs) **were registered, an increase of 1.2% over 2020 (50,291 cases)**.
- The **rate of crime** was particularly **high in Madhya Pradesh** (63.6 per lakh in a SC population of 113.4 lakh) and **Rajasthan** (61.6 per lakh in a SC population of 112.2 lakh).

- **India Discrimination Report by Oxfam India:**

- **Decline in discrimination in Urban Areas:** It has been the case due to education and supportive government policies.
- **Difference in Earning:** The average earning of self-employed workers in 2019-20 was Rs 15,878 for people from non-SCs/ST categories, while it is Rs 10,533 for those from SC or ST backgrounds.
  - Self-employed **non-SC/ST workers earn a third more than** their counterparts from **SC or ST backgrounds**.
- **Rise in Discrimination in Rural areas:** The SC and ST communities in rural India are facing an increase in discrimination in casual employment.

### What are the Safeguards against Discrimination in India?

- **Constitutional Provisions:**

- **Equality Before Law:**

- **Article 14** says that no person shall be denied treatment of equality before the law or the equal protection of the laws within the territory of India.
- The right is extended to all persons whether citizens or foreigners, statutory corporations, companies, registered societies or any other type of legal person.
- **Prohibition of Discrimination:**
  - Article 15 of the Constitution of India states that the State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them.
- **Equality of Opportunity:**
  - Article 16 of the Constitution of India states that there shall be equality of opportunity for all citizens in matters of employment under the State. No citizen shall, on grounds only of religion, race, caste, sex, descent, place of birth or any of them, be ineligible for any office under the State.
- **Abolition of Untouchability:**
  - **Article 17 of the constitution** abolishes Untouchability.
- **Promotion of Educational and Socio-economic Interests:**
  - Article 46 requires the State 'to promote with special care the educational and economic interests of the weaker sections of the people, and, in particular, of the Scheduled Castes and the Scheduled Tribes, and to protect them from social injustice and all forms of exploitation.
- **Claims of Schedule Castes:**
  - Article 335 provides that the claims of the members of the Scheduled Castes and the Scheduled Tribes shall be taken into consideration, consistently with the maintenance of efficiency of administration, in the making of appointments to services and posts in connection with the affairs of the Union or of a State.
- **Reservation in Legislature:**
  - Article 330 and Article 332 of the Constitution respectively provide for reservation of seats in favour of the Scheduled Castes and the Scheduled Tribes in the House of the People and in the legislative assemblies of the States.

- **Reservation in Local Bodies:**

- Under Part IX relating to the Panchayats and Part IXA of the Constitution relating to the Municipalities, reservation for SC and ST in local bodies has been envisaged and provided.

### **What are the Related Government Initiatives?**

- **Land Reforms:**

- Land reforms were brought for more equitable distribution of land and upliftment of the marginalized. The Land Reforms of the independent India had four components:
  - The Abolition of the Intermediaries
  - Tenancy Reforms
  - Fixing Ceilings on Landholdings
  - Consolidation of Landholdings.

### **Constitution (Scheduled Castes) Order of 1950** (amended in 1956 & 1990):

- It recognized Hindu Dalits, Dalits who had converted to Sikhism and Buddhism as Scheduled Castes. The Supreme Court is hearing a bunch of petitions now seeking inclusion of Dalit Christians and Dalit Muslims as Scheduled Castes.
- **Pradhan Mantri Kaushal Vikas Yojana (PMKVY):**
  - It aims to mobilize youth to take up skill training with the aim of increasing productivity and aligning the training and certification to the needs of the country.
- **SANKALP Scheme:**
  - Skills Acquisition and Knowledge Awareness for Livelihood (SANKALP) is an outcome-oriented programme of the Ministry of Skill Development & Entrepreneurship (MSDE) with a special focus on decentralized planning and quality improvement.
- **Stand Up India Scheme:**
  - It was launched in April 2016 to promote entrepreneurship at the grass-root level focusing on economic empowerment and job creation.
  - To leverage the institutional credit structure to reach out to the underserved sector of people such as SCs, STs and Women Entrepreneurs.

- **Pradhan Mantri Mudra Yojana:**

- It provides funding to the non-corporate small business sector through various last-mile financial institutions like Banks, **Non-Banking Financial Companies (NBFCs)** and **Micro Finance Institutions (MFIs)**.
- Loans have been given to disadvantaged sections of society such as women entrepreneurs, SC/ST/OBC borrowers, Minority community borrowers, etc. The focus has also been on new entrepreneurs.

## **Way Forward**

- **Effective Implementation of Laws and Policies** to protect marginalized communities, such as Dalits and Adivasis, against discrimination.
- **Education and Awareness-Raising** among people, especially in rural areas, to highlight the harmful effects of caste discrimination and the violation of constitutional rights.
- **Economic Empowerment of Marginalized Communities** through schemes such as Stand-Up India, PMKVY, and Mudra Yojana, along with **2<sup>nd</sup> generation land reforms** for more equitable distribution of land, and
- **Collaboration and Dialogue among Civil Society** organizations, government agencies, and marginalized communities to address caste discrimination.

## **Inclusive practices:**

### **Reducing the Likelihood of Discrimination**

Examples of practices that support equality and inclusion reduce the likelihood of discrimination

We can reduce the chances of discrimination happening by working in ways that promote equality, diversity and inclusion. For example:

- Respect diversity by providing person centered care
- Treat the individuals you support as unique rather than treating all individuals in the same way
- Ensure you work in a non-judgmental way. Do not allow judgmental beliefs to effect the care and support you provide
- Follow the agreed ways of working in your workplace to create an environment that is free from discrimination

- Work in an inclusive way that sees the positive input that all individuals can make to society and to their own care
- Be confident to challenge or confront discriminatory practice if you see this in your workplace.

### Workplace Inclusivity

- Promoting workplace inclusivity is essential for creating environments where all employees feel valued and respected.
- Addressing discrimination in the workplace requires a multi-faceted approach that focuses on crafting equitable spaces and drawing inspiration from success stories in diversity.
- Workplace inclusivity goes beyond simply having a diverse workforce. It involves creating an environment where every employee feels safe, supported, and empowered to bring their authentic selves to work.
- This means actively working to eliminate biases and prejudices that may exist within the organization.

### Crafting Equitable Spaces

- Creating equitable spaces involves implementing policies and practices that prevent discrimination and create an inclusive work environment.
- It requires a commitment from leadership to prioritize diversity and inclusion in all aspects of the organization.
- Diverse hiring practices play a crucial role in crafting equitable spaces. By actively seeking out candidates from different backgrounds and experiences, organizations can ensure that their workforce reflects the diversity of the communities they serve.
- This not only brings fresh perspectives and ideas to the table but also helps to break down barriers and challenge stereotypes.
- Employee resource groups are another important aspect of crafting equitable space. These groups provide a platform for employees to connect, share experiences, and support one another.
- They can focus on various aspects of diversity, such as race, gender, sexual orientation, or disability, and work towards creating a more inclusive workplace for all.

- In addition to diverse hiring practices and employee resource groups, training programs are essential in promoting workplace inclusivity.
- These programs should focus on cultural sensitivity and unconscious bias awareness.
- By educating employees about different cultures, traditions, and perspectives, organizations can foster a more inclusive and understanding work environment.

### **Success Stories in Diversity**

- Highlighting success stories in diversity can inspire organizations to make meaningful changes in their own workplaces.
- By sharing stories of companies that have successfully prioritized inclusivity, employers can learn and implement similar strategies.
- One success story in diversity is that of a technology company that recognized the importance of gender diversity in their workforce.
- They implemented a mentorship program specifically designed to support and empower women in the organization.
- This program not only helped to increase the representation of women in leadership positions but also created a culture of inclusivity where everyone felt valued and supported.
- Another success story is that of a retail company that actively sought out employees from different cultural backgrounds to better serve their diverse customer base.
- By embracing diversity and creating a workforce that reflected the community they served, the company was able to build strong relationships with their customers and gain a competitive edge in the market.
- Celebrating diversity and showcasing its positive impact can promote a culture of inclusion across industries.
- When organizations recognize and appreciate the unique contributions that individuals from different backgrounds bring to the table, it creates a sense of belonging and fosters innovation.
- Workplace inclusivity is crucial for creating environments where all employees feel valued and respected. By crafting equitable spaces through diverse hiring practices, employee resource groups, and training programs, organizations can foster a culture of inclusion.
- Drawing inspiration from success stories in diversity can further motivate employers to make meaningful changes in their own workplaces, ultimately leading to a more diverse and inclusive workforce.

## **Education's Role**

- Education plays a crucial role in shaping the worldview of future generations.
- By prioritizing inclusivity in curriculums and creating safe spaces for all students, educational institutions can inspire young minds to reject discrimination in all its forms.
- Education is not just about imparting knowledge and skills; it is about molding individuals into compassionate and empathetic human beings.
- Inclusive curriculums and safe spaces are two key components that contribute to this holistic development.

## **Inclusive Curriculums**

- Inclusive curriculums ensure that diverse perspectives are represented and celebrated. It involves the incorporation of materials that reflect the experiences of various marginalized groups and the promotion of critical thinking skills that challenge biases and stereotypes.
- Imagine a history class where students learn about the contributions of women, people of color, and LGBTQ+ individuals who have been historically overlooked.
- By including their stories, educational institutions can provide a more accurate and comprehensive understanding of our shared history.
- Inclusive curriculums foster empathy and understanding among students. When students are exposed to different cultures, religions, and backgrounds, they develop a broader perspective of the world. This exposure helps break down barriers and build bridges between communities.

## **Safe Spaces for All**

- Creating safe spaces within educational institutions is paramount in fostering inclusivity. These spaces provide students with an environment where they can express themselves freely without fear of judgment or discrimination.
- Imagine a school where students feel comfortable discussing their thoughts and ideas openly, knowing that they will be respected and heard.
- In such an environment, students are more likely to engage in meaningful discussions, challenge their own biases, and grow intellectually.
- Moreover, safe spaces also address the emotional well-being of students.

- Educational institutions that prioritize mental health support programs create an atmosphere where students feel valued and supported. This, in turn, enhances their overall learning experience and contributes to their personal growth.
- By implementing programs that address bullying and harassment, educational institutions send a clear message that discrimination and mistreatment will not be tolerated. This creates a culture of respect and acceptance, where students can thrive academically and socially.
- Education's role in shaping future generations goes beyond the mere transmission of knowledge. Inclusive curriculums and safe spaces are powerful tools that enable educational institutions to create a more inclusive society.
- By embracing diversity and fostering an environment of respect and acceptance, we can inspire young minds to become agents of change, rejecting discrimination in all its forms.

### **Legal Advocacy**

- Legal advocacy is a powerful tool in protecting the rights of individuals and ensuring equal treatment under the law.
- Through the implementation of anti-discrimination laws and landmark cases that challenge discriminatory practices, legal systems can serve as a catalyst for societal change.
- Legal advocacy goes beyond simply advocating for the rights of individuals; it also involves promoting awareness and education about the importance of equality and non-discrimination.
- By engaging with communities, organizations, and policymakers, legal advocates can foster a culture of inclusivity and respect.

### **Protecting Rights**

- Anti-discrimination laws are crucial in safeguarding the rights of individuals and promoting equal treatment.
- These laws prohibit discrimination based on protected characteristics, such as race, gender, religion, disability, and sexual orientation, providing legal recourse for victims of discrimination.
- Legal advocates play a vital role in ensuring that these laws are not only enacted but also strengthened and enforced.

- By working closely with lawmakers, they can advocate for amendments and improvements to existing legislation, making it more comprehensive and effective in addressing emerging forms of discrimination.
- Moreover, legal advocacy extends beyond the courtroom.
- It involves providing support and guidance to individuals who have experienced discrimination, helping them navigate the legal system and access the resources they need to seek justice.
- Through this holistic approach, legal advocates empower individuals to assert their rights and challenge discriminatory practices.

### **Landmark Anti-Discrimination Laws**

- Throughout history, landmark cases have shaped the legal landscape and advanced the fight against discrimination.
- From the Civil Rights Act of 1964 in the United States to the Equality Act in the United Kingdom, these laws have set important precedents and paved the way for progress.
- For example, the Civil Rights Act of 1964 was a groundbreaking piece of legislation that outlawed discrimination based on race, color, religion, sex, or national origin.
- This landmark law not only addressed racial segregation and unequal treatment but also laid the foundation for subsequent anti-discrimination laws in various areas, such as employment, housing, and education.
- Similarly, the Equality Act in the United Kingdom is a comprehensive law that prohibits discrimination based on protected characteristics and promotes equality in various aspects of life, including employment, education, and the provision of goods and services.
- This legislation is a testament to the commitment of the UK legal system to combat discrimination and ensure equal opportunities for all.
- By studying and learning from these cases, we can gain insights into effective legal strategies for combating discrimination.
- Landmark cases serve as reminders of the power of legal advocacy and the potential for positive change.
- They inspire future generations of legal advocates to continue the fight for justice and equality.

## **Media Influence**

- The media wields immense power in shaping public perceptions and attitudes.
- By advocating for responsible representation and challenging stereotypes, the media can contribute to the dismantling of discriminatory narratives.

## **Media's Power in Shaping Perceptions**

- The media plays a significant role in shaping public opinion about marginalized groups.
- By depicting diverse characters and telling stories that challenge stereotypes, media outlets can foster empathy and understanding.
- Responsible representation requires inclusive casting, accurate storytelling, and the inclusion of diverse voices in the decision-making process.

## **Advocating for Responsible Representation**

- Advocacy for responsible representation involves holding media organizations accountable for their portrayal of marginalized groups.
- By promoting diverse narratives and challenging harmful tropes, activists and organizations can create a demand for inclusive media.
- Through boycotts, petitions, and support of media that prioritizes inclusivity, individuals can contribute to positive change in the media landscape.

## **Economic Disparities**

Economic disparities often perpetuate discrimination by creating barriers to opportunities and resources.

Addressing systemic imbalances and implementing policies that promote prosperity for all is crucial in advancing the fight against discrimination.

## **Addressing Systemic Imbalances**

Systemic imbalances perpetuate economic disparities, making it difficult for marginalized communities to escape the cycle of discrimination. By implementing policies that address wage gaps, access to education, and discriminatory lending practices, society can work towards a more equitable distribution of resources.

## **Policies for Prosperity**

- Policies that promote prosperity for all are essential in combating economic discrimination.
- This includes initiatives such as affordable housing, job training programs, and accessible healthcare.
- By creating an environment where everyone has equal opportunities to thrive, society can take a significant step towards eradicating discrimination.

## **Technology's Impact**

Technology has the potential to both perpetuate and combat discrimination. By understanding the algorithms of equality and harnessing the power of digital platforms, we can leverage technology as a catalyst for change.

## **Algorithms of Equality**

- Algorithms used in technology have the potential to perpetuate bias or promote equality.
- By ensuring that algorithms are designed with inclusivity in mind and regularly audited for biases, we can minimize the risk of discriminatory outcomes.
- Additionally, diverse representation in the development of technology can contribute to more equitable systems.

## **Digital Platforms as Catalysts**

- Digital platforms provide spaces for marginalized voices to be heard and create communities of support and activism.
- Social media campaigns, online petitions, and digital organizing have become powerful tools in advocating for change.
- By harnessing the power of digital platforms, individuals and organizations can amplify their message and mobilize broad support.

## **Global Perspectives**

- Discrimination is a global issue that transcends borders.
- By learning from worldwide struggles and successes, we can strengthen our collective efforts in combating discrimination.

## **Worldwide Struggles and Successes**

- Examining struggles against discrimination around the world sheds light on the challenges faced by different communities.

- It also highlights the importance of solidarity and learning from each other's successes and failures. By understanding the global landscape of discrimination, we can develop more effective strategies and policies.

### **Learning from International Efforts**

- International efforts in combatting discrimination provide valuable lessons that can be applied globally.
- By studying successful initiatives, policies, and movements in different countries, we can identify best practices and adapt them to our own contexts.
- Solidarity and collaboration across borders are pivotal in creating a united front against discrimination.
- Embracing humanitarianism is vital, as it fuels initiatives that tackle discrimination by promoting human welfare and social reform globally.

### **Activism and Solidarity**

- Activism and solidarity play crucial roles in driving positive change and challenging discriminatory systems.
- Grassroots movements and fostering solidarity beyond borders can create momentum for transforming societies.

### **Grassroots Movements**

- Grassroots movements are powerful drivers of change. By mobilizing communities and advocating for policy reforms, grassroots activists can challenge discriminatory practices and bring awareness to marginalized voices.
- The collective power of grassroots movements has historically been instrumental in creating lasting societal transformations.

### **Solidarity Beyond Borders**

- Solidarity beyond borders allows for global collaboration in the fight against discrimination. Allies around the world can provide support to marginalized communities facing discrimination.
- By sharing knowledge, resources, and experiences, individuals and organizations can collectively work towards a more inclusive world.
- Inclusivity and equality are fundamental rights that every individual deserves.

- Discrimination continues to be a reality for many people around the world, but by navigating the global path to inclusivity and equality, we can make significant strides towards a more just and equitable society.
- It requires a multi-faceted approach that addresses various aspects of discrimination, including understanding its origins, taking action to overcome biases, promoting inclusivity in workplaces and education, advocating for legal protections, challenging media narratives, addressing economic disparities, leveraging technology, learning from global perspectives, and fostering activism and solidarity.
- By working together, we can create a world where discrimination has no place and inclusivity and equality thrive.

## Unit V - Scientific Ethics

Transparency and Fairness in scientific pursuits – Scientific inventions for the betterment of society – Unfair application of scientific inventions – Role and Responsibility of Scientist in the modern society.

### **Transparency and Fairness in scientific pursuits:**

- There is growing interest among prevention scientists in the potential for transparency, openness, and reproducibility to facilitate this mission by providing opportunities to align scientific practice with scientific ideals, accelerate scientific discovery, and broaden access to scientific knowledge.
- The overarching goal of this manuscript is to serve as a primer introducing and providing an overview of open science for prevention researchers.
- In this, we discuss factors motivating interest in transparency and reproducibility, research practices associated with open science, and stakeholders engaged in and impacted by open science reform efforts.
- In addition, we discuss how and why different types of prevention research could incorporate open science practices, as well as ways that prevention science tools and methods could be leveraged to advance the wider open science movement.
- To promote further discussion, we conclude with potential reservations and challenges for the field of prevention science to address as it transitions to greater transparency, openness, and reproducibility.
- Throughout, we identify activities that aim to strengthen the reliability and efficiency of prevention science, facilitate access to its products and outputs, and promote collaborative and inclusive participation in research activities.
- By embracing principles of transparency, openness, and reproducibility, prevention science can better achieve its mission to advance evidence-based solutions to promote individual and collective well-being.

## **Factors Motivating the Open Science Movement**

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- Proponents of open science advocate for transparency, openness, and reproducibility as mechanisms to align scientific practice with scientific ideals, accelerate scientific discovery, and broaden access to scientific knowledge.
- Depending on the nature and importance of a study, these principles are operationalized as one or more relevant open science practices.

### **Aligning Scientific Practice with Scientific Ideals**

Transparency, openness, and reproducibility are inherent in fundamental scientific ideals, such as communality, universalism, disinterestedness, and organized skepticism for example, open science practices better enable researchers to verify the work of others.

Verifiability relates to the ideal of science as “self-correcting,” which means the scientific community governs itself in order to calibrate evidentiary claims and limit unavoidable errors, thereby safeguarding credibility and instilling trust in the scientific literature. Because verifiability requires researchers to provide empirical support for scientific claims, practices like data sharing enable the verifiability of empirical evidence.

Toward that end, open science bolsters research integrity by facilitating verifiability. As researchers increasingly espouse these ideals, making open science the norm would better align actual scientific practice with the ideals to which scientists subscribe.

### **Accelerating Scientific Discovery and Progress**

Open science also can accelerate the progress of science as a cumulative enterprise. Transparency and reproducibility facilitate reuse and building on the work of others, leading to greater returns on research investments.

For example, sharing data, code, and materials allows a greater proportion of products from previous research to influence new studies.

These practices can speed the process of new discoveries and expedite error detection, thereby redirecting unproductive lines of research more quickly.

A new research team can better check the internal consistency of another team's results, reanalyze data using the original analytical strategy, and examine robustness to alternative analytical choices, prior to conducting a new study.

In addition, openness enables collaborations not possible through siloed research, such as crowdsourced initiatives that build large datasets to create opportunities for a greater number of rich data analyses.

Data sharing also yields greater power to investigate new or more complex questions (e.g., intervention effects on rare outcomes, subgroup effects, or moderated mediation) that require larger sample sizes than are typically found in one study.

Adopting protocols, software, and analytic strategies from previous studies can increase standardization, facilitating more efficient discoveries and research syntheses that summarize the cumulative evidence within a line of scientific inquiry.

### **Broadening Access to Scientific Knowledge**

- The open science movement also focuses on making research products and outputs more usable and freely available to everyone, broadening access to scientific knowledge and resources.
- For example, disparities in financial, human, and physical resources across research institutions can be mitigated by the free availability and reuse of protocols, data, code, software, and materials from previous research.
- In addition, open access articles can be read online or downloaded freely by stakeholders not affiliated with research institutions that have journal subscriptions, such as non-governmental organizations, policymakers, and engaged citizens.
- Through this focus on free availability of research findings and products, open science can accelerate the flow of scientific evidence to the public.

## Need for an Open Research Lifecycle

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- Researchers make numerous decisions across all stages of research, or the research lifecycle, including question formulation, study design, data collection and analysis, and reporting and dissemination.
- Without transparency, researchers have undisclosed flexibility in making these decisions (sometimes called “researcher degrees of freedom”), which enable specific concerns motivating the open science movement.
- For example, a “closed” research lifecycle hinders the ability to reproduce previous research facilitates selective non-reporting of studies and results (i.e., publication bias and outcome reporting bias) and other detrimental research practices, prevents detection of unintentional errors and intentional misconduct.
- Goodman offer a three-term taxonomy that may be helpful to facilitate shared understanding of and clear communication about reproducibility within prevention science.
- First, “methods reproducibility” refers to the ability to implement the same methodological and computational procedures with the same data to obtain the same results as a previous study.
- It facilitates trust that data and analyses are as represented, requiring provision of enough detail about original study methods and data for another to repeat the same procedures. “Results reproducibility” refers to the ability to implement the same methodological procedures with a new, independent dataset to produce results corroborating a previous study.
- Using this terminology, a replication study generally refers to a study designed to examine or test the results reproducibility of a previous study, with the potential to provide new evidence for a scientific claim.
- Finally, “inferential reproducibility” refers to the ability to draw conclusions that are qualitatively similar to a previous study, either from an independent replication or reanalysis of the original study data.
- All three types of reproducibility are relevant to the field of prevention science and germane to the open science movement, each with important considerations across stages of the research lifecycle.

### Detrimental Research Practices

- While there are various determinants of reporting findings that are false and irreproducible, common “detrimental research practices” may be important contributors.
- Some researchers intentionally engage in these practices with full knowledge of their negative consequences; however, most researchers likely do so unknowingly or under the belief that these practices are acceptable and compatible with research integrity.
- Regardless of intention or understanding, these practices have detrimental effects on research integrity by inflating the false positive error rate in the research literature.

Fig. 1



Roadmap for a Transparent, Open, and Reproducible Research Lifecycle.

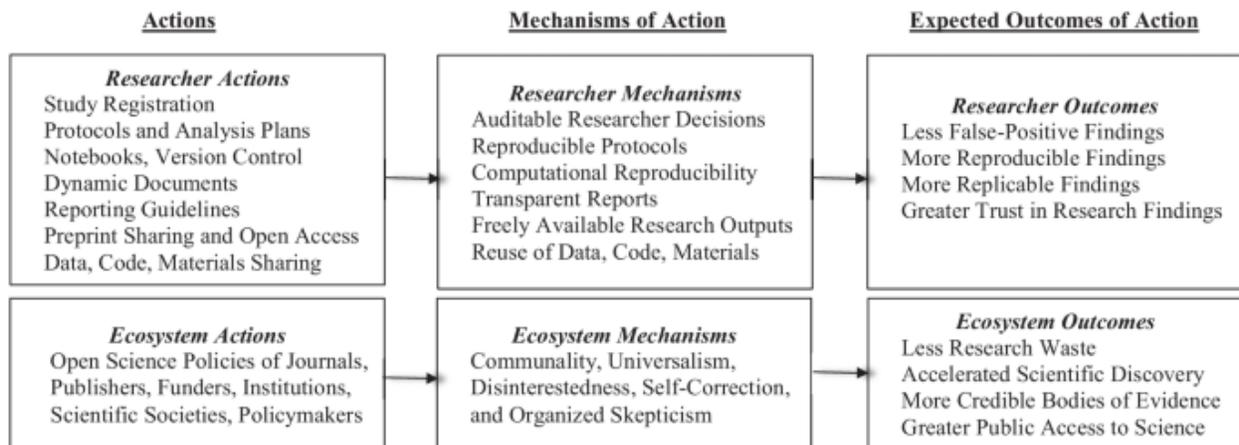
Note: Figure adapted from the roadmap co-developed by SG for the Berkeley Initiative for Transparency in the Social Sciences Research Transparency and Reproducibility Training (RT2) workshops.

**Fig. 2**

**a. Logic Model of "Problem Theory"**



**b. Logic Model of "Program Theory"**



- Logic Models of Open Science "Problem Theory" and "Program Theory"
- It is important to note, however, that this set of core open science practices has largely arisen from idealized versions of studies using the hypothetical-deductive scientific method, such as randomized trials and experiments testing confirmatory analyses via null hypothesis significance testing in a frequentist statistical framework.
- While principles of transparency and openness are relevant to all empirical research in prevention science, it may be premature or undesirable to require each open science practice for every type of empirical study a prevention scientist might conduct.
- Rather, a goal of this paper is to provide readers (particularly those new to transparency and reproducibility) with an overview of prominent open science practices.
- In the sections that follow, we describe open science practices in greater detail, along with a description of the stakeholders and contexts of research that contribute to a need for greater openness and transparency.
- We then connect these activities and concepts to prevention science research practices.

## **Scientific inventions for the betterment of society**

- Over the past two centuries, many people have used their knowledge, skills, and experience in order to create a host of inventions that have made the world a much better place for us to live.
- Here are eight paramount discoveries and innovations that have improved our standard of living and have given us the opportunity to pursue our personal and business endeavors in a more comfortable and prosperous fashion.

### **KEY POINTS:**

- Paper money, invented by China, kickstarted economies by removing the need to barter with goods.
- Vaccinations helped reduce illness and deaths, and local anesthesia made surgeries easier for patients.
- The first automobile is believed to have been invented by Karl and Bertha Benz.
- The first digital computer was created in 1937.

## **Financial Services**

**Banknote (Paper Currency): Tang Dynasty of China—7th Century**

China is not only credited with having invented paper, but it is also generally recognized as the first country in the world to use paper money. The paper money system helped improve economies worldwide by moving them away from bartering.

## **Healthcare**

**Vaccinations: Edward Jenner—1796**

Edward Jenner's work is widely regarded as the foundation of immunology. Jenner is well renowned worldwide for his innovative contribution to immunization and the ultimate eradication of smallpox.

**Local Anesthesia: William Morton—1846**

William Morton was one of the first individuals to demonstrate how ether could be used to remove the pain of operations. His use of anesthesia was displayed at a public demonstration to the surgeons of the Massachusetts General Hospital in Boston on Oct. 16, 1846, where John Collins Warren excised a tumor from a patient's neck.

William Morton wasn't necessarily the first to discover or invent anesthetics, but his name is most commonly referenced when speaking of the first practitioners to use the drug. In fact, for several years, various controversies and litigation surrounded the credit for the development of anesthesia.

### **Antibiotics: Alexander Fleming—1928**

Alexander Fleming discovered the active substance he termed "penicillin" while working on the influenza virus. Fleming made this discovery by observing that mold had developed accidentally on a staphylococcus culture plate and that the mold had created a bacteria-free circle around itself. He was inspired to experiment further and found that a mold culture prevented the growth of staphylococci, which verified his discovery. To this day, penicillin is used to treat a host of bacterial infections.

### **Food and Drink**

Pasteurization: Louis Pasteur—1862

Louis Pasteur developed the process now known as "pasteurization," which is a process of heating food to a specific temperature for a definite length of time and then cooling it immediately to reduce the number of viable pathogens that may cause disease. Dairy products, canned foods, juices, syrups, water, and wines are the primary products that are pasteurized today.

### **Transportation**

Modern Automobile: Karl Benz—1886

Karl Benz patented all of the processes that made the internal combustion engine feasible for use in cars. Karl Benz and his wife, Bertha Ringer Benz, were the founders of the Mercedes-Benz automobile manufacturing company.

## **Energy**

Modern Alternating Current Electrical Supply System: Nikola Tesla—1891

Nikola Tesla filed for seven U.S. patents in the field of polyphase alternating current motors and power transmission. Tesla's patents comprised a complete system of generators, transformers, transmission lines, motors, and lighting. Tesla is also credited with the invention of the radio. However, a patent dispute with the Marconi Company resulted, ultimately leading to the U.S. Supreme Court ruling for Tesla after his death.

## **Technology**

- Electronic Digital Computer: John Atanasoff and Clifford Berry—1937
- John Atanasoff and Clifford Berry constructed the first electronic computer with vacuum tubes while working for Iowa State College.
- The Atanasoff-Berry computer was the first digital computer. It introduced the concepts of binary arithmetic, regenerative memory, and logic circuits.
- The Atanasoff-Berry machine never reached the production stage and remained a prototype.

## **Patent Rights**

- While this list consists of well-known and distinguished inventors, it is important to note that their works were built upon the ideas and labor of many people in order to create the final product or service that we enjoy and use today.
- Many of the contributors to a key invention or innovation often go unremembered and uncompensated.
- Hopefully, governments worldwide will strive to resolve this problem by implementing a more equitable patent system.
- The most recent significant step toward accomplishing this goal in patent law was the passage of the America Invents Act on Sept. 16, 2011.
- The passage of this Act moved the U.S. patent system from a "first to invent" to a "first to file" system, which means that all parties know upfront that if they have a good idea for an invention, they need to be the first to file a patent application with the United States Patent and Trademark Office to protect their intellectual property rights.

- Passage of this Act also eliminated delays previously experienced through interference proceedings and allowed a patented product to come to market in an expedited manner.

### **What Can Be Invented to Make Life Easier?**

If you can think of something that makes life easier, you can probably create it. Computers, design applications, three-dimensional printers, and other technological innovations make the creation process much easier now than in the past.

### **What Is the Difference Between a Patent and an Invention?**

- An invention is something created by someone. A patent grants the exclusive rights to the patent filer.
- Patents generally last for a specific period, based on the type of patent it is—in the U.S., the term for a utility patent is 20 years.

### **What Inventions Changed Life?**

- There are hundreds of inventions that have changed the way we live. One of the most significant was agriculture, which moved us from hunter/gatherers to farmers and reduced human migratory patterns.
- The printing press and steam engine are two other notable inventions attributed with drastically changing life.

### **The Bottom Line**

- For current entrepreneurs, the 2011 change in U.S. patent law, with the use of low-cost, powerful personal computers and the affordability of the ever-expanding internet, should provide a much greater business environment for establishing a successful small business.
- We have already seen a number of relatively new and successful companies that have benefited from online intangible business models.
- Examples include Google, Amazon, eBay, YouTube, LinkedIn, Craigslist, Wikipedia, and PayPal, to name a few. With the U.S.'s progressive patent law, new online businesses have an additional advantage for establishing a successful small business operation.

## **Unfair application of scientific inventions:**

While scientific inventions have brought about numerous benefits and advancements to society, they also come with certain disadvantages. Some of the disadvantages of scientific inventions include:

1. **Unintended Consequences:** Scientific inventions can have unforeseen consequences that may be harmful to the environment, human health, or society as a whole. For example, the use of certain chemicals or technologies may have negative impacts that were not initially anticipated.
2. **Ethical Concerns:** Some scientific inventions raise ethical dilemmas and challenges. For instance, advancements in genetic engineering raise questions about the ethics of altering the genetic makeup of organisms, including humans.
3. **Social Disruption:** Scientific inventions can disrupt traditional ways of life and societal structures, leading to social unrest or inequality. For example, automation and artificial intelligence have the potential to displace jobs and widen the gap between the wealthy and the poor.
4. **Dependency:** Society can become overly dependent on certain scientific inventions, which can create vulnerabilities if those technologies fail or are misused. For example, reliance on fossil fuels has led to environmental degradation and climate change.
5. **Health Risks:** Some scientific inventions, such as certain medications or technologies, may have unintended health risks or side effects that only become apparent over time.
6. **Environmental Impact:** Many scientific inventions have environmental consequences, such as pollution, deforestation, or habitat destruction. For example, industrial processes can lead to pollution of air, water, and soil.
7. **Security Risks:** Certain scientific inventions, particularly in the fields of cybersecurity and biotechnology, can pose security risks if they are misused or fall into the wrong hands.
8. **Inequality:** Scientific inventions can exacerbate inequality if access to these innovations is limited to certain groups or countries, leading to disparities in development and quality of life.

It's important to note that while scientific inventions have drawbacks, they also have the potential to address many of these challenges through further research, regulation, and responsible innovation.

Scientific inventions are what drives life and progress. However, there are few downsides to it.

- ***Loss of jobs.*** The company which comes with the useful scientific invention will dominate its competition meaning other companies will lose customers and people will be threatened to lose their jobs. Machinery and automation will cause the same effect.
- ***Moral dilemmas.*** For example, the development of sentient robots which are in every aspect better than humans will make the human race redundant.
- ***Cost of lives.*** Experimentation has its costs. Either it's with animals or trials with people - someone will die in the name of science.
- ***Potential for ultimate destruction.*** Atom, nuclear physics, and nuclear energy are great discoveries. Yet, atomic bombs have the strength to destroy bigly. Not only physics can destroy. Biological inventions can be weaponized to release specially designed viruses to eradicate life. Same with chemical warfare. Science in bad guy hands can destroy civilizations.
- It's not illogical to think that every invention is made for the good of the world. Inventions help people, better society, and advance technology, right? Many inventions do probably start out with good intentions, even if it's in the vein of just seeing what happens.
- However, as you'll see in the list of inventions below, the reality can be very different and not everything in this man-made world has had a positive impact on the world.
- In fact, the damage has been catastrophic in some cases. But of course, it's only possible to call out these inventions through the magic of hindsight.
- Who knows what other modern creations will have a darker side to them in decades to come?

## **Cigarettes**

- It seems obvious now that smoking is bad for you, yet for a while smoking was seen as a harmless habit, heavily marketed to millions of people.
- The first commercially available cigarette was launched in 1865 by Washington Duke made on his 300-acre farm in Raleigh, North Carolina, USA. His hand-rolled cigarettes were sold to soldiers at the end of the Civil War.
- It wasn't until the late 1940s and 50s that studies began to take place linking smoking to lung cancer.

- For instance, in Britain in 1949, Richard Doll, a researcher working for the Medical Research Council, and Bradford Hill, an epidemiologist at the London School of Hygiene, began looking at lung cancer patients in London hospitals.
- The patients were asked about family history, diet, and previous diseases. In 649 cases of lung cancer, two were non-smokers. Doll immediately gave up his own five cigarettes a day habit.
- By 1956, the link was incontrovertible and soon restrictions were placed on advertising, followed by higher taxation, restrictions on sales to children, and on smoking in public places, with information on tar and nicotine content being given to the public cigarette sales fell for the first time in a decade.
- Many smokers at the time blamed the tobacco companies, who aggressively promoted their products to consumers without any health warnings.
- Today, there are various restrictions on nicotine advertising. Still, in 2018, the World Health Organization reported that tobacco kills more than seven million people each year.
- More than six million of those deaths are the result of direct tobacco use, while around 890,000 are the result of non-smokers being exposed to second-hand smoke.

## **Plastics**

- When plastics were first invented around 110 years ago, they were seen as a miracle invention for their strength, flexibility, durability and heat resistant structure.
- Today, they're still heavily in use, with most food packaging arriving to consumers in plastic containers, and syringes and hygienic packaging used in hospitals to prevent diseases.
- Plastics are used so prevalently in part because they're pretty much indestructible, but ultimately that's become plastics' best and worst trait.
- In 1964, the world produced 15 million tons of it. That grew to 311 million tons in 2014, which is expected to double in the next two decades.
- Around 33% of all plastic is used once and thrown away, and as plastic can't biodegrade, they just break down into smaller and smaller pieces that leak toxic chemicals and ruin ecosystems instead.
- While there is still a lot of work to be done to fully wage the war on plastic, changes are being made, for instance in 2018 when many companies like McDonald's banned the use of plastic straws and introduced paper alternatives around the UK.

## ➤ **Nuclear Fission**

- Nuclear fission is either a nuclear reaction or a radioactive decay process in which the nucleus of an atom splits into smaller parts (lighter nuclei).
- The fission process often produces free neutrons and gamma photons, and releases a very large amount of energy even by the energetic standards of radioactive decay.
- Nuclear fission of heavy elements was discovered on December 17, 1938 by Otto Hahn and his assistant Fritz Strassmann, and explained theoretically in January 1939 by Lise Meitner and her nephew Otto Robert Frisch.
- In the United States, an all-out effort for making atomic weapons began in late 1942. This work was taken over by the U.S. Army Corps of Engineers in 1943, and known as the Manhattan Engineer District.
- The top-secret Manhattan Project, as it was known, was responsible for creating the first nuclear weapons.
- In the years after World War II, many countries were involved in the further development of nuclear fission for the purposes of nuclear reactors and nuclear weapons.
- The UK opened the first commercial nuclear power plant in 1956. By 2013, there were 437 reactors in 31 countries.
- So far, two nuclear weapons have been used in the course of warfare, both by the United States near the end of World War II. On August 6, 1945, a uranium gun-type device (code name "Little Boy") was detonated over the Japanese city of Hiroshima.
- Three days later, on August 9, a plutonium implosion-type device (code name "Fat Man") was detonated over the Japanese city of Nagasaki. These two bombings resulted in the deaths of approximately 120,000 people.
- Today these areas are no-go zones with radioactive activity still prevalent. The lasting effects of these attacks highlight the destruction nuclear weapons can wreak, but countries all over the world worryingly still sit on secret stashes of them.
- Centrifuge machine heat shield used in DOE project to enrich uranium with fissionable U-235 for use in nuclear reactors (From the collection of LIFE Photo Collection)
- Badge of the Organisation for Information on Nuclear Power (From the collection of British Museum)

## **Gunpowder**

- Gunpowder is the earliest known chemical explosive. Experimenting with life-lengthening elixirs around A.D. 850, Chinese alchemists instead discovered gunpowder.
- The Chinese used explosives on a wide scale in the 10th and 11th centuries.
- The cannons, flamethrowers, and grenades that they used in battle were quickly adopted by European forces for battles on land and at sea. However, Europeans refined the applications of gunpowder and improved the devices that used gunpowder, producing weapons that dramatically transformed the nature of warfare.
- Gunpowder made warfare all over the world very different, affecting the way battles were fought and borders were drawn throughout the Middle Ages.
- Although gunpowder and its modern derivatives do still have some major uses today, almost all ammunition used in guns throughout the world (except for muzzleloaders and some military cannons and artillery pieces) is loaded with smokeless powder. Manufacture of smokeless powder is a complicated and expensive process.
- Gunpowder container decorate with inlaid shell pieces (From the collection of Museum of Ethnic Cultures, Minzu University of China)

## **High-Fructose Corn Syrup**

- High-fructose corn syrup (HFCS) has gotten a bad rep over the years and has been nicknamed "the Devil's candy," a "sinister invention," and "the crack of sweeteners" among many other sweet-toothed evil things. Different forms of HFCS have been in varying levels of production since the 1950s, but it wasn't until 1976 that the FDA approved HFCS as Generally Recognized as Safe (GRAS) that it began being used heavily in American cuisine.
- Used to sweeten food, enhance flavor, and add texture and volume, HFCS is a cheap and easily mass-produced ingredient that's become a prime culprit of the US obesity epidemic. Why? Well from 1970 to 2000, there was a 25% increase in "added sugars" in the US. After being classified as GRAS, HFCS began to replace sucrose as the main sweetener of soft drinks in the United States. At the same time, rates of obesity rose.
- While consumption of HFCS in the US has declined since it peaked at 37.5lb (17.0kg) per person in 1999, it's still rife in many diets.

- In 2012, the average American consumed approximately 27.1lb (12.3kg) of HFCS, versus 39.0lb (17.7kg) of refined cane and beet sugar. To keep up with the health concerns of consumers, food companies have begun to eliminate them from their products.
- McDonalds for instance in 2016 pledged it would replace HFCS with regular white sugar in its burger buns and Hershey's, Heinz, and PepsiCo have made similar moves.
- Eat Cane Syrup & Molasses poster (From the collection of Library of Virginia)

## **Cotton Gin**

- The cotton gin was invented by Eli Whitney in 1793 and patented in 1794. It's a machine that quickly and easily separates cotton fibers from their seeds, enabling much greater productivity than manual cotton separation.
- The fibers can then be processed into various cotton goods such as linens, while any undamaged cotton is used largely for textiles like clothing.
- It revolutionized the cotton industry in the United States, but unintentionally caused the growth of slavery in the American South as the demand for cotton workers rapidly increased. While it was true that the cotton gin reduced the labor of removing seeds, it did not reduce the "need" for slaves to grow and pick the cotton.
- Cotton growing became so profitable for the planters that it greatly increased their demand for both land and slave labor. In 1790 there were six slave states, in 1860 there were 15. From 1790 until Congress banned the importation of slaves from Africa in 1808, Southerners imported 80,000 Africans. By 1860 approximately one in three Southerners was a slave.
- As a result of this, the cotton gin has been identified as an inadvertent contributing factor to the outbreak of the American Civil War (1861–1865).
- The war was fought between the United States of America and the Confederate States of America, a collection of 11 southern states that left the Union in 1860 and 1861 and formed their own country in order to protect the institution of slavery. After the war was over, the Constitution was amended to free the slaves, to assure "equal protection under the law" for American citizens, and to grant black men the right to vote.
- More specifically, the 13th Amendment abolished slavery, the 14th Amendment guaranteed that citizens would receive "equal protection under the law," and the 15th Amendment granted black men the right to vote.

- While the constitution was eventually amended, it doesn't eliminate that heinous period of history or reduce the impact that can still be felt among American citizens, centuries later.

## **Cars**

- Cars allowed people to travel faster and further than ever and provided a sense of adventure and independence for many.
- Today though, the automobile is thought to be one of the worst inventions of the 20th century. But why? When Karl Benz developed a petrol-powered automobile it was dismissed by critics, with many feeling as though nothing would overtake horse-drawn carts, trains, and bicycles. With hindsight, we know that couldn't be further from the truth.
- Nevertheless, with their ubiquitous use around the world, cars have made their mark on the world in various negative ways.
- The modern negative consequences of heavy car use include the use of non-renewable fuels, air and noise pollution, urban sprawl, and automobile accidents. To get a sense of this particular effect, in 2015 for instance, there were around 6.3 million car accidents in the US alone.
- To combat these issues, big car companies are working to create more environmentally friendly cars and vehicles laced with enough tech that they can perform a parallel park better than the driver. But however safe the cars are in comparison to when they were first produced (seatbelts have reduced the risk of death by 45%), it's the drivers that carry a responsibility as well.

## **Internet**

- The internet is arguably one of the most successful inventions in recent decades. It's provided a fast way for people to connect with each other, receive news, learn things, and be entertained among other things.
- It's also created new career paths in a range of different and exciting industries. But it's also hindered the way we previously did those same things.
- As much as it's brought people together, the internet has also: segregated us from daily interactions; Internet addiction disorder (IAD) is a diagnosable thing; bullying in schools can now reach students at home because of social media;

- it's easier to share illegal materials like child pornography; and identity theft and cybercrime is huge with 30% of US consumers notified of a data breach in 2017, with the amount stolen peaking at \$16.8 billion.
- Just this quick overview highlights the numerous areas of life the internet has seeped into in a fairly short time. However despite the problems, dangers, and concerns, the role the internet plays in the day to day doesn't feel like it's slowing down anytime soon.
- Computer Software: Internet Tutorial (From the collection of The Strong National Museum of Play)

### **Mobile phones**

- Mobile phones or cell phones are as much a part of people's lives as the internet, and the two have become heavily intertwined.
- The world's first mobile phone call was made on April 3, 1973, when Martin Cooper, a senior engineer at Motorola, called a rival telecommunications company and informed them he was speaking via a mobile phone.
- The phone Cooper used, if you could call it that, weighed a staggering 1.1kg and measured in at 228.6x127x44.4mm. With this prototype device, you got 30 minutes of talk-time and it took around 10 hours to charge.
- We are now in the age of the smartphone.
- People didn't start using the term "smartphone" until 1995, but the first true smartphone actually made its debut three years earlier in 1992.
- It was called the Simon Personal Communicator, and it was created by IBM more than 15 years before Apple released the iPhone.
- The heavy use of smartphones has started to negatively impact people's mental health and wellbeing, for instance it's thought it can contribute towards sleep issues and replace in-person communication.
- There's also the expectation to be online and connected all the time, self-worth is equated to likes on social media, and reading on smartphones can be worse for learning and comprehension.
- In today's world, phone addiction is a very real thing, and it's because phones are not just a means to call someone but also a device to store images, watch things, pay for goods, manage your finances, exercise with and so much more. So what's next for these handheld computers?

## **DDT**

- DDT was supposed to be the magic solution that would rid the world of insect-borne diseases like malaria. Discovered in 1873, DDT (short for dichloro-diphenyl-trichloroethane) wasn't used widely until 1939, when Swiss chemist Paul Hermann Muller noted its effectiveness as a pesticide during World War II, a discovery that earned him a Nobel Prize in 1948.
- After the war, its use exploded and from 1942 to 1972, around 1.35 billion pounds of DDT were used in the US.
- The environmental effects of using millions of pounds of potent pesticides each year was, for a while, completely ignored. In 1962, Rachel Carson's book *Silent Spring* was the first to call attention to the fact that DDT might not be as magical as people thought it was.
- The book cataloged the environmental impact that coincided with the widespread use of DDT in agriculture in the United States, and questioned the logic of using potentially dangerous chemicals in the environment with little prior investigation of their effects.
- Carson claimed that DDT and other pesticides had been shown to cause cancer and fertility issues, and that their agricultural use was a threat to wildlife, particularly birds.
- Its publication was a seminal event for the environmental movement and resulted in a large public outcry that eventually led, in 1972, to a ban on DDT's agricultural use in the United States.
- A worldwide ban on agricultural use was formalized under the Stockholm Convention on Persistent Organic Pollutants, but its limited and still-controversial use in disease vector control continues because of its effectiveness in reducing malarial infections, balanced by environmental and other health concerns.
- Man spraying Elm Trees in Wisconsin with DDT to prevent Dutch Elm Disease by Lee Balterman (From the collection of LIFE Photo Collection)
- DDT affected birds by George Silk (From the collection of LIFE Photo Collection).

## **Roles and Responsibilities of scientists in modern society**

- It is believed that in the world we find ourselves in 2006, it is un-deniable that scientists hold a great number of responsibilities to themselves, their colleagues, and to the larger non-scientific public in general.
- I believe that there is a significant abyss between science and society, and that this gulf is affecting the way that scientists work, and their respective responsibilities.

- Scientists are increasingly seen as outsiders; they are no longer seen as an integral part of society. There is no doubt that the public is largely not interested in science (or at least ignorant to its existence), and that perhaps the public's view of science in general is somewhat different to what life is like at academic and scientific institutions.
- So how has science become so alienated from society?
- Although I don't know the full answer to this, I believe that science's portrayal (or lack thereof) in the media has played a significant role.
- One rarely hears of scientific stories in the general press, and this lack of publicity leads to public scientific ignorance, and ultimately, disinterest.
- Therefore, less people are taking up science at university, and we are left in the situation where a small minority of people are involved and interested in the longest running human endeavour. Thus, the general public are left largely unaware of what is happening in science today.
- This lack of interest on the public's part leaves the scientist with more responsibility than ever; if science is to continue to evolve, then which direction should it take, and what are our scientific priorities?
- I believe the only way to progress is for greater unity in the global scientific community. Scientists from across the world must work closer than ever before to establish their common goals, and to work towards these goals together, rather than nations wasting resources by 'racing for the prize'. For this direction to be successful, scientists must respect the fact that they have certain responsibilities to each other, which, if ignored, will thwart this scientific process.
- Primarily, professionalism is of utmost importance. We are always learning, whether it be through our own discoveries, or through what has come before us.
- Although we should avoid taking anything for granted, we must at some level trust our colleagues and forefathers who came before us.
- In doing so we must also accept the fact that others will put their trust into our work and discoveries.
- Therefore the need for accuracy and honesty is vital in the scientific community. It is all too easy to dismiss an unexpected result, and pretend that it didn't happen, rather than investigating into why the result may have occurred.

- It must be accepted that this is part of the scientific process, and scientists should, from a philosophical point of view, always expect to be surprised and not take current theories for granted.
- Another responsibility of great importance is the ability of the scientist to share their knowledge and findings with others. Science is historically riddled with examples of supposedly 'great minds', for example Newton and Darwin, being territorial and selfish over their work.
- When one makes a discovery, one must tell the scientific world in aid to further progress and to inspire others.
- The scientists must put the progress of mankind ahead of egotistical ambitions and rivalries.
- So, what responsibilities does the scientist owe the public? As discussed, the scientist holds a large amount of power due to their knowledge, education, and research.
- The way the scientist uses this power is the main responsibility they have to the public. So, the scientist must consider the implications of their work on the world.
- Primarily, the scientist must believe that their work is for the better good, that they are making the world a better place. The scientist must not use their knowledge to knowingly contribute to work that would be detrimental to the world.
- They must be careful and considerate of what their work tells them, and if they identify an area of their work which could be used for detrimental purposes, they must do all they can to prevent this from happening.
- This is simple enough on paper, however, when a scientist is offered a lucrative contract, or perhaps the promise of subsequent funding for a later research project, they may be tempted to ignore their conscience, and partake in work which in other conditions, they would be unwilling to contribute towards.
- The scientist must be strong in these scenarios, and accept that there are people out there who wish to appeal to their greedy side in order for them to gain.
- The scientists must stay strong, and not 'sell out' their professional ethics and integrity because a carrot is being dangled in front of their faces.
- This is another reason for greater unification of scientists. If the scientific community were in agreement of the direction of science, it would be harder for individual scientists to get bullied by people with dishonest intentions.

- Finally, the scientist must work harder to communicate their findings, both to people within the scientific field, and outside of it.
- They must listen to others, and develop the skills necessary to explain to 'laypeople' how they are conducting themselves, and what their discoveries mean to society.
- After all, society puts trust into scientists, with the hope that science will make their lives better, and ultimately, they often pick up the bill for research, so it is only right that scientists inform them in the appropriate way of their findings.
- So, what is the way forward? Well, to reiterate, I believe it of utmost importance for a greater integration of scientists and scientific fields. Luckily, I believe the emerging technologies will aid us in this quest. Thanks to the rise of global communications and the Internet, there will be greater pooling of information, and research will become available as soon as it is completed.
- Hopefully this will also lead to greater transparency of work; if this technology helps us to observe each other work, we can see exactly how experiments are carried out, and have far easier access to advice and evaluation from our peers. Hopefully this greater transparency and freedom of data will also make science more exciting and accessible to the public.
- The epoch we are living in is typical for the frequent occurrence of crises, which affect lives of masses of people.
- The consequences of these crises impose the responsibility on science as a force, participating in these situations and therefore, it places a great responsibility on those, who are actually responsible for science, the scientists.
- One can often hear the harsh criticism of the science and this is natural. Many disasters happen as a result of the modern technologies.
- It is enough to mention the Chernobyl catastrophe of 1986 to visualize, how disastrous the consequences of mistakes in technology can be. There was a nuclear reactor explosion, which ejected a huge amount of radioactive matter into the environment, polluting the soil and water for many years.
- Except for the technogenic cataclysms, there is also an opinion that all the geological and meteorological catastrophes happen because of humans' fatal influence on the environment. This can actually be confirmed by a fact, that the frequency of these phenomena, taking place nowadays, is much higher than that in the past.

- Obviously, science is nothing without those who possess the knowledge of that and push technological progress forwards, the scientists. For that reason, they carry great responsibility towards humanity.
- The distinctive feature of modern science is its close link to manufacture, when the newly introduced ideas receive their practical application in a short period of time.
- In this case the scientists' responsibility increases, because they are in power of the events of the near future, and as an ancient philosopher truthfully said, "the great power demands the great responsibility".
- The area where the matter of scientists' responsibility remains extremely sharp is the field of nuclear research and its applications.
- From one point of view, nuclear fission is a powerful source of energy, which can move vehicles and heat houses, but on the other hand, a small defect in the fission system may cause a huge disaster, which could destroy lives of thousands of people.
- The other disadvantage of nuclear power is the pollution of the environment due to the nuclear waste. Since the geological energy resources are running out, scientists develop new ways of the nuclear energy usage, making it safer for people and the environment.
- Now researchers are close to the realization of a project of small nuclear plants, which would be heating up the ordinary urban houses and would be located in the city area. An obvious question arises: will it be safe? A tiny spark in the electrical wiring of such a plant will have irreparable consequences.
- Other disputable areas of research include genetics, bioinformatics and neurobiology. There is a constant disagreement between people of different professions concerning the right for scientists to perform such investigations.
- The hottest disputes occur between atheistic scientists and religious people, where the first state that they are trying to help people overcome some diseases, which cannot be healed in any other way, but many of those who believe in God consider the genetics experiments as an interfering with Divine Providence.
- It is a question of ethics, whether scientists should work in this area. There is a blurred boundary between the accepted and unconventional areas of research.
- Something, which falls within the unaccepted region, is cloning, and especially the human cloning, which definitely goes against the ethics. One can say that animal cloning should be totally accepted, that there are no contradictions in religious, ethic and social aspects; but this may eventually lead to human cloning.

- Since the required technologies for cloning have been achieved and some experiments were successful, experiments on humans could potentially be started. It is impossible to predict the results of such experiments.
- Although we are able to forecast the genetic properties of a clone, it is absolutely unknown, what kind of character the clone would possess. What would that child of science bring to the world? The main difference between an animal and a human is the existence of a unique mentality and an immortal soul. Will clones possess such qualities or will they be human-like animals with the ability to talk, suitable for hunting and consuming by their creators? These are the questions for scientists to be answered before attempting such experiments.
- Another area of scientific exploration, which may cause a possible threat to the society, is robotics and, especially, biorobotics.
- The researchers of the Reading University succeeded in constructing a robot, which was independently controlled by a biological brain inside the machine. The main components of such a creature are the rat's neurons in a biological fluid connected to tiny electrodes, similar to those in microchips of a computer.
- The neurons appear to "behave" as a collection of interconnected cells, reacting to the external stimuli. After a certain period, the robot, equipped with a camera, started to learn and memorize the operational environment (which was a box in that case).
- Finally, it was stopping its motion if the way was blocked by an obstacle and changing its route.
- This experiment shows that bio robotics, together with neuroscience have progressed very far. Obviously, the scientists involved will modernize their creatures, teaching them to perform more and more complex tasks; but what would happen if something goes wrong?
- The first thing, which comes into one's mind, is the colorful production of Hollywood's "Terminator". We are much closer to the time described in this film, than we think.
- It is a great risk for scientists to work in these areas, because they are playing with fire.
- The modern super-powerful computers and nanotechnologies are great tools for the researchers, but it is vitally important to direct the works into the right channel and to keep the situation under constant firm control.
- It is in the hands of researchers to change all the humanity and provide people a great support for industry, manufacturing and life.

- It is their responsibility to prevent the situation going out of control and putting the society in danger.
- Recall what the world looked like at the beginning of the twentieth century. There was no electricity in many regions of different countries; the aero plane was fantastic without mentioning the space travelling.
- Now we get to the farthest part of the Earth in several hours, we can talk to our friends, holding a small device, which is literally connected to nothing.
- On the other hand, millions of people have died because of scientific progress, which brought us the nuclear weapon. These are the different aspects of the consequences of science, which can save lives, but take them away even more rapidly.
- The responsibility of all of these events lays with those, who pushed the progress forwards – the scientists. We worship them because they granted us with many blessings and blame them for poisoning our lives.
- Those who are in power over science are in power of billions of lives, which expect the magicians of nature to make great discoveries for the blessing of the humanity.
- Scientists have an important role not only in avoiding inappropriate and dangerous decisions, but also advising policymakers and other stakeholders about the best and wiser moves to make towards a human-centered society, thereby fomenting scientific knowledge and enhancing cross-cultural connections and joint research.
- They should also not forget the objective limitations of Science, which is always incomplete. With this purpose, we stress the importance of transferring knowledge among all scientific disciplines, using a transdisciplinary cross-talks approach.
- A few examples of how this may be done are presented in the paper.
- Science and technology are essential tools for innovation.
- To reap their fullest social potential, we need to articulate and solve the many aspects of today's global issues that are rooted in the political, cultural, industrial and economic realities of the human world.
- “There are some objective limitations to Science itself. Science is still far away from its goal of knowing the truth, which it always needs to be incomplete; also, science is not the only way to search for Truth.”
- Our society is witnessing an era of ever-faster growing revolution at all levels, in an exponential spiral pace that sometimes may awaken a feeling of vertigo. It doubtless goes towards objective improvements in humanity and nature.

- However, the society is not immune to eventual serious unintended consequences. Scientists have to be alert, therefore, in not only avoiding inappropriate and dangerous decisions, but also advising policymakers about the best and wiser moves to make, since having a human-centered society is advantageous to everybody.
- We should not forget that there are some objective limitations to Science itself. Science is still far away from its goal of knowing the truth, which it always finds to be incomplete; also, science is not the only way to search for Truth.
- There are other valuable ways, such as philosophy, ethics, and religion, which are unfortunately limited too, because we always arrive at concepts of reality which are unintelligible to reason. Now or later, we will always find unintelligible mechanisms that are “left face to face with the awful mystery which is reality” (Dampier, 1971, p 501).
- Before elaborating on these points, we will start clarifying some conceptual generalizations of interest in this context.

### **Conceptual Generalities**

- What do we understand from Science? Etymologically, the term “Science” comes from the Latin scientia (scire = to learn, to know), meaning a process of studying and knowing the fundamental laws of nature, through a dialogue between theory and experiment.
- It is one of the most remarkable inventions of humankind, a source of inspiration and understanding, which lifts the veil of ignorance and superstition, is a catalyst for social change and economic growth, and saves countless lives.
- The function of science is to expand continually our knowledge of the phenomena of nature, giving us an insight into the complex interrelations of phenomena, or rather between the concepts used to interpret those phenomena.
- The extension of the concept coincides with the extension in the classical Greco-Roman times, in English the word “science” is limited to natural sciences, also known as “hard sciences”, something done in a laboratory; which involves taking measurements with instruments, accurate to several decimal places; and controlled, repeatable experiments where you keep everything fixed except for a few things that you allow to vary. Areas that often conform well to these stereotypes include chemistry, physics, molecular biology.
- This divide between natural sciences on the one side, widening our knowledge of the phenomena of the nature and the relation between the different concepts used to interpret them, and philosophy and arts, on the other side, focused more on human origin and

destiny, the project of life, the Weltanschauung, even when it realizes its impossibility of achieving this purpose because there is no human way of solving everything, started in the 19th century (indeed, the word “scientist” was not coined until 1833) and according to Richard Holmes (2016), it was destructive as it was neither a natural nor a necessary divide.

- They are traditionally divided between a primarily basic science, which studies the fundamental laws of nature: in a free search for progress of pure knowledge, from microcosms (atoms) to macrocosms (universe), and a secondarily applied science on how the power of thinking can be increased by pursuing useful purposes and eventual specific practical advantages like medicine, engineering, industry, cyberspace, economics, quality of life, environmental and climatic changes...
- "No single discipline can capture reality fully or claim to have the complete knowledge."
- A new call to abolish this traditional division came from Venkatesh Narayanamurti, former Dean of Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS), in 2008, who described it as artificial, as it assumes a linear relationship that does not always exist—discovery goes both ways, while inventions draw on scientific knowledge and scientists gain insight from new devices and applications.
- Narayanamurti proposes organizing science as a cycle that moves from discovery to invention and back again, a highly nonlinear model, because they must feed on each other, in a cross- and interdisciplinary work that breaks down disciplinary walls and encourages collaboration, which has been successful in some of the top scientific institutions.
- Some of the world’s most important inventions were made not by basic scientists and applied scientists working sequentially in isolation, but by those who teamed up, sharing ideas and insights and even sometimes switching roles in cross- and interdisciplinary work. For instance, Bell Labs, home to many important discoveries, such as the development of the transistor in 1947, which laid the foundation for modern electronics and earned eight Nobel Prizes, blurred lines between disciplines, talented personnel, ample resources, and leadership (Powell, 2017).
- There are other disciplines such as social sciences (sociology, economics, political science, history...), and human sciences (philosophy, ethics, theology, art, psychology, anthropology...), usually known as soft sciences. Do they really constitute science at all, and do they deserve to stand beside the hard sciences?

- A key problem is that the task of operationalizing intuitive concepts is inevitably more difficult and less exact in the soft sciences, because there are so many uncontrolled variables.
- Far from colonizing social science under the banner of natural science, some social scientists consider their disciplines as science, and others want to think that the robustness of the philosophical approach is even more intense and transcendent than the so-called natural sciences, say, nuclear physics, because they offer achievements of great importance. Philosophy is forced to consider science as the best available evidence.
- In its intention of achieving a complete construction of reality, philosophy focuses on human origin and destiny, and its Weltanschauung, or project of life, even if it realizes the impossibility of achieving this purpose—solving all problems, because there is no human way of solving everything (see: Ramirez, in press).

### **Towards a Transdisciplinary Approach in the Natural & Social Sciences**

- The science of the 21st century is in most areas far too complex to be understood, let alone experimentally verified, by any one person.
- This necessity of knowing something in depth reveals how the different specialties of knowledge become continuously more specialized, erecting barriers between disciplines, even if, in the end, these barriers between disciplines may block the possibility of judging and of doing better.
- This is why we need an interdisciplinary approach, a cooperative integration between all the branches of sciences, with each branch competent in a restricted field, but in contact with the rest, keeping all the subjects in permeating touch with each other, for better answers about being human and our single common Universe, because no single discipline can capture reality fully or claim to have the complete knowledge. “The moment a problem of any kind is encountered, recourse is always made to interdisciplinary solutions”.
- Moreover, conclusions from different disciplines cannot contradict one another.
- “Sciences and humanities are actually not independent, but interdependent ways of getting to know the world.”
- These interconnections and comprehensive approaches are becoming more and more apparent at different levels: a) within a discipline, as the translational approach in medicine shows, “from field to bench, and from bench to bedside”, i.e. before applying

the adequate therapy (pharmacology or surgery), we have to know its pathology (abnormal) and, even prior to that, its physiology and structure (normal); and b) between all different disciplines of sciences and humanities, transferring knowledge gained in one discipline to others, with the very desirable goal of the integration of the human sciences, at some level, rendering coherent the areas where various disciplines overlap.

- Sciences and humanities are actually not independent, but interdependent ways of getting to know the world.
- Both share a sense of reality that transcends time and place; hence their common interest in a fixed 'human nature'.
- This is tied to a way of thinking and a sense of knowing that are largely contemplative. As it may seem self-evident, and was regarded as important by Einstein, Bohr and the founders of quantum theory a century ago, and by Karl Popper, who argued that falsifiability was a hallmark of good science, "all our theorising and experimentation depends on particular philosophical background assumptions" about the world (Koch, 2004).
- An especially good example of transferring knowledge gained in one discipline to others is the Viennese school, one of the most important intellectual schools of the 20th century, which had a mixture of classes and nationalities, faiths and worldviews, amid a babble of peoples and languages.
- In 1947, he founded the Mont Pelerin Society (MPS), along with Milton Friedman & Karl Popper (the "Chicago school" of economists was made up largely of MPS members) and his ideas were taken up again by a subsequent generation of politicians in the mid-1970s, including Margaret Thatcher and Ronald Reagan, He was the recipient of the 1974 Nobel Prize in Economic Sciences.

### **Towards an Integrated and Comprehensive Technological Revolution**

- We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has ever experienced before.
- We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society, as Klaus Schwab, Founder and

Executive Chairman of the World Economic Forum, exposes in *The 4th Industrial Revolution* (2016).\*

- "The desire to know the unknown is what inspires humankind's search for knowledge."
- This Fourth Industrial Revolution is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres: ubiquitous, mobile supercomputing, artificially intelligent (AI) robots, self-driving cars, neuro-technological brain enhancements, genetic editing... The evidence of dramatic change, which is happening at exponential speed, is all around us.
- We cannot close our eyes to the information technology (IT) challenge, when diffusion is continuously spreading throughout the scientific world and everybody is investing more in it and in high-tech, and each time more intelligently. IT is an authentic revolution, with higher efficiency, more productivity and less transport expenses, resulting in an increase in quality of life.
- Internet, a ubiquitous and an exponential growing web, has become the first global social organization, linking and bringing together different people into a single global cultural community, affecting international relations (Choucri, 2013) and forging a common sense of humanity;
- Mobile phone usage and internet access have exponentially risen: social media has become important and fundamental, connecting families across vast distances, the internet is now quintessentially helpful for e-banking, education or medical reasons, or for market trading (80% smartphones; smart cities...); in the case of migrants and refugees their importance goes well beyond staying in touch with people back home—phones have become a lifeline, suggesting where they should go, and whom they should trust. They even help us in dealing with important risks too, such as rumors leading to misinformation, or sensitive data falling into the wrong hands
- Artificial intelligence may help improve our decision-making capacity, and unravel the complexity of biology (producing drugs) and advanced human health (diagnose), given that living organisms are complex systems which process information using a combination of hardware and software.
- Internet of Things (IoT) is going to change business more than the industrial revolution did one century ago, encouraging innovation and offering prediction and prevention as one of its most valuable assets; it requires interoperability among all the different systems

and kinds of applications; for instance, a smart city with a digital ecosystem including citizens, universities, hospitals, companies, government...

- Even if we cannot live without IT, we should not forget that its use is not free of risk: social media webs, so efficient for agglutination of attention, are not appropriate for a public discourse, given their volatility: they are uncontrollable, unstable, short-lived and amorphous, appear suddenly and disperse with the same speed, showing a lack of stability, consistency and credibility, as the Korean philosopher Byung-Chul Han (2017) argues: digital communication enables instantaneous, impulsive reaction, being in fact responsible for the disintegration of community and public space. Suspicions about security have also risen, given the vulnerability of the present digitally connected cyber world (Ramirez & Garcia-Segura, 2017).
- The most important comment, however, is that the last decision belongs to humans, because we are the ones who have to know how to use these new concepts adequately, knowing how to discriminate in the event of eventual risks inherent to their above described whirl.

### **Limits of Sciences**

- "What is important is not the objective reality, but subjective perception."
- The continuous appearance of new scientific discoveries—some by serendipity, like the usefulness of some drugs or the law of gravity, which was discovered after Newton observed the fall of an apple—shows that science has no borders.
- Once, when Max Planck went to Munich to study Physics in 1875, somebody advised him not to do so because “there was nothing left to be discovered”, when it is probably Physics that shows better the living continuity of knowledge.
- The desire to know the unknown is what inspires humankind’s search for knowledge; the more we know, the more questions we ask. We want our understanding to be completely harmonious, which is never totally accomplished.
- Science’s quest for knowledge about reality presupposes the importance of truth, both as an end in itself and as a means for resolving problems.
- When we are using science, we are trying to arrive at the truth. In many disciplines, we want the truth to translate into something that works.

- But if it is not true, it is not going to speed up computer software, it is not going to save lives and it is not going to improve quality of life. However, experience says that science can only disclose certain aspects of reality, but not the whole truth.
- Universal truth is beyond the scope of any scientific enterprise. Science is not synonymous with truth. Let us base this assertion on a couple of arguments: the tentative nature of Science, by definition, the subjectivity of the perception, and the undeniable fact of the existence of many scientific studies subject to error and to fraud.
- The nature of Science is tentative by definition, by a scientific self-limitation to believe only what is empirically verifiable, and the emphasis that reality is measurable. Scientific concepts are not realities, but just models: Science is a hypothesis which produces laws which, to be universally acceptable, do not need to have an overall contradiction, even when described from different coordinate systems.
- Examples of common assumptions, which have played significant roles in pursuit of truth: the laws of energy conservation and of entropy increase, causality, constant light velocity in vacuum... Science expands our knowledge of nature, giving us an insight into the complex interrelations of phenomena, or rather between the concepts in which phenomena are expressed.
- But these generalizations, even if they are universally accepted as ultimate scientific concepts, have often proven to be mistaken; they are just inductions, which may be useful, only working hypotheses, drawing more or less probabilistic conclusions.
- Science, thus, is only a guide to what is probable, an affair of probability; even if the odds in favor of much of it are very high, it is impossible to reach the exact complete knowledge.
- There are no scientific dogmas, there are no certainties in science: all scientific theory is open to challenge; scientific findings cannot be ignored, nor treated as mere matters of faith.
- Our own experience tells us that the subjective perceived phenomena, the human sensations, are not reliable, because what is perceived cannot be separated from the perceiver.
- Knowledge is inevitably constructed by the knower in interaction with his nervous activity, and we should never forget that each scientist has his own values, priorities and may also have all sorts of cognitive biases, prejudices or unfounded speculations.
- Much of the public hears what it wants to hear.

- Thus, although science attempts to unify different ideas, prejudice and self-righteousness, it bases itself on an illusion from a particular viewpoint, and there may be struggles. Many things have to be scientifically understood.
- The same things may look different if our viewpoint is different, as it is evident from the quite well known Indian tale about six blind men who touch an elephant to learn what it is like: The one who feels the leg says the elephant is like a pillar; the one who feels the tail says the elephant is like a rope; the one who feels the trunk says the elephant is like a tree branch; the one who feels the ear says the elephant is like a hand fan; the one who feels the belly says the elephant is like a wall; and the one who feels the tusk says the elephant is like a solid pipe.
- The different interpretations of the elephant imply that one's subjective experience is inherently limited by its failure to account for other truths or a totality of truth.
- At various times the parable has provided insight into the relativism, opaqueness or inexpressible nature of truth, the behavior of experts in fields where there is a deficit or inaccessibility of information, the need for communication, and respect for different perspectives.
- We cannot thus ignore the subjective experiences and the limitation of our faculties of perception, given that the human cognitive capacity is limited.
- The daily experience also tells us that many scientific studies are subject to error: for instance, wine testers have more sophisticated sensations than ordinary people; the visual field does not perceive any blind spot, even if there is one, known as optic papilla, in the area of the retina where the optic nerve arises; the phi phenomenon takes place when two successive lights are turned on, a sensation of movement of light is perceived, even if in reality nothing moves; or take cryptomnesia, the capacity of remembering something we are not conscious of remembering, mixing real and imaginary memories.
- Many aspects of scientific progress may also be inhibited by fraud, not unusual at all, since that the scientific system is based on trust: some 14% of scientists say that they have witnessed it. For instance, given the logistical difficulties of providing visual evidence or replicating precisely remote field work, there may be a number of irreproducible (and often poorly conducted) studies, which may foment dishonesty, when scientists or researchers invent data, but which in reality may have come from major manipulation to outright fabrication of data.
- **Reality goes beyond the Limits of Science**

- We have just asserted that science only gives information about what is apprehended by the senses, but these senses do not reveal the Reality.
- This does not necessarily have to be restricted to physical terms, by suppressing its subjective dimensions, even if—we have to admit it—these observations are subtler. If we want to understand the human being and the universe, science has a lot to say, but it is not the only test of validity. The uniqueness of a human mind is its ability to think about things which do not fall under the senses. There are other ways of knowledge, but to see life steadily and as a whole, we need something that will overpass the limits of science, ethics, philosophy, art and theology, all of them equally valid and limited in isolation, like science.
- Science has plenty to say about many aspects of the world—about art, drawings, paintings, poetry, sports, anything you mention..., but it has nothing or very little—to say about many other basic questions, such as: What was the beginning of the universe? What is the universe made of? Might an alternative model of gravity remove its *raison d'être*? What is the origin of life on Earth? Are we alone in the universe or is there a probability of life elsewhere in the universe? What is human nature? How much can human life span be extended? How do organisms know when to stop growing? Can cancer be cured or ageing be stopped? What genetic changes made us uniquely human? Is “consciousness” present outside of organisms? Is morality hard-wired into the brain? What are the limits of learning by machines? and so on.
- We would like to add to these considerations that there is a need for a bridge between science and religion, because both have things to say about the same subject matter.
- They are different ways of studying the same territory; they have different kinds of things to say; they are different phases in humanity’s attempt to understand the world, and they each have a strong contribution to make to the efforts of humans to cope with life.
- Some aspects of the world can be known through empirical observation; others, through religious thought. Science tells us more and more about how things work. Why they work, and what is the overarching reality, are issues of an evolving religion. Science without religion is soulless.
- Religion without science is superstition, or, as Einstein stated, “science without religion is lame; religion without science is blind” (Ake, 2001). Consequently, science and religion should not be seen as conflicting forces; on the contrary, they have to progress and share

the same pedestal: science has to be inspired by values such as love for Creation, respect for life and promotion of human dignity.

- In sum, recognizing the limits of scientific knowledge—science does not have the last word—includes an explicit recognition of the tentative nature of science, combined with the fact that some things are, theoretically, unknowable scientifically. In the end, we seem to be brought to the theologian dictum of Tertullian, *credo quia absurdum*.

### **How Scientists can help create a Human-centered Society**

- In spite of their limitations, scientists can play an important role in favouring a human-centered society. We suggest a few simple examples of how this may be done.
- An international team of experts, after estimating that as much as 85% of the US biomedical research effort is wasted, has recently produced a manifesto with a master plan to improve the quality of scientific research, “to perform good, reliable, credible, reproducible, trustworthy, useful science”.
- Its goal is to increase the speed at which researchers get closer to the truth, taking into account four major categories: methods, reporting and dissemination, reproducibility, and evaluation and incentives. Who are responsible for improving the quality of science?
- Not just the researchers, but also other stakeholders, such as research institutions, scientific journals, funders and regulatory agencies. Fomenting scientific knowledge and enhancing cross-cultural connections and joint cooperative research have to be their main goal.
- **Scientific cooperation in easing relations between governments:**
- Science is fundamentally an interactive, cooperative pursuit, which allows us to expose the results of research to review and critique through a common language to more easily cross cultures and borders.
- Rachel Rothschild, analyzing centers on The European Monitoring and Evaluation Programme (EMEP), which was designed to investigate the pollutants causing acid rain and began operations under the United Nations Economic Commission for Europe in 1977, notes that the creation of the EMEP is an evidence of how addressing global environmental concerns can pave the way for easing geopolitical conflicts.
- “EMEP’s formation illuminates the importance of developing technological networks and international research projects on acid rain in furthering both détente among European countries as well as international research and policies for environmental protection”.

- The impetus for cooperating across the Iron Curtain on air pollution monitoring came from a group of scientists and environmental officials in Norway working on acid rain.
- Despite security concerns over disclosing power plant locations and resistance on placing pollution monitoring stations within the Soviet Union, the Scandinavian scientists were eventually able to secure the commitment of the Communist bloc to a Europe-wide environmental research program—a breakthrough that resulted in limited technological cooperation.
- This development helped ease Cold War tensions, fostering subsequent political relationships, which culminated in the 1979 UN Convention on Long-range Transboundary Air Pollution.
- Another example is how science brought Americans and Russians together, just after the dissolution of the Soviet Union and the end of Cold War, in late 1993, a US-Russian collaboration into sensitive areas, like the safety and security of nuclear weapons and materials.
- The Russian Federal Nuclear Center VNIIEF and Los Alamos National Laboratory conducted a ground-breaking joint experiment to study high-temperature superconductivity in ultra-high magnetic fields, sharing each other's previously highly secret sites on nuclear weapons programs. VNIIEF sent to Los Alamos explosive magnetic flux compression generators from Russia, which were charged with US-supplied explosives and stationary pulsed power machines to produce ultra-high electrical currents and magnetic fields that, in turn, produced a wide range of high-energy density environments needed to pursue a unique approach to civilian nuclear fusion.
- This joint collaboration resulted in over 400 joint publications and presentations between 1993 and 2013, and opened the door for joint work in other areas.
- These stories clearly demonstrate that countries can achieve some scientific collaboration by working together, although it is less evident whether scientific cooperation can become a precursor for political collaboration, i.e. whether science would be a driver for peace, bringing peace to the region or the whole issue is just wishful thinking.
- We hope science would play its part.

#### **Improving the public's understanding of socially relevant science:**

- The ubiquitous impact of science-based information and technologies in everyday life suggests that misunderstanding how science works can have serious consequences.

- Although the fake news phenomenon in the context of science is not at all new, social media disseminates this kind of news much faster among online social networks.
- There is an increasing need for the scientific community to have a more prominent role in social media, because people's decisions and strongly held beliefs are often at odds with the conclusions and recommendations of empirical studies and scientific consensus; they can be influenced by unscientific mass media and widely publicized campaigns providing inaccurate information via disconnections between human emotion and rationality.
- Surrounded by like-minded friends and followers, opinions are reinforced and become more extreme, because simply presenting facts is unlikely to change beliefs when those beliefs are rooted in the values and groupthink of a community.
- It should bring us a necessary shot of humility: be sceptical of your own knowledge, and the wisdom of your crowd (Regan, 2017; Sloman & Fernbach, 2017).
- People often have strong opinions about issues they understand little about.
- In some cases, the implications of misunderstanding or rejecting science are more or less harmless, because what the public admires is a sense of wonder and fun about the world, or answers to big existential questions, such as the popularization of physics, of animal behaviour, of how brain works; or if someone believes the Earth is the centre of the Universe or if there are other planetary systems, like the TRAPPIST-1 that was recently announced by NASA. Does it really matter to our daily life?
- In other cases, however, the issues that people face in their lives can be socially relevant or even critical, like when they are focused on uncertainty perhaps under the label of environment, health or food. Here are a few examples:
  - Vaccination is a particularly important issue to think about here, given the rise of the anti-vaccination (anti-VAX) movement that has the potential to reverse the health gains achieved through one of the most powerful interventions in medical history.
  - Researchers estimate that between 1963 and 2015, in the U.S. alone, nearly 200 million cases of polio, measles, mumps, rubella, varicella, adenovirus, rabies and hepatitis A and approximately 450,000 deaths from these diseases were prevented, thanks to the development of a human cell strain that allowed vaccines to be produced safely, with Leonard Hayflick's discovery of WI-38, in 1962, to safely grow the viruses needed to produce vaccines against more than 10 diseases. The anti-VAX is an emotionally-charged phenomenon distrusting healthcare, undervaluing many vaccine-preventable diseases that have become much less common, like smallpox and polio.

- It is based on a flawed debunking of a chronological (but not causal) relationship between vaccination and autism, based on a falsified and discredited study by Andrew Wakefield in 1998, that has since been shown to be fraudulent but often highly cited.
- Vaccine refusal is not just a problem for unvaccinated children (measles outbreaks), but for everybody because it endangers the health of an entire generation of children, lowering local herd immunity. §
- But if enough people forego vaccination, vaccine-preventable disease outbreaks can occur since the disease spreads among unprotected individuals, as the recent emergence of some diseases that were previously considered dormant in Western countries, such as a revival of measles, pertussis, mumps and rubella demonstrates.
- There is an increasing trend among many people to favor “clean”, healthy diets, even if they have not been diagnosed with any intolerance.
- These people prefer ecological and sustainable agriculture, choose containers or smoothies with the words “bio” or “detox”, and eat foodstuff without lactose, sugar, flour or palm oil just because it seems healthy to them, and, on the other side, they worry about eventual toxins or artificial ingredients in processed frozen or junk food, which may reduce its nutritional value, lead to overweight, or even enhance the risk of diabetes or cancer, demonizing them as “pure poison”.
- A few decades ago, the ‘danger’ was the saturated or trans fats; nowadays it seems sugar has become the main ‘devil’; it was quite advisable to eat the blue fish not long ago because of its omega-3 acids, but now, the issue is quite dubious given the presence of too many heavy metals in it;
- Similar comments may be made on another scientific myth according to which antioxidants are good and free radicals are bad.
- By the 1990s, many people were taking antioxidant supplements, such as vitamin C and carotene, based on the theory that free radicals cause ageing as proposed by Denham Harman (free radicals would be reactive molecules that build up in the body as by-products of metabolism and lead to cellular damage), assuming the corollary that molecules that neutralize free radicals, such as antioxidants, were good for human health.
- Yet in the early 2000s, scientists trying to build on the theory encountered bewildering results: mice genetically engineered to overproduce free radicals lived just as long as normal mice.

- All this is going out of our hands, leading towards what is known as orthorexia, which is the term for a condition that includes symptoms of obsessive behavior in pursuit of a healthy diet:
- If certain diets were previously rejected because of certain elements, considered prohibitive, these days the main problem is with conservatives or colorants, antioxidants, additives which pretend to conserve the life of products, avoiding mold or micro-organisms which destroy the food, emulsions which prevent the food from sticking to different surfaces, and thickeners which give body to sauces and stews.
- All food has chemicals; even milk contains thiamine and riboflavin, i.e., vitamins B1 and B2; and those called “functional foods”—because they affirm to have more nutrients like calcium or Omega-3—keep adding chemicals to the original product. All this does not make much sense to a world that flees from the “artificial” searching for the 100 % pure and natural.
- The main aim of dietetic guidelines, rather than being red nutritional advice, should be to help keep an ordered meal, adapted to each local cultural habits; f.i. 5 fruits/day, eat every 3 hrs, no carbohydrates after 5 PM, one glass of wine or beer... In few words, just follow common sense!
- How can scientists influence what is being presented in social platforms? By articulating how this kind of science works when they talk to journalists, or when they advise policymakers.
- For instance, since as humans, we have all sorts of cognitive biases that come into play when we try to evaluate the risks posed by any decision, scientists should offer an alternative to bias-based decisions, enabling leaders to create more effective policies and avoid a “cure” which may be worse than the disease.
- We are aware that using inaccurate and false information in the context of science is much murkier and unclear, because usually there is no clear dichotomy between fake news and real news, it challenges the position of science as a singular guide to decision-making, and because it involves owning up to not having all of the answers all the time while still maintaining a sense of authority.
- "Scientists cannot neglect the ethical responsibility concerning their work."
- But if we want “to inoculate” the public against popular sticky misinformation campaigns, including the damaging influence of some fake news that circulates on scientific matters propagating myths on whatever topic, we cannot risk leaving this task in the hands of

journalists because, besides not being well-trained to assess the validity of all studies (many of you may have already heard the difference between a scholar and a journalist:

- A scholar is somebody who knows a lot about very few things, whereas a journalist knows very little about a lot many things), they are attracted by the human interest of a news and the hope of creating an attractive headline.

### **Ethical Values of Science**

- We do not wish to close our presentation without a brief comment on one of the most important issues a scientist must face in his contribution towards a human-centered society: the relationship of science with ethics.
- Science has been a catalyst for social change and economic growth, and saved countless lives. But, even if in se science is not good nor bad, it is evident that there is always an eventual danger or evil concerning its application.
- For instance, a new anti-malaria drug dispenser of a drug called ivermectin kills Anopheles mosquitoes, the sort that transmit malaria. But, in addition to helping in the eradication of this illness, protecting the people indirectly, by making their blood poisonous to Anopheles, it may also cause other obvious ill effects in the digestive system, turning human beings into chemical weapons.
- The atomic research, besides its deadly applications we all know about (nuclear weapons), may also lead to peaceful applications, like the “tracer elements”, which can be applied as a radio-active method of diagnosis, in cancer radiotherapy or as effective fertilizers.
- All stakeholders have to be conscious of the importance of investment in Science, fostering scientific knowledge through the interconnections between all its branches with an open mind, transdisciplinary approach, enhancing joint research and cross-cultural connections, and providing funds not only focused on real life problems, but also on the fundamental tenets that will underpin the future of a human-centered society.
- If development of science is important, what is even more important is human development, i.e. development of human beings themselves, which is all about “growing up truly to human beings, capable of governing themselves and the universe through the well-balanced development of science, art & religion”.