Physics Communities and Their Roles

- Physics communities are an organized group of persons associated together for scientific purposes.

1. Ethiopian Physical Society (EPS)

- The Ethiopian Physical Society (EPS) enhances physics research and education for national development.

Objectives of EPS

1. To promote physics education and research in the country
2. To organize and coordinate various conferences on physics education and exchange of scientific information
3. To popularize physics in order to make students develop interest in physics
4. To promote active participation of Ethiopian physicists and the general public in the design and implementation of the physics curriculum
5. To create a means for disseminating scientific information; etc.

2. Ethiopian Physics Society in North America (EPSNA)

- Ethiopian Physics Society in North America (EPSNA) was established to promoting physics education and research among Ethiopians in Ethiopia and North America.
- EPSNA's mission was to enhance the education and training of Ethiopian Physics professionals through donations of **educational materials**, **field equipment**, **computing facilities**, and **scholarships**.

3. African association of physics students (aaps)

- African association of physics students (aaps) is Student-run educational association.
- It comprises students and recent graduates who are interested in physics.

Making of Physics Knowledge

1. Posteriori (Experiential) knowledge

- Knowledge through experience
- **Seeing something**, **hearing about something**, **feeling** something called **a posteriori knowledge**.

2. Priori knowledge

- A priori knowledge refers to knowledge that is independent of experience and is derived from reason itself.
- a priori knowledge is based on **deductive reasoning** and can be known to be true without the need for empirical verification.
- It plays a crucial role in various fields, such as **philosophy**, **mathematics**, and **theoretical sciences**.

Examples:

- **Mathematical equations**
- **Tautologies**, and
- **Certain principles of logic**.

Experiential (a posteriori) knowledge

- **Experiential (a posteriori) knowledge** refers to knowledge that is acquired through direct experience or empirical observation of the world.
- Some common types of experiential knowledge include:

1. **Perceptual knowledge (Sensory Perception)**

➢ Knowledge gained through direct **sensory perception**, such as **seeing, hearing, tasting, smelling, and touching**.

For example, **knowing that an object is red**

2. Empirical knowledge

- Knowledge gained through **systematic observation**, **experimentation**, and **data collection**.
- This includes **scientific knowledge** that is based on empirical evidence and the scientific method.

3. Procedural knowledge

- Knowledge of how to perform certain tasks or skills, acquired through practice and repetition.
- Examples include **riding a bicycle**, **playing a musical instrument**, or **driving a car**.

4. Memory Knowledge

- Stored information like facts and events. *Example*: **Remembering historical dates** or **knowing the capital of a country** is forms of memory knowledge.

5. Intuitive Knowledge

- Understanding gained without conscious reasoning.

  Example: Riding a bicycle.

6. Introspection knowledge

- Refers to the process of self-reflection and examining one's own thoughts, feelings, and experiences.
- It involves looking inward and gaining insights about oneself through introspective analysis.
- This type of knowledge is often used in fields like psychology and philosophy to understand human behavior and consciousness.

7. Testimonial knowledge

- Knowledge gained through the testimony or accounts of others.
- This includes information obtained from **books**, **lectures**, conversations, or other forms of communication.

Non-Experiential Knowledge (a priori Knowledge)

- Non-experiential knowledge, also known as a **priori knowledge**, refers to knowledge that is independent of experience or empirical evidence.
- It is knowledge that can be obtained or justified through **reason**, **logic**, or **deduction**, rather than relying on observations or sensory perception.

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- Examples of non-experiential knowledge include:

- **Mathematical truths**- refer to statements or propositions that are universally accepted as true within the realm of mathematics.

- These truths are based on **logical reasoning** and **rigorous proof**.

"2 + 2 = 4"

- **Logical principles**- are fundamental rules or principles that govern reasoning and rational thinking

- **Philosophical concepts**- These concepts often involve fundamental questions about **existence**, **knowledge**, **ethics**, **reality**, and **the nature of human experience**.

Scientific method

- The **scientific method** is an ordered series of steps to acquire knowledge based on experimental evidence.
- It involves a series of steps that include:

1. **Observation**- the act of gathering information or data through the use of our senses or scientific instruments.
2. **Question**- refers to an inquiry or problem that drives the research process.
3. **Research** - refers to the systematic and organized process of gathering information, data, and evidence to answer a specific question.
4. **Hypothesis**- is a proposed explanation or prediction that is based on existing knowledge, observations, or theories.

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5. **Experiment**- is a controlled procedure designed to test a hypothesis or answer a specific research question.

6. Analysis- refers to the process of examining and interpreting the data and results obtained from experiments or observations.

7. Conclusion- refers to the final outcome or result of a scientific investigation or experiment.