HS 312 – Introduction to Science and Technology Studies

Lecture 13

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Reasonable disagreements

- Almost all participants in disputes have good reasons for their positions;

- Symmetrical approach attempts to show that labelling losing participants as unreasonable is unwarranted

  The symmetrical approach argues that labeling losing participants as unreasonable is unfair because all viewpoints, whether winning or losing, should be analyzed equally.
  Example: In a scientific debate, if a rejected theory is dismissed as irrational, the symmetrical approach would instead examine why it was believed, rather than assuming only the accepted theory was reasonable.

- In the 1970s geophysicist Thomas Gold proposed an 'abiogenic' theory of the formation of hydrocarbons i.e. oil is not a fossil fuel but physical product

- Was it an irrational position ? Duhem-Quine thesis

  The Duhem-Quine Thesis states that scientific hypotheses cannot be tested in isolation because they are always part of a larger network of assumptions.
  Example - If an experiment contradicts a physics theory, the issue could be in the theory or in the measuring instruments, background assumptions, or calculations—making it unclear what to reject.

- Even in maths like scientists and engineers, a theoretical position that is contrary to apparent evidence is maintained by some

Reasonable disagreements

- Disagreements are regularly and routinely managed and contained

- Most minority views are eventually excluded from public debates

- Extremely deviant views are marginalized

- For example; Leonard Euler's conjecture for polyhedral → $V - E + F = 2$

- Proof was elegant but counter-examples were shown; so some wanted to derive universal relation that is true for all polyhedra; others mathematicians argued about looseness of the category polyhedra

- The meaning of polyhedra had to change in response to the proof and counter-examples

Image Source: https://mathworld.wolfram.com
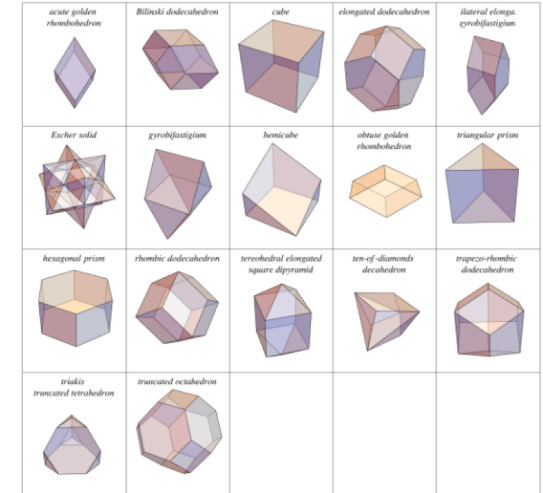
Experimenters' regress

- Experiments are normally thought to provide decisive evidence

- Experimental systems should be tools for producing differential responses based on different inputs

- At genuinely novel research fronts, experimenters do not know what their results will be

- Created to answer open questions that have not yet been answered

- Experimenters' regress – The experimental system is working when it gives the right answer, but one knows the right answer only after becoming confident in the experimental system

Experimenters' Regress is a circular problem where scientists judge an experiment's validity based on expected results, but they only know the correct results after trusting the experiment.
Example:
In the early days of gravitational wave detection, scientists weren't sure if their detectors worked because no waves had been observed. But they could only confirm a detection was real once they trusted the detectors—creating a cycle of uncertainty.

Experimenters' regress

- For example; measurement of gravitational waves in 1970s – Joseph Weber at Maryland had developed a large antenna but found many times larger than expected

- Others built equipment to replicate but found none; Weber had spent years calibrating his antenna

- Were their detectors working well? Or was Weber's device was measuring something else (an artefact) or simply erratic?

- Replication requires identical equipment – but that will reproduce same faults

Group Presentation

6	200110024	Banothu Aravind	Chapter 6		16	23B1212	Rahul Kumar
	22B1000	Barre Varthika Reddy	The sex life of the whipta	19-Feb		22B0903	Ratlan Sri Charan Singh Naik
	22B1041	Bathala Shashank				17B030013	Rohit Auti
	22B1042	Bhogi Siri				22B1028	Routhu Pavan Sekhar Naidu

Sources

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- Harry Collins and Trevor Pinch (1998). The sex life of the whiptail lizard. Chapter 6, in *The Golem: what you should know about science;* second edition: Cambridge University Press, Cambridge UK.

Thank you