

## Post-Session Activity 1: My Understanding of Effective Learning

I would define *learning* as sequences of individual processes that deal with unknown (or not clearly defined) experiences (e.g., knowledge, skills). Here, a process (e.g., memorisation, familiarisation) is a set of linked (either continuous or discontinuous) operations or activities. In my opinion, *effective learning* is a set of new sequences that aims to consolidate the understanding of a discipline.

From the above, expectation, memorisation and initial understanding are three examples of processes that are part of the *learning experience*. Each process can be subdivided into specific operations/activities (e.g., techniques to memorise or to comprehend/understand a subject). Also, each process is connected to one or more processes (of different weights) summing as individual sequences that are also inter-connected. *Effective learning* is when the vast majority of these sequences of *learning experience* are connected and an individual is able to readily apply to specific problems.

I currently teach Thermodynamics for 3<sup>rd</sup> year Engineering students (as well as supervision of UG and PG students). My usual approach is based on the following sequence:

- Motivation, or why learning a particular subject is important in the professional life (using examples, if possible);
- Main background of the subject, i.e., review the main scientific aspects that are crucial to fully understand the subject;
- The main subject is then introduced as a natural consequence of the main background;
- Examples are introduced, starting from simple cases with direct (engineering) applications. Other (more complex) examples involving previous learnt (and inter-connected) subjects are introduced. I believe this may help individuals to (a) understand the recent learnt subject (initial learning consolidation); (b) raise awareness that knowledge is a continuous and cumulative process;
- As part of the continuous assessment (but also for the continuous learning process), I split the class in small groups and assign to each group a scientific paper related to a particular (and applied) aspect of the course. They are asked to write a report followed by an oral presentation containing:
  - (a) summary of the paper;
  - (b) a short (but comprehensive) literature review on the main (or more relevant) subject related to the course;
  - (c) 1 page document (and 1-2 slides) summarising the paper for a wide (but not technical) audience;
  - (d) 1-2 slides on how the paper could fit in a thermodynamic lecture.