

Initially, I thought that learning was a passive process where you memorized “facts” and reproduce them at your whim, so as to impress other people. Later, I was told that learning and acquiring knowledge was what is expected in general by society. And to meet these expectations, I conceded. But slowly, I started realising that by learning, I am doing humanity a favour in the evolutionary process. The human brain is supposed to be the most advanced instrument on the earth, capable of understanding emotion, logic and reasoning. Every time I learn, I rewire the circuits in my brain and recycle neural tissue that has been rendered obsolete; Learning is fundamental to human civilization. How does a human gain competence in a particular field of enquiry? Learning. In my efforts to learn, I have employed various techniques that are considered conventional, but had never really understood learning as a scientific process. The *Fish is Fish* phenomenon was something I found very interesting. I used to look up in the sky at planes and think why they appeared so small. If they were people inside it, surely they would be shrunk to the size of a point! When I was going to travel in a plane for the first time as a kid, I wondered how they were going to shrink me into an order of a millimetre. This sounds naïve but is a classic example for the *Fish is Fish* phenomenon that I could relate to! When I myself was told that the earth was round, I wondered how people at the sides do not “fall off”. Obviously, I had to take it for granted until I took my first physics course in high school. My biggest takeaway from reading these chapters was that Learning was an active process, facilitated primarily by the learner and not the instructor. Learning sciences can be defined as the systematic study of processes that effect proficiency of an individual in a certain field. Learning must not be a dry, passive process where one is compelled to memorize facts, implications, examples and theorems. Instead, one must keep in mind that learning is a staged process with important *dimensions*; Gaining a deep background in factual knowledge, Understanding facts and ideas in different contexts with the developed conceptual framework and then finally reorganizing and marking knowledge so as to maximise retrieval of information and hence, the transfer of that information to solve problems in varied contexts. This is what makes a human unique from other animals; the ability to adapt and to demonstrate increased problem solving skills. Of course, every person has his/her own techniques. Something that is key to an effective learning process is the gauging of preconceptions. The initial understanding of a concept must be engaged, so as to not effect flagrant misinterpretations while learning. In primary school, I once thought that a fraction written as $^{-1}/_2$ was different from $1/_{-2}$. And I was forced to learn further operations on fractions with this initial misunderstanding, and concurrently, this lead to me performing badly. But later, this initial misunderstanding was engaged and I was forced to “unlearn”, which was difficult at first but lead to enormous growth and progress. To further enhance one’s concepts, one must follow a metacognitive approach to learning which entails self-assessments and retrospection as to what worked and what did not. I have a bad habit of picking up my phone impulsively while I am in the middle of a study session, only to find that nothing has changed from minutes ago. If things do change, this happens very rarely, and I am seldom rewarded by this habit. Hence, as explained in the book, it is arguably become very hard to extinguish it. I too appreciate music, and there were times I practised and could not see any miraculous improvement coming around in a week’s time. However, being motivated and believing that the result need not be immediate, and that it is ever so sweeter when achieved when more effort is put in kept me inspired. I have often resorted to observational learning. Analysing several virtuosi perform and their techniques, body language and demeanour has made my playing a lot more refined, dynamic and expressive. When I consciously try to make my instrument sound in a certain way, or phrase a bar of music accordingly, I resort to perceptual learning where in I make several attempts and tend towards the better sounding version in various contexts. Developing technique is also an element of motor learning. Learning a topic from a new but related field in mathematics is made much easier when patterns are identified. These are often a myriad of non-conscious and spontaneous decisions or realisations that compound to re-organisation of knowledge, and thereby strengthening it’s roots. For example, the set theoretic inequality/containment $A \subset B$ which means that A is contained in B. This gives a notion that the size of the set A is lesser or equal to the size of set B (which is trivial in arithmetic). This is called making an implicit pattern or in other words, finding regularity in otherwise irregular environments. I have often resorted to this type of learning when I cooked up a few words that sounded phonetically consistent in the English language, say *biology : biological :: etymology : etymological*. The last word seems more complex but the implicit pattern that can be identified here is that all the noun forms end with a y. The most gruelling things I have learnt are mathematical theorems. First off, I must have a deep theoretical background about what the proof entails. This includes fundamental mathematical axioms and postulates. Then, I try to understand the mechanics of the proof and find a few examples or non-examples to the theorem. Then, I group it with the set of closely related theorems so that I can remember it better. The closely related set here refers to a group of

theorems that have a similar proof technique , or a similar result. Thus, organising it in the end gives me a bigger picture and better retrieval and transfer abilities.

AN AUTHENTIC LEARNING EXPERIENCE- My standpoint

Conventionally, orthodox learning has a lot of pre-set regulations that must be accepted by the instructor and the learner. This mostly results in instruction by elimination, and hence only a fraction of the learning audience actually benefits. This has led to the questioning of these basic regulations by experts who are of the opinion that the retainment and transfer of knowledge is best achieved when the learning is supplemented and “constructed” by the learners themselves. The instructor shall not treat knowledge as a collection of facts and procedures, but rather provide opportunities for the students to construct their own knowledge based on their understanding of raw concepts. This is achieved by connecting what is taught in school to problems in the real world that would mirror the information taught in school. This knowledge construction depends vastly on the student’s previous experiences and the learning environment, which may comprise certain incentives. Thus, students are encouraged to explore out of the school curriculum and discuss parallel examples that are evident in real life. An example would be to use the COVID-19 data for statistical data analysis- The students can relate to these much better and would be motivated to complete their tasks more efficiently if they are interested in the material. This entails an authentic learning experience.

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