Learning about teaching - notes

People don't want to study, because for this, you have to stress your brain and lose energy. They want to know, but waiting to be taught.

**Motivation**

Educators should not motivate. Motivation must come from within and the role of teacher is to create a conducive environment for it

**Putting the theory and then giving practical tasks is not the best way to remember information.**

First you should put the listeners brain in difficult conditions, it should be stuck looking for a way out. It's important to give the brain the ability to build knowledge yourself, not just read it outside.

**Mistake**

This is great! They are necessary for learning. When the brain is stuck and wrong, at this stage the previous knowledge does not explain the picture of the human world. Having enough courage and a safe environment around, a person begins to gain new knowledge. And then the teacher / ki task is to provide them (or the person can blame the teacher / book and stay with the old picture of the world in the comfort zone)

**Change of context**

To pin new information, it is desirable to give another situation / change the context. According to recent studies, this is very important for remembering.

**Pause + Reminder**

After acquiring new knowledge, you should give your brain a rest, and in a few days / week or two try to remember it yourself. The recall turns out to play an important role in the process of building strong neural connections and long-term memory.

**Assessment**

It is carried out to understand whether it is possible to achieve the desired result, such as changes in thinking or behavior. You can give a task to solve, test, conduct a personal conversation / call or watch a person

There should be interaction between students and teacher, students and students. And the student has to make an effort, and then he will enjoy studying.

**Safe conditions**

The brain doesn't learn when it's in survival mode. The role of a teacher / ki create safe conditions and pay attention to the emotions of listeners, allow them to be and accept them.

This way of teaching is often “no time ". In a short amount of time, I want to give as much information as possible and we give facts. Surely a teacher can come and sing his song, but it's important to give people the opportunity to learn and build knowledge in their head.

**Entertain or teach**

The teacher does not have to love both credits and good feedback after the lecture, does not mean that the person has learned. In the memory of a person, the jokes of a teacher could remain, instead of knowledge.

Of course, this does not mean that you can learn only under the above conditions. And the teaching method depends on the goal. But everything we know about the brain needs to be taken into account when studying (whether it's school, university, courses or one lecture / webinar on environmental or other subjects)

**Conditions we should create when teaching… and why these are important (And why this“why?)**

* The learners brain is active
* The learner constructs the new knowledge in their own head
* The learners’ thinking is made visible, that is, there is constant interaction
* The learner has tasks that enable to make mistakes in order to analyse them
* Tasks are rather effortful than easy in every aspect
* There is NO emotional tension, stress, or anxiety

**Thus, learning is facilitated the most**

* Effort - but only then, if it is not just word of mouth; putting in effort should happen in effective and wise ways. If child uses wrong learning strategy, effort is useless.
* Making mistakes - but only if the mistakes will be reflected, analysed, processed, studied – only then the mistake will be repaired and deep learning occurs.

**What kind of memory traces we want to induce in learners?**

Memory traces (knowledge) should be:

* Durable – remains accessible across periods of disuse
* Flexible – is accessible in the various contexts in which they are relevant, not simply in contexts that match those experienced during instruction

Learning and performance – different or even opposing phenomena:

* considerable learning can occur in the absence of any performance gains and, conversely,
* substantial changes in performance often fail to translate into corresponding changes in learning.
* Moreover, in has been shown that the conditions that produce the most errors during acquisition are often the very conditions that produce the most learning.

**Becoming effective learner involves:**

* understanding key aspects of the functional architecture that characterizes human learning and memory
* knowing activities and techniques that enhance the storage and subsequent retrieval of to-be-learned information and procedures
* knowing how to monitor the state of one’s learning and to control one’s learning activities in response to such monitoring
* understanding certain biases that can impair judgements of whether learning has been achieved that will support later recall and transfer.

**Peculiarities of memory**

* We do not store information in our long-term memories by making any kind of literal recording of that information
* Instead, we do so by relating new information to what we already know
* We store new information in terms of its meaning to us, as defined by its relationships and semantic associations to information that already exists in our memories

**What that means – we have to be an active participant in the learning process— by**

* interpreting,
* connecting,
* interrelating,
* elaborating,
* not simply recording the material.
* Basically - information will not write itself on our memories. Conscientiously taking verbatim notes or reading to-be-learned content over, if it is done in a passive way, is not an efficient way to learn.

**Retrieval strategies - Which ones are good? Which ones are useless?**

* Massed practice, practicing for a long time ☹ (because makes an illusion of knowing/mastering skill; gets automatic („Yeah, I’ve got it!“, but without pauses allows not so much myelination)
* Self-testing, retrieval practice ☺ (best in written form; allows retrieving from long-term memory; vaccinates against forgetting; demands effort and thinking about material)
* Interleaved practice ☺ (because demands effort and gives the brain the message that this knowledge is „functional“, builds more lasting circuits)
* Rereading ☹ (demands little effort; makes illusion of knowledge; when we read, we recognize the material and do not retrieve)
* Rewriting ☹ (same as with rereading; may base just on short time memory and not on retrieving)
* Conceptual mapping (because often used superficially and in this case demand little effort) – it is more related to storaging phase – this is encoding strategy
* Rephrasing with your own words ☺ (demands effort and thinking about the material, BUT is effective if retrieved from long-term memory)
* Spaced, distributed practice ☺ (demands effort; allows for retrieval from long-term memory; gives the brain a signal that this material will be important also in future)
* Variability of practice - learning the same concept in different contexts/situations ☺ (demands effort and continuous attention/recalibrating skills/knowledge)
* Highlighting important parts of the material 😐 (demands little effort, makes illusion of learning; can be useful for sophisticated learners though)
* Relating the material with own experience or other subjects/topics ☺ (demands effort and thinking about the material) – this is encoding strategy

**Learning vs performance**

* What distinguishes, then, effective and ineffective learning strategies?

With more effective learning, that is, building memory traces that are potentially *durable and flexible,* following might relate:

* Learning process demands effort and mistakes occur (the more, the better)
* Learning is based on retrieval, not recognition; that is, one reconstructs the information based on long-term memory (the little that is already there; although it feels quite… hard), not massed practice based on short-term memory demanding little effort and thinking (testing is learning!)
* During learning, one **thinks about the material** and conceptualises it (as opposing rereading, that may relate also to relatively little thinking and occasional mind-wandering)
* Learning is spaced in time and over various contexts; the situation and tasks vary as much as possible, leaving little room for mindless repeating of the same operation

**Le’ts talk about mistakes once more**

* Errors and mistakes are typically viewed as something to avoid during the learning process, in part out of fear that they will be interpreted— by ourselves or others—as documenting our inadequacies as a learner, but also out of a concern that such errors or mistakes, by virtue of being produced, will be learned.
* A variety of research findings suggest, by contrast, that making errors is often an essential component of efficient learning.
* Introducing desirable difficulties into learning procedures, for example, such as variation or interleaving, tends to result in more errors being made during the acquisition process, but it also tends to enhance long-term retention and transfer (e.g., Lee 2012, Simon & Bjork 2001, Taylor & Rohrer 2010).
* Conversely, manipulations that eliminate errors can often eliminate learning. Thus, for example, when retrieval of to-be-learned information is made so easy as to insure success, by virtue of recency, strong cue support, or some other factor, the benefits of such retrieval as a learning event tend to be mostly or entirely eliminated (e.g., Landauer & Bjork 1978, Rawson & Kintsch 2005, Whitten & Bjork 1977).

**Conclusions:**

* Every brain can create synapses (=learn all fields) and make them stronger/myelinate their axons (=get better and better) – so we do not have „wise children“ and „less wise children“, but all children with neuroplastic brains who may need different amount of time and varying learning strategies to learn
* If we do not understand the learning process, it is easy to pick wrong learning strategy -> we might get the illusion of learning, but not real change in knowledge/skills
* **Let’s reframe effort and mistakes – they are the best part of learning! If there wasn’t any, the day was wasted.**
* The student has to have emotionally safe, supported, warm feeling, and cognitive effort-demanding at the same time – this is the optimal context of learning

**3 basic needs of learning**

**3) Relatedness (opposite: coldness)**

* *Relatedness* concerns feeling socially connected. People feel relatedness most typically when they **feel cared for by others.**
* Yet relatedness is also about belonging and **feeling significant** among others.
* Thus equally important to relatedness is experiencing oneself **as giving or contributing to others.**
* Relatedness pertains, moreover, to a sense of **being integral to social organizations** beyond oneself.
* That is, both by feeling connected to close others and by being a significant member of social groups, people experience relatedness and belonging, for example through contributing to the group or showing benevolence.

**How to support feeling of relatedness:**

* Warmth, open curiosity, even if somebody “trolls” – it is not about you, that they do it
* Look every situation from their perspective
* Nobody should never feel that they are left out from the “herd”
* Find ways for everybody to feel significant and valuable
* Make them feel that they and their contribution is wanted by you
* Make them feel that they are respected

**How to kill feeling of relatedness:**

* Make them feel as units, not individuals
* Make them feel incompetent and shamed – preferably in public!
* Bully or let others bully
* If someone acts wrongly, let them feel that they are thrown out from the group

**2) Competence (opposite: chaos)**

* competence refers to our basic need to feel effectiveness and mastery. People need to feel able to operate effectively within their important life contexts.
* The need for competence is evident as an inherent striving, manifested in curiosity, manipulation, and a wide range of epistemic motives. It energizes myriad behaviors, from people in leisure moments playing mobile video games to scientists discovering the laws of the universe.
* Competence is, however, readily thwarted. It wanes in contexts in which challenges are too difficult, negative feedback is pervasive, or feelings of mastery and effectiveness are diminished or undermined by interpersonal actors such as person-focused criticism and social comparisons.
* Another aspect of competence is structure – the feeling that I know “how the world functions” – what is expected from you, from where I get help when needed, that the educators are available when needed, etc.

**How to support feeling of competence:**

* Make them explicitly feel that you are there to help them; that you and them are in the same boat
* Be explicit in what you expect from them and how to achieve that; and from where to get help and support if they do not know, what do to
* Give tasks, that help them to get better step by step
* Follow the rules that you have agreed jointly; notice from time to time, whether all the rules are still relevant
* *After action review –* reflect (collectively) after every task you do – how did we think and act; why it worked or did not work?
* Give informative feedback, that says *what they should try next*

**How to kill feeling of competence:**

* Do not say what you expect from them or do it in a way, that they do not understand
* Threaten with failure, make them anxious
* Little help and support
* Keep rules inconsistent
* Vanish, when they need help
* Give comparative or judgmental feedback or say something about the performance, not process

**1) Autonomy (opposite: control)**

* the need to self-regulate one’s experiences and actions. Autonomy is a form of functioning associated with feeling volitional, congruent, and integrated.
* autonomy considered as this sense of voluntarism is, therefore, not the same as independence (or self-reliance).
* The central aspect of autonomy is the feeling that one’s own actions are valuable and meaningful from one’s own perspective (“I truly know, what I want to do something”).
* The hallmark of autonomy is that one’s behaviours are self-endorsed, or congruent with one’s authentic interests and values.
* When acting with autonomy, behaviors are engaged wholeheartedly, whereas one experiences incongruence and conflict when doing what is contrary to one’s volition.
* Our autonomy can be threaten by many aspects as our identity is multifaceted; in adults, one of the most important thing for supporting autonomy would to value peoples’ ideas (to see the “thinker”, “idea-generator” in your learners, and value them as such). But also if our pace of learning, our emotions etc will be under control or pressure, then our feeling of autonomy and hence, motivation, will be thwarted.

**How to support feeling of autonomy:**

* Help them to see the activities, you ask them to do, as valuable from their perspective
* Give meaning to every activity from their perspective
* Let them think, to come out with their ideas and solutions
* Follow patiently their pace and rhythm of learning
* Accept and welcome negative emotions
* If possible, give meaningful choices (meaningful from their perspective)
* Take their “I”, their personality into account, if possible – e.g., if somebody have some skill that might be useful, involve them

**How to kill feeling of autonomy:**

* Compare, make social comparisons, create rivalry!
* Do not let them think, think for them, give solutions
* Force your pace upon them
* Do not explain, why some activity is needed
* Ignore or diminish their negative feelings

**Conceptual change and misconceptions**

* We can achieve knowledge via senses and also via thinking – differently organized representations
* Most of the principles and phenomena in the world are not achievable via senses – we need special representations in our mind and special kind of mental operations
* In real life, we need both
* Simple, sensory-based representations and idea allow us to solve simple problems, while representations that are “verbal”, allow us to solve complex problems

NB! If we simplify the complex knowledge so that is fits to our experience, it may lead to misconception.

Misconceptions tend to lead to incorrect practices…

**According to conceptual change theory, learning involves three steps:**

* Recognizing or detecting an anomaly. This refers to becoming aware that your current mental model (representation or theory or conception) is inadequate to explain observable facts. The student must realize that he/she has a misconception(s) that must be discarded or replaced
* Constructing a new model. This entails finding a better, more sufficient model that is able to explain the observable facts. It involves the students' replacing one model with another
* Using a new model. This refers to students using the new model to find a solution when presented with a problem. This reflects an ability to solve problems with the new model.

Hence mental models (representations of theories or concepts) are at the core of conceptual-change theory. For example, you are using a mental model when you think of the earth as hollow.

**Some instructional strategies for conceptual change/ for leaving misconceptions behind**

Universal:

* Assess preconceptions
* Some of preconceptions may be correct – use them as a bridge of examples to the new conceptions
* If you present new concepts, then in a way that students see it as plausible, high-quality, intelligible and generative
* Use model-based reasoning, diverse instruction, cognitive conflict, predict-observe-explain model, bridging examples, refutation (some will be explained later)
* Help them to become aware of their own misconceptions
* Help them “self-repair” their misconceptions
* Once they got over their misconceptions, allow them to use their new knowledge, e.g., in debates, to strengthen these

**Don'ts:**

* Do not rely solely on lectures.
* Do not rely solely on labs or hands-on activities.
* Do not rely solely on demonstrations.
* Do not rely solely on having students simply read the text.
* Do not rely solely on a singular perspective when there are multiple ways to interpret material.

**Predict-observe-explain**

Related with some topic where people often have misconceptions, plan a situation where you could demonstrate in some experimental way (does not have to be hands-on, enough, when it is video etc) the opposing and correct information. But BEFORE presenting it, give learners time to write down, what they think would happen in this experiment/situation – to predict. Then presenting the experiment will follow so that learners are able to compare their own ideas to the reality and become aware of their own thinking. Which is good ☺ After that, their role is to explain, what really happened and why; why they predicted it differently, if they did.

**Diverse instruction**

Diverse instruction simultaneously challenges at least two erroneous beliefs that underlie a misconception (alternative conception).

Shifts in intuitive theories or misconceptions are more likely to occur when people encounter new information that challenges several features or assumptions of these models.

Conceptual change is more likely if students are presented with a few examples that challenge multiple assumptions, rather than with a larger number of examples that challenge just one assumption.

Example: understanding the shape of the earth in children: there are several misconceptions, one related to the relative size of the earth and other with the gravity

**Cognitive conflict**

… arises when students encounter experiences that they are not able to assimilate or that are incongruous with their current cognitive structures/conceptions. Cognitive conflict can lead to conceptual change

Ways to elicit cognitive conflict

Present the audience with anomalous data (data that do not fit their existing conceptions) – this would be the basis of discussion. Anomalous data should be credible; if possible, offer multiple lines of data; if possible, data that is somewhat known from their everyday experience; if possible, illustrate the data with experiments

Present them with refutational texts (a refutational text introduces a common misconception, refutes it, and offers a new (alternative) theory that proves to be more satisfactory) – this would again be the basis of discussion where learners could support their views with the evidence from the text