

Distant Associations

1. Question

What I am trying to consider here is: What kind of knowledge, understanding, and skills is *necessary* for people, jobs, and society, given that technology takes giant steps to compete with us in ever more aspects.

2. Distant associations

What *is* necessary, in particular for insights and innovation, is the ability to come up with an associative connection between distinct areas. Insights, here, somewhat differs from understanding, and innovation differs from creativity — more on that later. And distinct areas is not just the same as in *domain*-independence of the competences often called critical thinking. For explaining what I mean by distinct areas to be linked I need to go farther back.

In connectivism's neural metaphor, "not all links are of equal strength". In particular, some links have strength = 1 and connect a concept with a unique 'parent' concept. For example, 'wheel' belongs to 'vehicle'. In fact, a vast share of our knowledge consists of such hierarchical (arborescent) links. Even if the hierarchy is sometimes exchangeable (e.g. Diderot > France > 18c, or Diderot > 18c > France, i.e. multi-faceted), all linked concepts belong to the same frame (or 'script', or 'scheme'), such as doctor, nurse, pill. This sort of relationships is the basis of much of machine learning, by 'co-occurrences' of, say, a word on the same page. Although the idea is still a bit vague in my head, Lakoff's *frame* concept is probably the closest match.

Now contrast these types of links with Lakoff's *metaphors* where things are not 'related' in the way family members are relatives, but just similar in some way, maybe in some formerly unnoticed way, or by any other associative thought. These links are not arborescent, but rhizomatic, "see also" links. As I understand McGilchrist, they need the right hemisphere mode, while the left hemisphere mode is happy to focus and drill down within ever more specialized and isolated frames and expertise areas. In a 2019 reading group, we were pointed to an article which even considered different distances within the brain: "*Local efficiency [among] nearest neighbors*" vs. flexibility by "*connections between physically distant regions*", [here](#).

You probably want an example for the distant associations. Examples are always difficult for me, but I'll try: while innovation is akin to creativity, and insight is akin to understanding, innovation is distant from, but similar to, insight in the respect I am trying to describe.

3. Understanding

Now understanding, as it happens in school after teaching and explaining, is basically making links within a frame of how something works. Downes described it as "the last piece has fallen into place" [here](#). But for the society as a whole 'learning' new knowledge, there is more needed: insight across distinct areas, i.e. distant links.

(This description might sound a bit oversimplified. Pieces falling into place sounds like links of all strength 1 and like a mechanic appliance starting to work, while for me, full understanding often feels more holistic, like "standing right in between" (like the root 'inter' of English under-standing) or right before (like German ver-stehen). And for children, learning relationships that are new to them might feel like rather distant links that will only later form a topic frame.

But for the quick and effective mediation of understanding, small links are typically used which connect to the stuff already known, while insight in new knowledge (new for everyone) involves more distant links.)

4. Imagination

There are two important requirements for coming up with new distant links: imagination, and independence (and these two are the central sections in the [summary](#) of my blogging of the last 5 years).

Much of human cognition has to do with the invisible, and the future is always invisible, so it must be imagined by our brain whose main function is that of a 'prediction engine', and each innovative idea and plan must be able to picture the intangible. (Also abstraction, albeit more akin to the left hemisphere mode, involves imagination, if we look beyond the generalisation as something removed, as a value in itself, modality-free, towards something that helps transferring practices into a second context, as an indirection/ a detour, cross-modal, much like a metaphor.)

Now what has technology done to imagination? I hate to sound like Nicholas Carr, because simulations for quickly acquiring critical skills are certainly a blessing. But on the occasion of the pivoting to online schooling I became shockingly aware how stupidly the affordances of New Media have been selected during the last 20 years: Instead of full New Media (including overcoming the limitations of pages), the fascination has been mostly about *multi*-media, and about bringing an abundance of pictures, videos and talks ever closer, to make every experience more colorful and louder, more lively, more immersive, from remote and ancient cultures to microcosmos to macrocosmos — at the expense of the need for imagination. The threshold of my frustration was reached when I learned from H5P's interactive textbooks, that even interactivity is only meant as simulating the teacher – student interaction (with questions and quizzes). Apparently, the limitations of the paper page are not even noticed, so eager are we to mimic traditional writing on our computers — which is mostly still a typewriter, just with built-in whiteout.

5. Independence

The other big prerequisite for coming up with solutions for future challenges, is independence in learning and thinking. There is the opportunity to skip a teacher and just ask the internet. But I have gradually become aware that the type of questions is changing, and with this, also the information offerings have changed.

I have noticed this in an especially negative way with questions about programming (on the forums like Stackoverflow, which I have encountered as a place of arrogant 'meritocrats' who talk down newcomers). Before a long hiatus in writing code myself, I used to obtain the information needed in Reference Manuals, where I could look up the individual elements as building blocks and use them. Now ever more software publishers don't offer such manuals anymore, but just send the users to the forums of other users. Superficially, it sounds like a progress that I can now ask a question for my concrete specific problem, and may get a bespoke ready solution, instead of having to build the solution myself from building blocks. The downside, however, is that I can't get information about building blocks anymore, and so I am dependent on finding a fitting case or at best an FAQ.

(IMHO, this trend has started already much earlier in a very different environment: in the library help-desks and catalogs. When lazy researchers asked the help staff for literature, the traditional browsable classification catalog was not as helpful to the general staff as it would have been for the researchers themselves. The latter would navigate the special subsections without many search words because they knew their stuff when they saw it. The general staff, by contrast, who did not know enough specifics, were happier about a keyword catalog. And then the libraries 'delegated' their work to Google altogether.)

Now it seems to be easier to get a ready response, but if it is about an innovative problem that nobody has been asking about before, it is in fact much more difficult now that Google is optimized

for the lazy usage. The offer of full-text search in every software has more or less halted the development of more sophisticated organising tools; not even the shortcut to a folder (the equivalent of the “see also” link) is sufficiently usable. Everywhere I look, the impatience grows to get a result fast and without effort — for example also in the ‘tools for thought’ business where the desired products are not really tools but prostheses that promise to do the work for us.

Now the online schooling has revealed how big the problems are that pupils have with independent work. I have always believed in the saying that there are no stupid questions, but I have become aware that some pupils are so much pampered with readymade answers, solutions, and ‘walkthroughs’ that parents and teachers have become reluctant to accept all of their kid’s asking for help. Which, in turn, causes other children to hesitate to ask and feeling dumb about it, as a relative of mine was told in the 50s that if she had listened, she would not have to ask. A tweet thread that shocked me was [this](#):

“[...] students who will struggle silently and cry rather than indicate they need help. They actively HIDE their struggle, so that I have no idea there’s a problem until they’re melting down.” and “I have students like this and it breaks my heart every time. It takes a LOT to earn their trust, and next to nothing for another adult to shatter it again.”

How much help is okay — this seems to be such a difficult question that only a human teacher/ coach familiar with the child can appropriately know it. It is such a wide spectrum from independence to getting help to getting the task done by someone else. In sports, I never succeeded with the upstart exercise at the horizontal bar — always the two helpers had to lift me around. And similarly, if every abstract concept is immediately dissolved by an example, the purpose of the whole exercise (to practise one’s independent imagination) is missed.

6. Stuff

Now how is this all related to acquiring and retaining knowledge about the stuff from the curriculum? At least in my country, school administration insist stressing that it is no longer about retaining knowledge, let alone rote memorizing or mere factual knowledge. They call the target “competencies”, but often these seem like just a disguise for memorized stuff. For example, “Pupil can point out/ expound/ state” something — which for good measure is even biased against the shy and in favor of the loudmouths. I think the focus is ever more on stuff, this has become particularly apparent when they refused to cut some of it during the pandemic.

The reason for this is, IMHO, that it is what can be assessed in the easiest way, and in the most fine-grained and accurate and, yes, ‘just’ way. I think this focus on justice of assessments is derived from laudable motives but has now utterly went awry. When the measure is mistaken for the thing being measured (the grades for the abilities) then the abilities are eventually harmed. Parents plague the pupils until some results are filled in on the homework assignments, or until a procedure for calculation is finally brought to an end, no matter if any understanding or skills have grown. In my opinion, much less of justifiable exactness, and more discretionary and perhaps a little biased judgement by seasoned teachers, could indeed be ethically superior, when I understand John Rawls correctly: even those disadvantaged by the inexactnesses would eventually be better off. The obsession with verifiable, bullet-proof grading results may have been increased by the schools’ fear of being sued by influential parents of dumb children, such that there is no leeway left for teachers’ human judgement. The assessment system already works like a machinery with industrial precision, like automated — much like artificial intelligence already.

So, it seems the entire society, like paralyzed, shies away from thinking about the simple question what do we really need to know by heart, when every fact, procedure, explanation can be looked up

in Google and YouTube? What concepts do we need to have “down pat”/ “at the ready” within our brain? Apparently, many have a hunch that the answer would be: almost none, but that the answer does not feel right because experience says that concepts at the ready feel so useful? I think this is where the desired distant association comes in: To come up with such a link, we need several memory contents simultaneously available. So, we do need to learn how to, and get used to how it feels like to, have things ready in the mind. But not for the sake of that stuff itself. Like the McGuffin, any exemplary content for in-depth exploration will do.

7. Conducive circumstances

The distant link does not form suddenly, in a Eureka fashion. It is just the sudden awareness about it that feels like the Ah-ha moment, after a long time of gradual emergence of simmering and vague hunches, from a rich background picture, via intuition rather than inferring and reasoning, often during a break, on a walk, away from the papers (having things in mind), or while doing unrelated work, maybe household work. This is, IMHO, the big difference from same-frame knowledge which derives from focussing and isolating. This is where McGilchrist’s modes of attention come to play: Distant associations emerge from a multi-point background picture, rather than isolating focus. And this is why such mental activity has become less esteemed and is more akin to less reputable practical and craft skills that require quantitative eyeballing, experience with bricolage, trial and error, and a big internal ‘database’ of holistic pattern images. I think it is an important takeaway from McGilchrist to education.

8. Creativity

Creativity is often seen as the main distinguishing superiority of human cognition over machines. And indeed, it often involves the same kind of novel link as described above. Often the heart of an artwork is the unexpected juxtaposition of two very different things. But there is a caveat which McGilchrist has pointed out: the novelty that is born from boredom. If the purpose of a creation is just a stimulus against boredom, it can be generated by machines just by applying combinatorics to the juxtapositions. A genuine human’s work, by contrast, is unique via a personal, subjective individuality, as far as I understand it.

A similar desire is, IMHO, the curiosity that is often praised as indicating forthcoming STEM researchers. When a child is fed with astonishing stories about nature, he or she will naturally consume them as happily as candy, because in any case the stories are much better than boredom. Similarly, at a certain stage he/ she will have learned that the question of “why” will yield the longest and richest responses, and will love those narratives, without primarily being interested in the actual causal relationships. And furthermore, science stories often involve novel superlatives that impress the young mind.

So, the curiosity and creativity needed for useful innovations and insights, is not necessarily fostered by consumption against boredom.

9. Teacher vs. AI

So, what might be a useful division of labor between teacher and AI?

(A recent trigger was the [question](#) of how AI teacher machines might even motivate students. I think I don’t underestimate AI’s eventual abilities, and how far some extreme thought experiments of ‘raising’ AI personalities can liken hypothesized machines to us — which I tried to describe in my [EL30 post](#) about alien AI intelligences. But I still think that the awareness of the humanness of our counterpart is a crucial requirement.)

Since I think the personal, subjective individuality is a necessary ingredient for “modelling and demonstrating”, I don’t believe that AI would be able to do the motivation job.

There is also a big fuss about automatically identifying gaps and suggesting the appropriate resources. But I think the charm of this idea is just the affordance which is already present in the flipped classroom: by making transparent what is required for the next lesson, rather than silently providing the scaffolding steps, the students may be better motivated to independently explore the prerequisites.

What remains for me, is the *coaching* role: with a high sensitivity towards every single child, the teacher can guess if the child needs help, or if there is another chance for independent work. I wonder if one day machines will be able to guess this from objectively observable cues. I doubt it.