

I spent quite a bit of last semester thinking a lot about how to create good ideas, and honestly, it's pretty easy. While epiphanies and flashes of insights are cool, I have been playing with a thought: how many big ideas in our world are simply variations of first-principles concepts, just cloaked under different names? Finite amount of concepts, yet seemingly novel ways to apply them in different contexts.

The background: to make breakthroughs in a field, you have to solve problems, questions in disguise. Creativity is the use of the faculties to generate feasible ideas to solve those questions. However, there are only so many ways to put ideas together, so how come there's a lot of innovation being done?

Here's my premise: every cool idea brought up is a product of the tools we've made over time to approach the creativity problem. We've developed a set of cross-domain tools for problem-solving, and domains set up the framework and tools we have for execution.

To solve any problem in any field, you need a mix of the two: a **generative** and a **domain-based** approach to creativity. It's easy to see how domain plays a role; for instance, to solve a word problem in mathematics, one must first translate it into mathematical language (algebra, figures, or geometry). To solve a programming bug, one must think procedurally by tracing the logic of one's code and thinking of edge cases.

The generative approach is a little more abstract: it's the patterns that track across each field's domain-based approach, the common threads that humans tend to follow. Here are some examples:

- 1) **Modularity**: taking a process/system and decoupling it into specialized parts. This makes things easier to maintain, helps people become experts in a sector, and allows us to recursively iterate over the initial question. One can't apply this infinitely, since things can go wrong in stringing multiple microprocesses together (in some cases, it's more capital-intensive than just working on a whole). So, this lies on a spectrum.
- 2) **Performance**: how well a system can do its designed objective under duress. Some subcategories of this:
 - **Scalability**: How does a current process translate vertically when more people are involved? This can be thought of in terms of efficiency, but also in terms of reach, getting the start product to more people than its current audience. Accessibility is a subcategory in this sense, expanding a product's reach to include people neglected by the original design.
 - **Optimization**: In any sufficiently complex system, there is a need for optimization, either regarding efficiency (reducing overhead while keeping quality), or speed (reducing lag). While we can recursively optimize solutions as our resources get better, this can't be done infinitely. It takes something to make something.

- 3) **Abstraction:** Making an engaging product requires that people be able to use it easily. By abstraction, I mean improving the user experience in such a way that it doesn't require them to interact with the product's underlying structure. There is always a way to make the user work less, however, this lies on a spectrum, since different audiences can desire different depths of interaction with a product.
- 4) **Human Factors:** not objectively linked to performance, but are rather psychological factors that augment human motivation to use the product.
 - **Design Functionality:** Humans are moved by beauty and appeal. While a product's aesthetic is rigid in the sense that it's ultimately decided by the creator, functional design requires that a product's design serve a purpose, and is not the end itself. Here, we are not talking about design choices that improve the offering of the product per se, we mean the choices that make people more curious about a product.

These are just a few problem-solving tools that transfer across domains. Another thing to consider is the premise of **higher-order ideations** - general ideas (still cross-domain) that transcend the solving of a specific problem, but rather focus on methodology in the domain. Questions in this vein challenge the notion that things are done in a certain way because of habit, and are the basis of novel fields that spin off the current.

- 1) **Integration:** my personal favourite: drawing inspiration from another domain's approach to methodology, system, or process to produce something new. For instance, creative design + web gave us tools like Figma, Canva. Mathematics + signal processing gave us the Fast Fourier Transform algorithm.
- 2) **Rule of Thumb:** taking a general approach in an overarching domain and applying it to a subdomain problem. For instance, taking advantage of symmetries is a math approach that applies in geometry and trigonometry. Integral approaches and the underlying idea of 'infinite sums of infinitesimal areas over a region' translates in analysis and statistics.
- 3) **Phenomenon Decipher:** It is very easy to forget that a lot of domains are born with the intention of deciphering phenomena around us. So, this approach entails creating frameworks from the ground up to create a system that can be used to predict future behaviour. See chaos theory and game theory.
- 4) **Occam's Razor:** How can the current approach to a problem be made simpler? The definition of simpler, of course, varies with circumstance. I find this particularly useful for learning how to explain complex ideas, especially in mathematics. It is challenging to find a simple but elegant solution to a problem, so when that proves difficult, a good way to see this is to find a simple and elegant solution in explaining the problem instead.

- 5) The Neighbourhood Implementation:** Given a central idea, we can always tweak elements of the original proposition to find similar ones. This also applies to problems, and oftentimes, in trying to come up with an alternative, we find hints to the original case study.

Lesson: While not an exhaustive list, this framework presents a different approach to idea generation: that by thinking about the tools available to one within the context of their domain, someone can point out fields that can benefit from the ideas, and conversely. In the same way the handyman, on needing to screw in a wood board, reaches for his drill by habit, and in a different scenario, is motivated by the tools in his workshop to create something new.