



Mechanizing Invention

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<http://www.ck-wong.ca/Technologies/Machnizing%20Invention.pdf>

Introduction

Invention definitely requires inspiration. Necessity is the mother of invention. We all agree. Would it be possible to have cookbook for invention? How could the youngster invent? It turns out that invention has two possibilities: through true inspiration and true hard work. In this article I am going to discuss superficially the mechanics of doing the laborious path of invention.

From Problem to Invention

Invention means you have a new solution that is different from others and solve a real problem. Invention is recognized by patent. Your invention will make advancement from prior art, i.e., existing methodologies. Before the 2001, patents are granted in the States are limited to the physical aspects of solution. After 2001, patent could be process. This is really a good recognition. I am not going to discuss how to do the patent application but apply the criteria of patent application to describe a roadmap for problem to invention.

The roadmap should identify a few major areas of investigation:

1. Stakes holders. Stakes holder could be divided into primary, those impacted immediately, secondary, those impacted by the primary and possibly the tertiary, those impacted by the secondary. Most people identified the primary but overlooked the other two levels this could reduce the ability to solve the real problem.
2. Limitations. To solve the problem one has to box in the limitations. If one could not study them the solution will not overcome them.
3. Cost factors. Cost is a form of limitation but it is so important that it should be reviewed separately. Cost could be physical, time, monetary, emotional, psychological, and many more. The solution should have an impact on the cost factors.
4. Values. Like cost, value is the part of the solution equation. A killer app is a killer app because it adds major value. A disruptive technology is disruptive because it completely changes the value of many things.
5. Conflicts. Among limitations, cost factors and values, they do not necessarily agree. The conflict, the disagreement and the out of alignment will provide the hint of the breakthrough.

Brew, Distillate, and Ferment

After you have done the home work by following the roadmap, you have to distillate, brew, and ferment all the data. Let them precipitate or let them crystallize to see what is coming out. All three processes are thinking processes. They may be the same to you or they may be different. These processes can be done with job aids. Bertrand Russell liked to walk the country path. Albert Einstein liked to walk around the campus or played some violin. I guess Da Vinci would like to draw. It is a way to let your subconscious to take control and do the number crunching. May be I put it in a too machanical way. Yes, this aspect is. One could argue that how does this different from inspiration? Inspiration is subconsciously done all the above and the solution falls out. We are talking a simulation of inspiration.

Concept Transplant

In pure mathematics, you could reduce a problem out of its context into an abstract one. By solving the abstract solution, you cold solve the real solution. You could also convert a scenario into an abstract form, and let the existing solution of the abstracted form solve your problem. This is solution transformation. To do this you must have broaden your mind with many fields of knowledge. You may solve a biology solution for the economic. In fact, the classic bacteria growth model is equivalent to the interest rate governing the economic growth.

Let's take a look close.

Interest Rate and Bacteria Growth

I purposely make the two scenarios dissimilar. If I change the scenario slightly to say the economic growth is controlled by the interest rate as the food availability controls the bacteria growth. The analogy becomes more visible. The skill one has to develop is to recognize the similarity and the symmetry in different domains and leverage on the solution. This is a skill. This is education. This is why Caltech, UC Berkeley, Harvard, MIT, Yale, Connell, and many serous institutes have so many activities other the studies. This is why music, sport and art should be included in one's list of study.

Cross-Pollination and Invention

Invention means the current method does not work. The alternative solution may be borrowed from other domain. Lifetime learning will improve our lifetime experience. If we are lucky, we may invent something and bring us wealth.