Innovative Loops: how iteration fosters creativity
5 more innovation patterns

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Abstract

This paper discusses five patterns of innovation and creative thinking. It is part of an on-going pattern mining process to identify the most important patterns of innovation. This paper will include the following patterns. PUSH FORWARD: Take your current set of ideas and solutions as input for the next iteration, don't stop too early. PROGRESSIVE ABSTRACTION: find more ideas by stating abstract topics, goals, or functionalities; find more ideas by identifying more properties on several levels of abstraction. CREATIVE CONSTRAINTS: use limitations as inspirations and design guidance. SIMPLICITY: Make complex systems simpler. INCREASE SERENDIPITY: Make use of positive chance encounters and increase the probability for such moments. Each pattern will be described on 1-2 pages.

Introduction and Overview

In the past years I have written several patterns on creative thinking and patterns in innovation processes. Most of them focused on how to get ideas, judging the ideas and even implement them. The whole process can be supported by basic methods (such as mind maps or brainstorming), basic tools (such as sticky notes, thought triggers or templates) and basic habits (such as incubation, visual thinking and having fun). In this paper we will find some patterns that are often necessary before the innovation process starts at all. Before we try to find an innovation we need to have a clear understanding of what we want to achieve at all. That is why we need patterns for orientation. Once this orientations is gained, there is a need to deeply understand the problem domain to avoid superficial solutions that fall apart when are tested or used in the field.

This paper adds to a body of patterns on creative thinking from the same author published on past *PLoPs, including:

- Patterns for Creative Thinking (PLoP 2012)
- Dream teams and the right place (EuroPLoP 2014)
- Patterns for Creative Thinking - Idea Generation (EuroPLoP 2015)
- The Magic 5 of Innovation (PLoP 2015)
- 5 Habits, 5 Methods (VikingPLoP 2016)

ORIENTATION and DEEP UNDERSTANDING are the foundation for a successful innovation process. They are a starting point and need to be applied during the whole innovation process. The orientation can change over time, especially when new ideas pop up. When new paths and solutions are explored, a DEEP UNDERSTANDING of new fields or sub domains is needed. Without an orientation and deep understanding, innovation takes place in the wrong areas. Or rather, no innovation takes place at all. You may generate new ideas. But an idea that does not matter or does not work is hardly innovative.

ORIENTATION FIRST is about doing the right things – things that matter to you. DEEP UNDERSTANDING is about doing them right. Doing them in a way that takes into account as much knowledge and data as you can get. The more you know, the better you can ideate and evaluate.

For this you can use patterns for systematic IDEATION to generate new ideas. Not every idea will be a winner. Basically, most new ideas are a COMBINATION of existing concepts, MODIFICATIONS of an existing concept, or REFRAMINGS of existing concepts (i.e. putting things into new uses). To let go of existing concepts and mind sets, we often need a kick into a new direction – that is a RANDOM IMPULSE. To find new forms, it can be helpful to let go of the old forms by focusing on their function. PROGRESSIVE ABSTRACTION does this over several levels (e.g. what is the function of a car, what is the function of traveling etc.).

These IDEATION methods will produce a lot of new ideas. But not every idea is great. And you can't implement all ideas anyway. So you need to select and prioritize them, some JUDGING is needed! Very often, an eloquent judgement requires deep understanding, and you may need to do additional OBSERVATION, ASKING, PARTICIPATING, and RESEARCH.

Identifying which ideas fall into the same category makes it easier to get an overview and select the right ones. By CLUSTERING the ideas, one can identify idea categories. When ideas compete, a group can do some VOTING on the ideas and derive PRIORITIES. It is also important to evaluate the value of an idea with different eyes – that's why you need a JURY: positive thinkers, skeptics, realists, makers etc.

Once you have found the most promising idea(s), you should not forget to make a final REALITY CHECK. Can you really do this? Do you want to do this?

The trouble is that most ideas never become a product that gets shipped. Whether it is the new killer app, a research paper, a new business, or personal fitness plan. Finding ideas is easy. Finding really good ideas is hard. Identifying the best ideas is a rare skill. Implementing these ideas is mastery.

IMAGINE THE FUTURE helps you to emotionally engage with your ideas. You have to develop a clear vision of how the world will look like once the ideas are implemented. What does it mean to you? It is about visualizing the outcomes. And then, JUST DO IT! THE JURY and REALITY CHECK give you the confidence that you are working on the right thing. When you IMAGINE THE FUTURE you feel excited. All you need to do is take the first step now! Innovators who seek for support in implementing their ideas and manage the change process should use the proven solutions from the Fearless Change patterns (Manns & Rising, 2015). They provide very good guidance to make ideas happen.
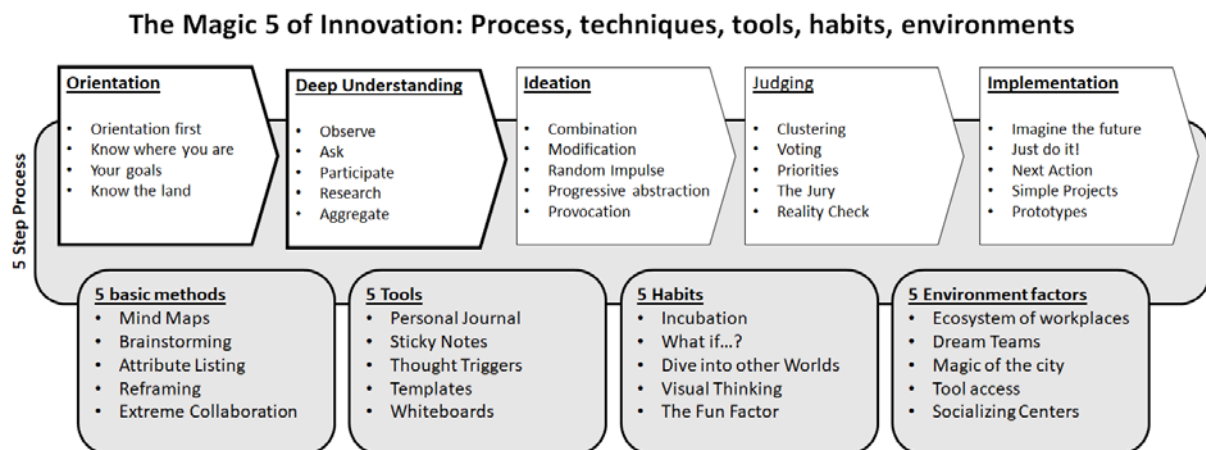

Fig. 1. Overview of patterns for creative thinking and innovation

Figure 1 shows the innovation process as linear flow. However, in reality there are many iterations, and loops of moving between the phases. The appendix gives a short summary of each pattern. The patterns in this paper are more non-linear in their character, as they push ideas back and forth, continuing the improvements of ideas and concepts.

- PROGRESSIVE ABSTRACTION is about questioning existing forms by considering the original purpose.
- PUSH FORWARD is about taking good and bad ideas and develop them further.
- CREATIVE CONSTRAINTS liberate innovators by limiting the design space.
- SIMPLICITY THRIVE suggests that innovators should continuously try to make things simple without taking away functionality and purpose.
- GIVE CHANCE A CHANCE means that you should create environments and situations that allow chance encounters to be fruitful.

Progressive Abstraction

Context

You are in the ideation phase and you are looking for alternatives to existing solution. You want to push forward new idea proposals or replace existing solutions when they are malfunctioning, ineffective, inefficient or outdated.

Problem

Many innovations try to improve existing solutions without questioning the general approach. By focusing on an existing design, we miss an opportunity to find new alternatives to address requirements.

For example, if we focus on improving fossil fuel motors we may miss alternative ways of transportations - or even reduce the need of transportation.

Forces

There is a tendency to improve existing designs. When a solution is found to be inefficient, malfunctioning, we often try to fix small things. This, however, is only incremental innovation. And we may innovate on the entire wrong solution. Lots of time might be taken to improve the wrong thing.

Often changes in the environment make a solution that worked before no longer a solution. When we focus on the existing solution we cannot see alternatives.

Existing solutions had many good properties, that's why they have been solutions after all. We do not want to lose the properties and functions.

If something works, we have often forgotten why we created or installed it in the first place.

Solution

Abstract from your existing solution. Define the original purpose, goal, function, or category. Look for alternatives that serve the same purpose, goal, function, or fall into the same category.

By identifying the category of a solution, you can find existing alternatives. For example, if a car does not work anymore, identify its category: transportation. Many alternatives exist in this category, such as bike, train, bus…

By identifying the function, you can look for alternative technologies that serve the same functionality. Instead of using gasoline, you can use electricity to power car engines.

By identifying the purpose, you can come up with new solutions all together. For example, if the purpose of the car is to bring groceries home you can use a delivery service instead. If the purpose is pleasure rides, you may think about alternatives that are equally fun but have a better eco balance.

The abstraction can move over several levels. That is once you made one abstraction, look for the abstraction on the next higher level. Example: maybe you are tired of taking a car every morning to get to work. To find alternatives, think about Why you take the car in the first place.

Take a car → Travel from A to B → Meet with other persons → Discuss project → Get feedback → Improve Project

Instead of looking for alternatives for using the car, you are now thinking about alternatives to get feedback or improve the project.

Sometimes, Why questions can help to find the next level of abstraction. A specific technique is to ask five times why in succession.

If you think about lectures, you can ask Why do we have lectures? -> To deliver basic concepts and answer questions. → Then why not use alternative ways for delivering the basics and increase the time for questions and feedback? → This led to the concept of "Flipped Classrooms" where students learn at home (using videos and scripts) and practice during the lecture.

Consequences

You get a better understanding of what should be achieved by the solution. By letting go of existing solution forms you are free to find any alternative that serves the same purpose.

Identifying existing categories, goals or purposes lets you think immediately about alternatives if they exist. You may find solutions from unrelated domains that serve the same purpose and can be re-contextualized for your problem.

However, by getting too abstract you may lose focus.

Push forward

Context

You have generated already some ideas, maybe in a Brainstorming session, using an Attribute List or a Mind Map. Some of the ideas are good but need further refinements. Other ideas seem very silly (because in a brainstorming one should Suspend Judgement) and you are tempted to trash or ignore them.

Problem

Throwing away (silly) ideas too early misses the opportunity to keep the interesting elements as thought triggers.

Forces

Raw ideas often do not have the required qualities of a good solutions. However, they often have interesting elements that should be kept to develop a good solution.

A good idea also needs to be good in the details. Doing the right thing right is important.

Ideas have many aspects and can inspire new ideas. Good solutions can benefit from other solutions. Combining existing ideas leads to new ideas.

Silly ideas are often not considered in detail. However, they might inspire new perspective or contain unusual features.

There is nothing more dangerous than a single good idea. Because if you do not evaluate alternatives you may overlook many opportunities for better ideas. With only one good idea, you cannot be sure whether there are better ideas. To make the one idea outstanding, alternative ideas need to be considered – otherwise there is no contrast to make that ideas special. Then, it's just one idea.

Collecting ideas in a brainstorming is not always productive in terms of *new* ideas. It rather brings on the table (or to the whiteboard) what is already in the minds of the participants. However, this raw material can be used as input for new and better ideas.

Many creativity techniques do not produce good ideas instantly. They focus on quantity rather than quality. However, this can be very frustrating if participants of a creative session find many useless ideas. They may successfully Suspend Judgment only to find out that in the next step of evaluation most of the ideas are discarded. A waste of time! Lateral thinking aims at finding unusual concepts. It is then important to transform unusual concepts into intuitive solutions.

Solution

Therefore, do not stop once you have a list of idea candidates. Use the ideas as input material for other creativity techniques. Take good ideas and refine them. Take silly ideas and turn them into something meaningful by using them as Thought Triggers.

For example, you can Combine ideas or attributes into something new. You can take one of the ideas and move it forward by having systematic Modifications of the idea, such as exaggerating, resizing, re-contextualizing, restructuring etc.

You can also use a silly idea and ask how could we make it work? By reflecting about this, new ideas often emerge. You can also identify desired properties of the silly idea and think about how you can transfer these properties to one of the more realistic ideas.

These operations should not only be applied to silly ideas. It is also important that you consider a good idea only as a starting point for better ideas. Continue to refine and improve the existing ideas by thinking about the details. You can turn a brilliant idea into a nightmare if you do make mistakes in the implementation. For example, if you have a killer app (say an instant messenger) but its usability is weak, it will not succeed. If it does not have a good user base or is too expensive, it will fail. So you have to get better ideas for the more detailed levels as well.

Consequences

Ideas are continuously refined. The best elements of diverse ideas can be combined and synthesized into something new.

No idea has to be left behind. Silly ideas can be used as stimulus to improve more reasonable ideas. They can also be the starting point to explore how unusual solutions could be achieved.

This approach allows you to first think out of the box and then further develop the ideas to bring them back to the box – that is to the constraints of the current situation.

However, this will increase the amount of time a creative session or a brainstorming takes. It is difficult to always remember to move forward with the existing ideas.

This approach does not come natural to most people. They settle with solutions that are good enough. Hence, they might identify the best fitting solution among existing solutions. But they do not take the effort to find better solutions based on entirely new approaches.

Pushing ideas forward brings you off the road, out of the box, into new modes of thinking. However, pushing them for a too long time may also get you side-tracked. You may follow up on thoughts that are no longer related to the original design challenge. Hence, after some time ask: Where does this lead us? Can we use it for our project?

Creative Constraints

Context

Many creative thinking techniques encourage out of the box thinking. We want to Cʜᴀʟʟᴇɴɢᴇ Assᴜᴍᴘᴛɪᴏɴs and take new perspectives. Constraints are often seen as limiting the solution spaces.

Problem

If you can do whatever you want, you may be overwhelmed with the options. Each alternative needs a decision. If bad decisions have no impact, you will not reconsider alternatives or new tricks. Without limitations we are not thriving for an optimal solution.

Forces

We can easily get lost if our goals are too vague. Constraints can set clear goals and help to focus. If no constraints are set, everything is possible. However, everything is far too unspecific and actually overwhelming…where to begin with?!

By identifying goals, requirements and target qualities, we use already constraints in a positive way: we only look for solutions that show certain qualities, satisfy our requirements and make us reach our goals.

If the number of options is smaller, then less time is needed to explore them. To make choices costs energy and will power. If some decisions are fixed, we do not have to spend time on evaluating what might be the best option.

Solution

Therefore, artificially introduce additional constraints to nudge your thinking. If we act with limited resources we often feel less pressure to find good solutions because we have already fixed some parameters.

As this is a thinking tool, the constraints are not necessarily real. You can constrain any parameter in the design process, such as budget, number of elements, time, colors, features, words. A constraint is like a dam in floating water. Like a dam forces the water to find new routes, a constraint makes it necessary to find new forms.

By limiting the material you can use, you can deeply explore its properties and think about how to best use it. If the material is unusual, you are forced to use it in non-traditional ways and come up with new approaches.

By limiting size or amount you can become more focused. For example, what if you had to express your ideas with only one word? What if you can only name three properties? What if a brand name must have no more than 5 letters? What if you have to make a full user instruction on only one page? Such limits force you to think in new creative ways. Writing instructions on 20 or 100 pages is easy. But integrate the same information on one page?

You can limit (and focus) your thoughts by defining random letters that are the start of solution words. For example, write down 20 gifts you can give to a good friend at his next birthday. You have

2 minutes. Now, do the same, but only write down gifts that start with the letter "D". Paradoxically, the latter task is more effective. Of all the things in the world, what would be a good present? But if you limit "all the things" to "things starting with D", the task becomes more manageable. Besides, the focus on one letter activates words in your mind better than a blank "whatever".

Consequences

As some decisions are set for you, you don't have to spend time on it.

Working within set constraints can make your solution more realistic and feasible.

Constraints push your thinking into new and unusual directions, they act as THOUGHT TRIGGERS.

Constraints reduce the number of options on some parameters. Thus, you can focus on other parameters. However, you may also exclude some interesting or better alternatives by these restrictions. Artificial constraints are a working tool, and should not be fixed throughout a design phase. Rather, you should CHALLENGE ASSUMPTIONS every now and then.

Constraints are often seen as limits rather than opportunities. Their creative potential is underestimated, hence, not used.

Constraints force you to make something in a different way. For example, if you constraint yourself to use only certain material, you cannot fall back to existing solutions. Hence, something new is needed.

Simplicity thrive

Context

In your ideation process, you came up with some very good ideas. Maybe you have created already some working prototypes or a product that satisfies all requirements. The question is whether all the features can be used in an efficient way. Complex requirements are often met by complex solutions.

Problem

Useful solutions are not always usable. Complex systems may require training, cognitive effort, time, or other resources. Such solutions only work if a lot of external *effort* is invested.

Forces

We live in a complex world. Technology makes many solutions both more complex and, sadly, more complicated. We feel overwhelmed by solutions that are too complicated. However, simple systems do not meet the demands of our complex world.

Complexity is often required to satisfy complex requirements. However, complexity is hard to control, manage and learn. Complexity can be overwhelming.

Finding complex solutions for complex tasks is easy. Finding simple solutions for complex tasks is hard.

Simple things can be boring. Simplicity needs complexity as a background (we perceive things as simple because other things are complex).

Simple things can be made complex (that is complicated), while complex things can be made simpler (that is integrated or better organized).

A solution is not perfect if you cannot add anything more to it. It is perfect if you cannot take anything away from it without reducing its function.

Solution

Thrive for simplicity. Reduce a system to its minimum level of needed complexity. Organize complex parts and integrate subsystems into one building block for higher-order system. Divide and conquer.

Reduce. Define which parts and actions are really needed. Get rid of all the unneeded features. If some features are only needed by a few users or stakeholders, consider to customize the solution. That is, only add the features for those users who really needed it. Features are expensive, especially for users because they have to learn and understand them.

Integrate. Simplicity integrates complex systems into one organized unit. For example, a car is a very complex system. However, by integrating all the subsystems into one concept, the car, we can understand it. Likewise, cities, bodies, architectures etc. are all very complex systems. Yet we can perceive and understand these complex systems as one concept. Take all the parts of a car apart, and you will have a complex system.

Pack. User interface design is often too complicated. It offers too much noise, too many unneeded features and options. Moreover, many user actions are not highly integrated. For example, Amazon's 1-Click-To-Buy has integrated several steps into one action (such as 1-Click-To-Buy).

Shift. Driving cars has become simpler, because the technology behind is more complex. Another example for the shift of complexity can be observed if you organize documents into folders. Shattered documents on a desk add complexity without need. Finding a document in the right folder is simpler. However, a system of folders can become complex, too. Finding a document becomes simpler but deciding which document goes where is sometimes a complex decision.

Affordance. Make sure that you do not take too much away. Some people consider decorations as unneeded package. However, decorations can add to the natural / organic appearance and affordance of objects. Hence, these objects become easier to understand and use despite of their increased complexity. For example, if you add more colors and layout elements to a design (making it more complex), you provide more orientation to the user (making it simpler for him). To bring a nail into a concrete wall, a more complex system (such as a hammer) might be better than a simpler system (such as a stone).

Consequences

Simple systems are more appealing, easier to learn and understand. They are better to manage for users. Often, they are also more fun to use.

You don't make things more complicated than they have to be.

Simplicity increases productivity. It means that the same can be achieved in simpler ways. Simplicity is different to being simple. Simplicity means that a complex task is made simpler without reducing its effect.

Making things simpler is a complex task. The simplicity in the final product is achieved by making the production process more complex and cost-intensive: easy to use interface often requires more complex coding, usability tests make the design process more complex, auto-corrections for faulty user input are more complex to implement, and anticipating which features are needed most requires a more complex analysis. The simplicity for the user is achieved by adding complexity to the developer.

It is not always clear in foresight whether the additional effort to organize a system is actually mirrored in savings. For example, if I know that I will process 100 photos the same way, then a recorded macro in a software like Photoshop is worth the effort. However, if I record the macro and realize that I can only use it once or twice, it would be too much effort. A macro reduces the complexity of processing the photo, however creating the macro is a complex task.

Give Chance a Chance

Context

Randomness is an important element of creative thinking. It brings in unrelated elements and concepts to your ideation process to get rid of biased thinking. Serendipity (unexpected chance encounters with positive outcomes, the "accidents" that lead to heureka!) is a constant source of insight in the history of innovation.

Problem

Chance encounters cannot be planned.

Forces

We have many chance encounters with other people, other situations, other solutions etc. Most of them have no meaning to the current problem you are working on. However, every now and then we can see how something new can be applied to our own design challenge.

Chance encounters are short and volatile. The moment might be gone before you see the potential for your own project.

Everything around us has meaning, all the time. However, we have not learned to draw connections between different situations and domains easily.

Seeing something as a solutions requires us to have an awareness of what we need.

Solution

Increase opportunities for chance encounters. Be open to discover new things at all times, be prepared! Have enough awareness of what is needed to see in unexpected objects or events the solution to your problem.

While we cannot control randomness and chance, we can make preferred (yet random) outcomes more likely to happen.

Sometimes we hear the success stories of businesspeople who met my pure chance and started a successful enterprise. However, these chance encounters often happen at places where it is more likely to meet like-minded people, such as conferences or business lounges. Where do you meet more new potential friends? At home on the couch or in a vivid bar with people like you?

We can increase the probability for serendipity just by doing more things. DIVE INTO OTHER WORLDS, visit not the same places again and again, try to experiment with different things, try out new products, paths, ways of traveling etc.

Increase the opportunities and be prepared - always expect the unexpected. See at the world with new eyes and ask: what does this mean to me, what does it mean to my problems at hand? Can it serve my needs?

To see that a chance encounter fits to your needs, you have to be aware what your needs are. Hence, experts who have fully or largely understood the structure of the problem they are working on will more likely realize the impact for their own work.

Consequences

You cannot control chance, but you can increase the odds. Who does not play, cannot win. Especially when playing is cheap (like going to different restaurants, read other newspapers), why not put yourself in places where it is more likely that you will find something unexpected and unfamiliar?

Getting inspired from other fields becomes more likely because you use all observations as potential solution candidates for your design challenge. You can make use of an opportunity or solution when it is presented to you.

Moments of "Heureka!" become more frequent. Achimedes found out how to test the authenticity of gold while sitting in a bath tube. He wasn't expecting it then, but he had in mind what he needed. As he observed how water spilled over, he got the idea that one can measure the volume (and hence the unique density) of gold. He was open to expect the unexpected, and he had the requirements ready. He shouted out "I got it" ("Heureka!").

However, there is still no guarantee that your fruitful encounters will increase. Just like you can lose all your money if you bet 100x times on the same number, you may invest a lot of time and other resources with no guaranteed result.

Appendix: Summary of all patterns

There are five basic methods for creative thinking:
BRAINSTORMING is about free association of ideas without judgement during the collection phase.
ATTRIBUTE LISTING is about finding the attributes and properties of a concept, problem or solution.
MIND MAPS help to externalize thought structures and map out the relation between concepts.
REFRAMING creates new meaning by putting things into new contexts.
EXTREME COLLABORATION is about involving a group intensely, allowing parallel contributions.

Three are five basic habits for creative thinkers:
INCUBATION is to let go of a problem and let the subconscious work out a solution.
CHALLENGE ASSUMPTIONS asks thought provoking what if….? questions.
DIVE INTO OTHER WORLDS enables new ways of thinking by mating different domains.
VISUAL THINKING opens a new channel of expressiveness and interaction with thoughts and artifacts.
BE FUNNY AND PLAYFUL sets you in an explorative mood where absurd ideas are welcome and rules are turned upside down.

The creative thinker can be supported by five basic tools:
PERSONAL JOURNALS keep track of ideas and thoughts when they pop up.
STICKY NOTES help to quickly rearrange concepts and create new relations and combinations.
THOUGHT TRIGGERS push our thoughts into new directions, escaping conventional thinking.
TEMPLATES integrate multiple Thought Triggers in a visual design to support methods.

Five things in the environment can largely influence the creative thinking:
ECOSYSTEM OF WORKPLACES is about matching up the workplace with different ways of thinking and collaboration.
DREAM TEAMS is about interdisciplinary teams with internal and external members.
MAGIC OF THE CITY is about a network of experts and innovators in the communal area.
TOOL ACCESS is about enabling creative thinking where ever you are.
SOCIALIZING CENTERS is about informal communication and inspiration at social meeting points such as the coffee machine.

To make innovative ideas happen there are five different process phases (which are not linear but intertwined):

ORIENTATION is about finding your goals and linking them to opportunities and your personal or team skills.
DEEP UNDERSTANDING is about deep understanding of the subject, getting missing information and involving key players.
IDEATION is about developing new ideas.
JUDGEMENT is about deciding which ideas are most important and should be implemented.
IMPLEMENTATION is about making ideas happen by executing the required actions progress towards a shippable innovation.