

5 Evaluation and Selection

One of the rules of creative thinking states: postpone judgment. But not indefinitely. During creative processes there are many instances when a more critical view is needed: Are we on the right track? Is this what we want? And how do our results relate to our original problem statement? And while reflecting in this way, is our original problem statement still correct? And do we need to do some extra research? Or present these interim ideas to some experts before proceeding?

Creative processes are iterative by nature: a few steps forward, and then a choice between something like continue, redo or go back. And during such a process from first vague idea to concrete product or system, choices have to be made, and most of the time on the basis of incomplete information.

On the one hand, one learns to live with this, in other words learns to make decisions with incomplete or implicit information and deal with such uncertainties. On the other, there are procedures to limit and manage such a paradoxical position. One can include go/no go points in the process, one can work with models and prototypes and do various kinds of testing. So, one can use techniques to simulate a future product and try to predict a potential success or failure of an idea or concept using systematic evaluation techniques.

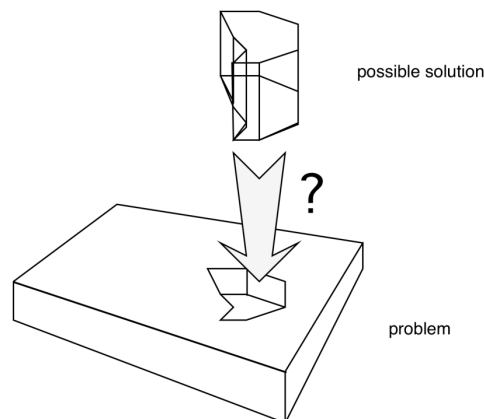


Figure 5.1: The right piece of the puzzle?

In a number of publications (a.o. Firestein et al, 1990) it appeared that the use of idea generation techniques by themselves (Brainstorming, Synectics, etc.) didn't lead to better ideas per se. The quantity and variation of ideas was higher, but there would be both better and worse ideas. The concluding recommendation was that to obtain quality, one would need to use proper evaluation and selection procedures.

In a very simplified way, one might look at it as finding the right piece of a puzzle in a bigger picture. Although this seems to make sense, it is a huge oversimplification. In practice, the boundaries of such a piece are never this clear, nor does one oversee all these boundaries at first. There are lots of dimensions upon which one might want to test a concept, not to mention that many of these judgments are not objective whatsoever.

I like to look at a development project as a process of moving from some implicit state (some vague idea or notion) to an explicit state (a product in use). So with a first vague notion of an idea, in fact the whole product is already there (implicitly), it only needs to be made explicit and be made visible and tangible. This path from first vague idea to product in use is depicted in Figure 5.2.

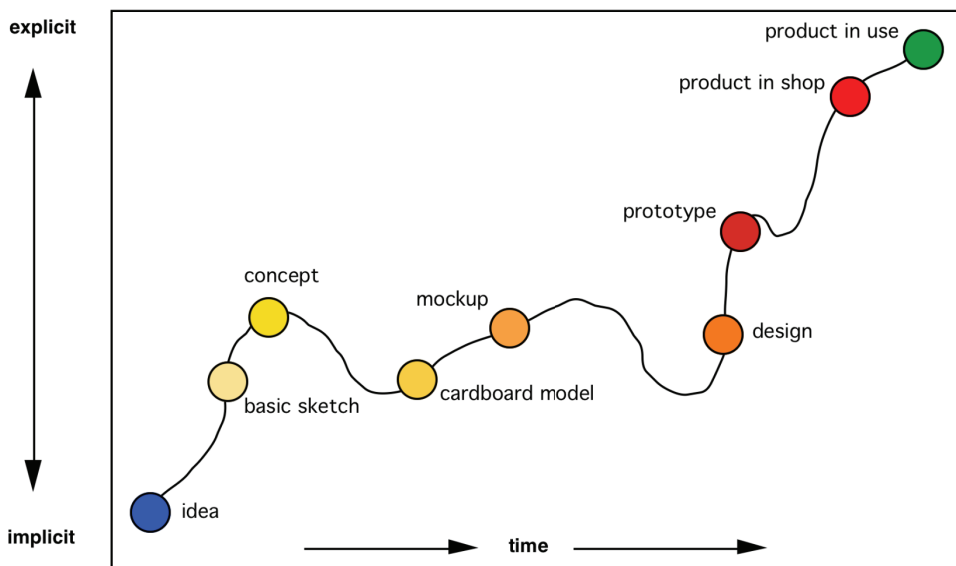


Figure 5.2: From implicit to explicit

When dealing with technical subjects, for example the design of cars, and judging whether some construction will withstand the required stress, one can use a prototype and drive this against a wall to test this hypothesis, and one might add dummies to evaluate loads on human bodies during a simulated crash test. But real data will come when the vehicle is used on the road. As an example, and with this in mind, Volvo keeps a record of all road accidents involving their cars (at least in Sweden) to collect accident scenarios and learn useful lessons for the development of their future models. The same happens in aeronautics and with railroads as the consequences of incidents are rather large and extremely visible.

But this is all learning from experience. What could one do at earlier stages of development, on the one hand to evaluate a concept under development, on the other to select between different concepts or ideas? This will be described in the next paragraphs, where we start from the more explicit and then move to more implicit techniques as used during creativity sessions.

5.1 Explicit Evaluation techniques

1. Prototypes

A cook composing a meal for some great event will often try out the recipe beforehand. He can then judge whether the combination of dishes turns out as he hopes, whether the proper ingredients can be obtained, he can look at the aesthetics of a plate, how to arrange ingredients on it and test his selection of wines.

With products and services, one can do the same. Implement a concept step by step, evaluating how a product works and make modifications there where needed. Especially when we are looking at major consequences of failure (in terms of human lives, investment in tools and installations, loss of image or competitive position), introduction should be done with great care, allowing for the identification of unpredicted pitfalls and other mishaps.

2. Criteria

Before prototypes or other simulations can be executed, another mean is the use of criteria to evaluate a concept in the course of development. A List of Criteria is a collection of Specifications, Requirements and Wishes representing functionalities and boundary conditions that have to be fulfilled and complied with or optimised. Synonyms for a list of requirements are 'Spec list' and 'Cahier des Charges'.

Three kinds of criteria can be discerned:

- Specifications: what is given, e.g. in most cases the problem that needs solving, but it could also be certain means that happen to be available;
- Requirements: to judge whether some concept complies, leading to a clear yes or no decision;
- Wishes: aspects that need to be optimised.

The first two, specifications and requirements help to select ideas that comply with minimum requirements. The third aspect really deals with how good an idea is.

H2 inventorise criteria?

The first source is of course that the concept should solve the problem or otherwise comply with the Problem Statement.

A second source consists of boundary conditions and qualities: environment, safety, comfort, health, cost, feasibility, etc.

A third source is stakeholders: what does each party or individual concerned find of importance. Next to interviewing potential future users, it should

include sales people, repair departments, help desks, maybe even fire brigades and medical care in case of potential accidents, etc.

A fourth source consists of analysing the whole life cycle of the product or system (Life Cycle Analysis or LCA) and listing all the conditions from this perspective. Stages in a life cycle might be: design, manufacturing, marketing, sales, transportation, installing, using, up to disposing and recycling. Each of these stages will lead to criteria to which a product should comply.

And a fifth source that comes forth from McWhinney's work on 'Realities' (McWhinney, 1992). Based on this work, one can develop criteria in four perspectives: (1) Norms and rules a product has to comply with, (2) Tangible aspects as discernable by our senses, (3) Evocative qualities in terms of personality and myth and (4) Functions and values the product has to fulfil.

Although in practice one doesn't necessarily use all these sources, even using two or three will soon lead to a long list of (overlapping) requirements and wishes. This should be cleaned up and categorised into some manageable set.

Limitations

An assumption in using elaborate lists of criteria is that a concept can be judged through some logical and structured way and that people doing these judgments can be objective about it. Another assumption is that all aspects of a solution can be evaluated explicitly. What about beauty, or challenge, or just liking an idea? These are as important in an evaluation and should never be omitted.

During sessions, we will seldom use very elaborate Criteria lists as described here. Although one might have one prepared beforehand, even then a summarising list will be made up with some 4 to 7 aspects. When generating ideas, most often, we'll have to do some extra development work before being able to apply such explicit evaluations. Referring to Figure 5.2 it would mean we have moved to somewhere between 'cardboard model' and 'design'.

So, although such extensive lists are seldomly used during sessions, it's important to understand the role of criteria in a creative process and how such criteria can be generated. Once you find yourself and your group generating 60 and more ideas for a problem, you need something to counterbalance this 'fluency'. In most of the techniques presented in this chapter, you'll see Criteria being used, at first very intuitive and implicit, and slowly on more and more explicit as described in Figure 5.2.

5.2 Intuitive techniques

'Intuitive technique' is kind of a 'contradictio in terminis'. The term technique makes one think of something predictable and controllable. With intuition, it's nothing of the kind: what is your gut feeling? How enthusiastic are you when considering some idea? Is it intriguing, sexy or cool or is it challenging? Any of these feelings can make one decide to take up an idea. And why not trust such

feelings? 'Looks good, must be good', that kind of thing. Intuition and feeling always play a substantial role in decision making.

3. iii – Interesting, Innovative and Inspiring

To assist a more intuitive selection one can use criteria such as

- interesting
- innovative or new
- inspiring and challenging
- elegant and simple.

5.3 Inventorising techniques

4. Itemised Response : +/-

For each idea, make a list of plusses and minuses, which can then serve to:

- elaborate the idea on the basis of this list, in part to work on the minuses, in part to emphasise some of the plusses;
- a decision on maintaining the idea or putting it aside.

5. ALU : Advantages, Limitations and Unique Elements

Systematically checking the Advantages, then the Limitations and finally the Unique elements of an idea. Ref. CPS, Buffalo / Colemont 1989.

6. PMI : Plusses, Minusses and Interesting

Systematically checking:

- What is good about the idea?
- Which aspects would one need to improve?
- What makes the idea interesting?

Ref. DeBono, 1970

Remarks

1. People often have difficulty discerning between 'Plusses' and 'Interesting'. Let's take a chair as an example: the plusses are about the object itself, how well it fulfils its functions: comfort, longevity, price, etc. 'Interesting' is about the functionality itself: which needs are fulfilled and how well are they being fulfilled? One can sit on it, it would look good in our office and we can

produce it. In other words, in a means–end perspective, what ends does it serve?

2. As discussed extensively in earlier chapters, people have a tendency to put aside the more creative ideas, just because of unfamiliarity. That is why in both these techniques, one concentrates on the plusses and points of interest before going into weaknesses and other reasons why one shouldn't adopt some of the ideas. So, ideas should be given a chance to grow on people, and once people start to acknowledge the value of an idea, then move on to what might have to be improved – the condition now being: “If we were to proceed with this idea, one should take care that . . .”
3. When enumerating plusses and minusses, (in my view) people are induced to take a decision, and that might not be what you want in first instance. When judging newly generated ideas, it's preferable to concentrate on getting acquainted with the idea first. That's why I now also leave out minusses, or reformulate these into concerns.

7. IPC: interesting, plusses and concerns

Over the years, and with these remarks in mind, I have come to use a slightly different approach:

- How and why is an idea interesting and functional (as a means to an end)?
- The plusses or how well it fulfils these functions.
- Which aspects should we pay extra attention to if we were to implement this idea? (uncertainties, weaknesses and recommendations for further development).

5.4 Confrontative techniques

8. Devil's advocate

At first sight, one might associate this technique with law practice, but it isn't. In this case the objective is to find out whether some idea or concept can withstand criticism. One may also use this to locate weak spots in a concept, spots that may need to be dealt with before the concept is further developed. In that case, it becomes an idea improvement technique.

Another use is when analysing competing products. Through such a devil's advocate stance, one might be identify opportunities for one's own future products. By association, one might imagine some participants to take up a role as an angel's advocate, somebody who is responsible for protecting an idea during the first stages of development, similar to a 'product champion' in an innovation process.



Figure 5.3: the Angel's advocate and the Devil's advocate

5.5 Sorting techniques

It is not unusual to have over 200 ideas after an idea generation step, but one may have some doubts on how useful each of these 200 words written on Post-it's or Flipcharts is. Although one may assume that amidst this collection there will be a number of great ideas or extremely useful stepping-stones, they may be hard to identify. So what could one do?

9. Dots

Together with H2's and Brainstorming, placing dots is one of the most commonly used techniques in sessions. Put simply: when having generated a number of ideas (somewhere between 20 and 200), the participants are asked to mark ideas of their choice. As a guideline for the number of ideas to select per person, one might take the square root of the total number of ideas. So, with 100 ideas, one might allot each with ten dots to mark ideas of their choice.

It is a relatively fast technique, one obtains results quickly, and one has a good overview of the ideas that seem to be in favour. But this is also a very critical moment. Earlier on we mentioned the Creadox: the paradox of doing a wonderfully creative session and when doing a selection step, finding that all the innovative ideas have been filtered out. Well, this is where that happens!

So, although it is presented as an easy step in the process, it should be executed with some care.

A couple of recommendations

- Read aloud all the ideas from the flipchart and invite people to ask for clarification where needed.
- Make up a short list of criteria (between three and seven) with the most important aspects to watch for.
- Remind the participants of the Creadox effect (the most innovative ideas are filtered out because they 'have not yet found adoptive parents')
- Invite people to take their time. Don't hurry, this should be done carefully.

Once this selection round is executed, invite people to sit back and appreciate the results. One may start a conversation about the choices that need to be made at this point. I personally don't like to assume that the ideas with the highest score will automatically win. The number of dots is only an indication of preferences at that point in time.

Although the technique is presented here as an idea selection step, one can use it in each of the diamonds in of the CPS process, for example when selecting a 'How To' to generate a useful problem statement.

10. Clustering

A way to create an inventory of all the ideas obtained after having run a number of creative rounds is to cluster all these ideas. This way, one acquires an insight in what one may call the solution space with various ways of dealing with the original problem. And as described earlier, one may now more easily choose from a number of directions on how to proceed.

Although it might be tempting to use some standard categorization to find clusters, generally speaking it is better not to use such a ready-made categorization. It is much more interesting and useful to let a categorization emerge at the time of clustering and develop one's own categorization for this particular 'solution space'. Of course, all kinds of discussions can come up, disagreements on a category or on some idea. Great! While this is happening, extra understanding is growing about what solutions ought to be about and what the most important aspects are.

Naming clusters

At some point, one will have to invent names for these clusters. These names stand for something ideas in one cluster have in common. I always suggest the use of metaphorical names that introduce new richness. Metaphors also help when clusters are not yet clearly delineated. As such, metaphors may help to bridge different opinions. And in a following stage, these names might even be

an inspiration for further development as this metaphor stands for something unique in that cluster.

All the ideas are to be used, and so participants have the opportunity to get accustomed to each of them. Like dotting, clustering is also concluded by sitting back and reflecting on the results, for example in terms of what's good about these clusters and what we may have overlooked. Another advantage is a deeper insight into the whole 'problem – solution space'. What kinds of elements play a role, what is of importance, what are consequences of particular solutions, etc. etc. Doing this helps a group to build and expand a shared understanding of the issue at hand.



Figure 5.4: Clustering ideas

In practice, one sees two kinds of clusterings happening:

- how to deal with the issue – choosing one of these approaches and consequently select an ideas in that cluster or combining ideas in that cluster; such an approach comes down to a more strategic choice on how to deal with the problem;
- different parts of a solution. With the latter, an option for follow-up is some kind of morfological analysis: the clusters are now parameters, and for each parameter, a number of ideas can be selected. A comprehensive solution will now consist of a combination of detail ideas for each of the identified parameters.

11. C-Box

This technique was originally developed by Marc Raison when he worked with the COCD (COCD, 1993–97) to have a tool to distinguish ideas in more or less innovative ideas and more or less feasible ideas. The C-box is a matrix along these two axes. The horizontal axis is about the feasibility of the idea, i.e. a company internal criterion. The vertical axis is about its functionality in a market or to a user and as such an external criterion. By combining these two into one matrix, one obtains a very useful overview of a collection of ideas.

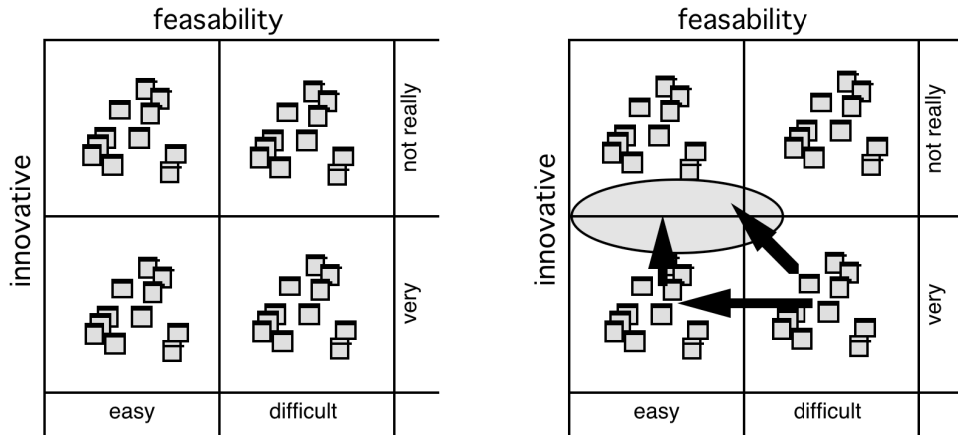


Figure 5.5: C-box

When selecting ideas for further detailing into concepts, one can now explicitly ask participants to elaborate ideas from each of the quadrants, including the more innovative ideas. What will probably happen now is that ideas first evaluated as very innovative and very hard to realise will start to move to less extreme positions in the C-box.

So, by putting energy into some of these more extreme ideas, one may find that an idea which at first looked completely unfeasible and really non-sensical, might start to make sense. By elaborating ideas with sketches, and doing some creative design work, some of the more extreme ideas might start to look more interesting and at least valuable enough to keep them under consideration.

Another interesting interpretation is that the best ideas are the ones on the middle axis. On the one hand, these ideas seem to be reasonably innovative, not just more of the same, neither far ahead of their time, and in terms of feasibility some competitive advantage might be obtained without too much development work needed. So, in the end it's not so much ideas in one of the quadrants that should be selected, but ideas 'halfway' both axis that might have the greatest potential.

5.7 Other approaches in a convergent phase

12. Selective confrontation

The general idea of selection is to evaluate ideas on the basis of criteria obtained independently from the idea generation.

But we can also develop criteria from the ideas themselves.

By selecting ideas intuitively, one may then develop a reasoning why that would be a good decision. When analysing such an argumentation, one will be able to extract criteria that obviously seem to be of relevance to such a choice. By also doing this on ideas one would not select, even more useful criteria may be identified. (Tassoul, 1992)

To give an example:

- Somebody might say: 'I would select idea A because this will have the best longevity and it is relatively cheap.'

So, obviously longevity and pricing seem to be important aspects in such a choice.

- This same person might continue by saying: 'I would not select B because I believe it might be dangerous and it would be difficult to transport.'

New relevant criteria come to the surface: safety and transportation.

The first objective of such a selective confrontation step is not so much to make a selection as it is to develop a set of relevant criteria which could then be used to evaluate other ideas. A short brainstorm and a quick selection stage would be enough to generate a reasonably valid set of criteria on some subject, assuming the participants are knowledgeable on the subject.

5.8 Applying Selection Techniques

We already looked at ideas being generated and then step by step developed into concepts and later on into actual strategies, programs or products. During the idea generation phase we aim at generating as many ideas as possible, and it is not exceptional to have 200 ideas at some point. But in the end we work towards 1 or maybe 2 or 3 concepts that could be further developed into implementable outcomes. So, the question now is: how do we get back from 200 to just 2 or 3 concepts. An example of such a process is presented in Figure 5.6.

Starting with some 200 ideas, it might be wise to go through all the ideas and elaborate them so everyone has a same understanding and then proceed with clustering them (1) to gain an understanding of the solution space and (2) help to make a first selection, either on a cluster level or on an idea level. This should lead to some 4 to 12 ideas, in other words a number of ideas that can

be elaborated somewhat further with first sketches and descriptions of functioning. When having elaborated concepts like this, more explicit criteria can be used for a second selection round which should lead to between 1 and 3 concepts. These are then further developed such that, following the session, some team may take up further design, development and implementation.

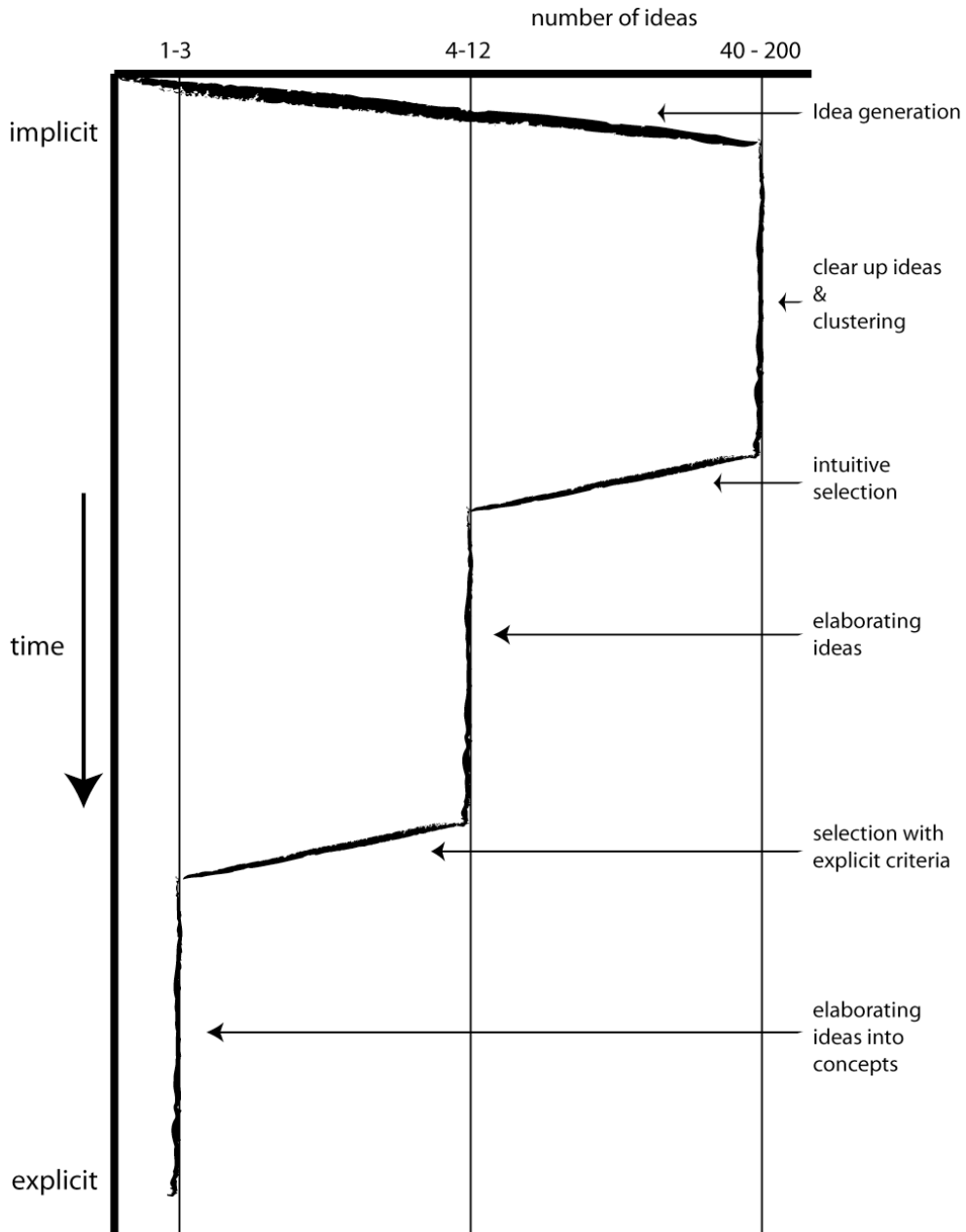


Figure 5.6: Selection and Elaboration – from Implicit to Explicit

This description (Figure 5.6) refers to an hypothetical process. In practice one may vary this of course, e.g. by not using a selection technique as such but by letting participants combine various ideas into single concepts, to give but one

example of such a variation. Below you'll find an overview of specific techniques you can use along the path from Implicit to Explicit.

5.9 Concluding

Almost per definition innovation is a risky business. To be able to evaluate and select ideas at an early stage, with limited information, is an important challenge for creative sessions. One needs to be able to recognise worthwhile ideas, those ideas that will really help us solve our problem or lead to useful innovations.

As discussed earlier in the chapter, idea generation techniques by themselves have relatively little added value; selection techniques should always be used in unison with intuition, feeling, emotion and wisdom. When that's the case, such techniques can help us build up a good argumentation by making such a decision explicit.

A summarising overview of evaluation and selection techniques:


From implicit...  ... to explicit	Intuitive	Gut feeling Simple and elegant
	Inventory	Clustering and naming clusters PMI (Plus, Minus, points of Interest) ALU , or vALUe (Advantages, Limitations, Unique elements) IPC (Interesting = ends, Plusses = means, Care = weaknesses)
	Argumentative	Comparison in pairs Itimized response
	Confrontative	Court of justice (judge, lawyers and a jury) Devils advocate
	Structured	Criteria - requirements and wishes Check lists Life Cycle Analysis
	Efficiency	Strengths, weight and usage ROI - Return on Investment

Table 5.7: Selection from Implicit to Explicit

intermezzo: Ad de Rooij

Ad de Rooij works at the headquarters of the Ministry of Public Works in The Hague. They are temporarily housed here, temporarily meaning for a few years or so. Then they move back to the city centre to a high-rise building. "It is more natural to go in and out of each other's office than here", secretary Petra Ravestijn tells me, as we are waiting for Ad to come out of his meeting. They all work in one room. "They" being the project group "Crystallisation 21".

Formally Ad is the project leader of Crystallisation 21, but that may well change in a few years. He likes to describe his function as architect of organisational changes at the ministry. He studied civil engineering in Delft. This took him 10 years and it has taken the better part of 10 years to get rid of Delft again.

"Why was it necessary to get rid of Delft?", I ask as I start the interview.

Delft is a fortress thriving on the notion that technology is the beginning and end of all things. This religion, or rather this political philosophy, is upheld so fanatically that it brings images of the national socialists of 1930 or the communists to one's mind. This is typical of Delft. Delft seems to be surrounded by a great wall with only one door, or rather a shutter on which TUDELFT is painted in big letters. If you want to go through that shutter you had better fit the Delft framework or simply forget the idea completely. Delft is not a part of society. Delft is a society on its own.

He defines creativity as "all that happens". It takes a while before I realise that he actually means what he says: All that happens. Everything that takes place around you in daily life. In Delft only the left brain hemisphere is used, and highly fragmented at that. It has taken Ad years to get the other half functioning again. As an example for this he mentions his ability to draw, which was quite well developed during his secondary school days. Delft took that ability away from him when he had to draw bridges as bricks, just blocks and blocks and blocks.

How and what poses a threat to creativity? Itself! It all revolves around a sum of worlds that are more or less dynamic. Static worlds threaten creativity. If people are not

poised towards what they really want, things start to turn sour. There is often quite a divergence between what people really want and what they think that they want. The reason for this can lie in pressure from society or the pursuit of success. You will have to undergo a continuous process yourself before you can find out what you really want. Ad touches the subject of Delft again. It is a fortress filled with knowledge. But knowledge is stagnant. Knowledge is merely a particle of all that happens. Many scientists at Delft hide behind this knowledge and it chills them. They forget the human relations which are so important. Human warmth instead of becoming frostbitten. That is what a dynamic world is about. A dynamic world appeals to real, feeling people.

What do you actually mean by this term "dynamic?"

Yes, this is quite complex; it is like the rotational speed of life. It is all that a human being can fathom and can develop as concepts. To really be intensely involved in something and to be able to express that, that is good for the world. With "to be intensely involved", he means tasting the full richness of life. Use your senses to the fullest and do so consciously. If you walk through the woods, you must experience the woods, and not only remember having pondered over a problem for 30 minutes without sensing what happened all around you. Be present where you are instead of where you think you are. It boils down to Shakespeare's "To be or not to be".

What does your job entail?

Conceiving and developing a different authority. Reconstructing organisations to different ones with added qualities; continuous development, staying alert and to keep on trying, that's his job. So how do you stimulate people in participating in all that happens, in their creativity? He forms groups of about five people that are intensely involved with a subject for some 2 or 3 years. Preferably big shots. That makes it easy to get the required funds and organisational space. These people stimulate each other as they go through a process together. Then subsequently they get things moving as 25 others are involved and later towards the clients, in my case the provinces of our country. For instance we are now concerned with making the A28 road

wider between Utrecht and Amersfoort. His main concern is whether this really needs to take place at all. And if these problems might not be solved in a different way. In general people are mainly concerned in extending the present situation. Society is becoming increasingly egocentric and so is the minister of Public Works. They want to beat their breasts presenting large and impressive structures, without first thinking if the funds under their control are best spent in that way.

Wouldn't you rather have a seat in the government?"

"Perhaps you are right, but later, I think it is a bit too early for that."

How does one jump from creativity to reality? Quite a lot of people are ensnared along this path. People think "Oh, let's be creative for a few minutes." They have their little brainstorm and that's it! Ad sees it as the essence of his work to help others get to creating under their own steam, not now and again, but continuously.

But how do you stimulate creativity in others?

It is possible to get them going. To achieve this he had a CD made on which a number of musicians translate a text. This is useful as a starting point for association. But there is no substitute for people's own participation. Another stimulant is teaming up people. He forms individuals into teams. There is no recipe for the right way to do this. Experience and life seem to be the answer.

Ad looks across the street at an office of KPMG, a large accountancy organisation. Look, the people over there are very formal, they work within stringent hierarchical rules. If you want to achieve results with such a club, you need to adapt to that situation. Even if you want to change people you must start by connecting to their present habitat. You must try to contribute to their ideals and continually bring this into sharper focus.

The main barrier is usually fear. People are afraid that they are not able or not allowed to do certain things. This can sprout from old convictions, when people have been told 15 years ago that they were not suited for something. Of course you don't need to handle everything psychotherapeutically,

but it may help to make others conscious of their long-time acquired convictions.

And what do you do, if all that doesn't work?

Then I leave the scene. One can stimulate people but it is up to them to make the right moves. If they don't do that then that's it. It stops for me. You might still be able to organise nice projects for them or worthwhile activities and meetings.

Do you have some advice for students of industrial design?

Yes, replacing the I of Industrial by the S of Society. The I stands for objects. A new approach should be tried with the emphasis on the human element. It represents a great challenge to the TU-Delft: getting people to unfreeze their present positions.

A prime example is the Horta House in Brussels. The architect Horta designed the house around 1900. Next to different functional aspects on a house structure, one notices the different furnishing and decorations that were quite different from what was the norm in those days. Art Deco, a new style that he managed to blend very well with the existing notions. He was able to move away from the daily practice of those days, having to put a lot of effort and capacity in influencing users, builders and other surroundings, but thereby creating a new experience. Art Nouveau was new in those days and he is one of the architects developing it.

"Do you have any ambitions you'd still like to achieve?"

"Yes, realizing a kind of Horta house, with multilevel cooperation. Search, bump against walls, and be vulnerable."

The Hague, October 2000.