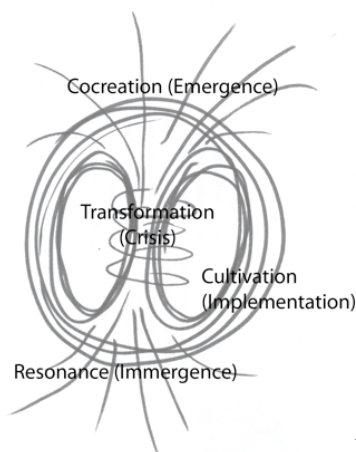zur IPG-Website

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The Field-Process-Model

Jascha Rohr, 03.11.2011

by Jascha Rohr & Sonja Hörster

Abstract

The field-process-model is a theoretical framework the Institute for Participatory Design developed to understand generative design processes as dynamic interactions of forces in a field. The development of this model became necessary after we encountered numerous theoretical and practical problems with the application of our former, more systemic oriented, understanding of pattern languages and design processes. The field-process-model explores the idea that a field with its forces (as used in numerous pattern languages) is the spatial description of a process, which in turn is the temporal description of a dynamic field. The model gives us a good understanding of how generativity and emergence unfold and how we as designers can foster these qualities in our design processes. Beneath the question of the emergence of new (design) ideas, the model also helps to investigate qualities such as immergence, crisis or bifurcation and of cultivation for generative processes. With the framework the field-process-model describes, we can develop applicable tools and strategies for actual design. The goal is to design in open and flexible processes that are alive and create results that are alive.

Current models of design processes

We have been trying to comprehend the nature of design processes for over 12 years now. Before we founded the Institute for Participatory Design we had been working in Permaculture Design. This was also the time we first came in touch with pattern languages and the work of Christopher Alexander. Permaculture was "invented" in the 1970s by Bill Mollison and David Holmgren as a practical design approach with the aim of mimicking natural systems to create sustainable human habitats. Bill Mollison was awarded the Right Livelihood Award for this work in 1982.

As founders and teachers of the Permaculture Academy in Germany it was our aim to offer the best teaching in environmental design. That meant that the theory, methods and processes used had to be sound approaches for achieving sustainable solutions for a given task.

Permaculture Design as a design approach does indeed offer a huge variety of tools and methods to achieve sustainable systems. It explains for example zoning techniques and overlay methods and shows how synergetic guilds of elements can be assembled.

But when it came to teaching how to actually do the design itself, even Bill Mollison's Designers Manual – a weighty compendium on permaculture – went silent. Some permaculture designers must have realized this weakness of the original work and offered classic design process models to permaculture design. The two widely used process models came from engineering. They were named the SADIM and the BREDIM design processes. The abbreviations stand for Survey, Analysis, Design, Implementation and Maintenance and for Boundaries and Resources, Evaluation, Design, Implementation and Maintenance respectively

Both models suggest a straightforward design process with easily understandable steps to follow. However, our observation has been that all the students who had been taught these models never actually followed them. Even when we tried to force them by asking them to document their own design process, they never took the steps suggested by these models. Rather they arrived at their design in some other mysterious way and retrospectively tried to describe what they had been doing using the SADIM or BREDIM models. The result often was both frustration and boredom.

This puzzled us and even though we have taught design along these processes, our own designs didn't follow them either. So what was happening? Were we all bad designers who couldn't follow a simple process or was the theory behind these models wrong after all?

We decided on the latter after we found that the same curious observation could also be made at almost any design university. Students are taught in almost everything on their subject (e.g. interior design – materials, form, color, history) but they learn little about design methods or processes. It seems that either you are a born designer and genius or you are an engineer who follows a technocratic and linear procedure to find a fix for a problem without any chance of reaching emergent qualities.

Both notions are a problem for anyone who teaches design or who conducts participatory design processes with lay persons, since this work is carried by the believe and the hope that design is an activity to change something for the better, which can and should be done by everyone.

So when we founded the IPG we were eager to find a realistic and practical model for what was actually happening in a design process. We were interested to understand how even laypersons can arrive at good design solutions that work for all participateurs: people and places alike.

If one plugs the term "design process" into Google's image search, the results show a huge variety of charts explaining design processes in various fields: engineering, interior design, product design, software design, management and much more.
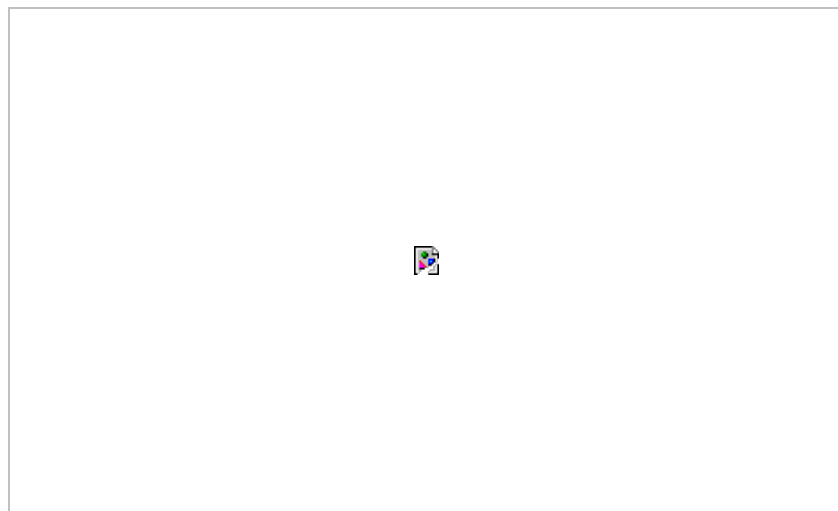

Figure 1: A google picture search result for the term „design process" from 24.9.2011

They all share similar characteristics:

- they follow a path in time,
- they suggest a set of steps to get to a final result,
- the models are generally depicted as lines or circles, some also show loops, short-cuts or iterations,
- often „design" itself is one of the steps in the described design process (which often leads to tautologies),
- none of them describes the moment where a new idea, an innovation, an emergent quality or a transformation of the existing takes place,
- none of them explains the normative problem in design of how we can achieve a positive, progressive (and sustainable) result while simultaneously staying open for surprises, learning and emergence,
- quite a few of them even suggest that you can state the goal of the process before you engage with it, which in our understanding is the 'best' way of preventing emergence.

Procedures and generative processes

Lets start by clarifying the theoretical terms with a clear distinction between processes and procedures:

We understand a process as a temporal event in space-time, a design process therefore as a temporal event in space-time in which innovation, transformation and new ideas emerge. Processes generally unfold by themselves, since life itself is an unfolding process. But for the purposes of design, us designers, as participateurs, can intentionally and methodologically help to give these processes a framework and direction. In contrast, a procedure is a set of instructions for carrying out or controlling processes. With this definition we can easily see that almost all "design processes" we see nowadays are not processes but procedures. And they reproduce a certain ontological dualistic framework, i.e. that we live in a world of objects, which can be altered by subjects (in our case the designers). Even worse, they carry a control-based understanding of creativity and the production of ideas, which finds its analogy in the conveyor belt of the industrial age.

But how can design procedures that are based on the idea of control, management and production lead us to sustainable solutions, that are alive? Well they can not. They fabricate structure rather than generating it. They are in fact at the core of many of our social and environmental problems. They can only reproduce modular solutions of that which is already known, they can't lead to emergence and they can not generate transformative energy for real change as long as their very nature is rooted in control and the consolidation of the detachment between subject and object.

In our own design practice and in our participatory and collaborative design projects we experienced that design processes which generate emergent and transformative solutions that are alive, follow a completely different logic.

Christopher Alexander writes on generative processes: "When we cook a soufflé, we generate the soufflé by initiating transformations between eggs, butter, sugar, and so on: we do not try to build it (…).(Alexander 2002, p180)"

This is a plausible analogy but how can we characterize generative processes further, how can we identify them and how can we learn to cultivate them? At the IPG we often try to see a process as an entity, which is alive itself. If we follow this thought we can observe general attributes of generative processes:

Generative processes generate themselves, their steps, methods, goals and results: we as designers are a strong force in a process, but not the only force. Our methods and intentions can frame and direct processes from within but as soon as we detach ourselves to control a process from the outside we kill it (or at least we destroy the generativity of the process). This means from the other side, that we have to open ourselves to the goals and results suggested by the process itself. It also means that we should let ourselves be guided in our methods. This suggests an unfamiliar openness, tolerance and flexibility of the designer.

Generative processes pass themselves on to the next process: a process seems to have a "genetic code" that will deeply influence all offspring processes. That's why it is often not possible to change the culture within a set project context. If the overall project – say the planning of an urban area – is ruled by rigid, fabricated structure in a controlled step-by-step design approach, it is almost impossible to open up the process to a more open and fluent participatory approach to design, e.g. the park within this area, and get a result which is truly alive. This has a good and a bad side to it: if you set up a strong generative process, it will be hard to hijack this process later by attempts to control it. If, on the other hand, you start implementing generative thinking in an organization with controlled workflows (the QM type organization), you will be busy defending yourself to prove that you actually have a methodology at all.

Generative processes choose their own participateurs and they care for the right place and the right time: every participatory design process needs human participants, a right place and a right time. There are many formats out there that have guidelines on who and how to invite, how long to work and where to work best. We do not believe in these suggestions. Every process needs its own set-up, which is just right for the field in which it unfolds. Sometimes only the professional designer should work with a place, sometimes you invite everyone via the local newspaper. Some processes are open ended, some have to run their course in exactly two days. The right decisions for these questions should be informed by the process itself or its parent-processes, not by some abstract methodology, by chance, regulation, or power.

Generative processes keep themselves clean: like a snake they shed off those participateurs that are not willing to transform or who can't become part of a solution. This sounds brutal but in our experience it is not, since it clarifies the process for all participateurs: those who stay and those who leave. There is a positive lesson for every participateur, but some lessons belong to another field and another process. For facilitators of generative processes inclusion and exclusion are fragile, dangerous but also necessary and vital questions and it is advisable to let the process work its own course in this regard.

You know you have helped the evolution of a generative process if you see the following happen:

Generative processes form patterns. They create individual structures, which can be recognized as having derived from the same process. This way they are alive. If you get a multitude of ever-the-same clone products instead, you know that the process was not generative.

The following chart shows the leaves of four coltsfoot plants. Their leaves have been detached from the stem (from top to bottom) and placed in a row (from left to right). The chart is part of a Goethean science experiment with the intent of intuitively showing the underlying structuring principles of the plants. Every coltsfoot plant basically carries the same genetic code. Every single plant was influenced by the same weather and soil conditions, you can see the pattern and you can sense the similarities

and yet every leave is different and unique. If you see similar patterns in the results of your design you can be sure that you achieved generativity.

Figure 2: Goethean science experiment (Bortoft)

Generative process create emergence: they always lead you to something new, which in this exact phenotype has never existed before and could not be envisaged at the start of the process. If you get the result you pinned down as your goal at the start of the process, your process was not generative.

Generative processes foster contextual awareness and collective consciousness. In order for a generative process to unfold, it is necessary that all participateurs connect to the process (or the field). This connection leads to a reciprocal affection between everyone and everything involved, so that the awareness and the intelligence are spread over all participateurs (not necessarily in equal proportion).

Now that we know how to identify a generative process and what to expect from it, we come back to the question of how to design in a generative process.

When we look at Christopher Alexander's work, we see that his method is to build sequences out of the patterns of a pattern language. The designer chooses appropriate patterns and follows them with his design to get to more and more defined and detailed drafts (Alexander 1979 p.372ff). Still, I wonder how this can prevent a designer from producing results that are not alive or sustainable or even appropriate, especially if the designer has not the same feel and intuition for the generativity that, for example, Christopher Alexander has. Pattern sequencing alone does not seem to be a sufficient and failsafe method for a generative design even though it can be a very powerful method within the overall process.

Qualified assesment

Again: At the Institute for Participatory Design we want to teach how to design generatively and are interested in designing in participatory and collaborative settings with lay people. So I have to face the question how a group's design decision supports processes to generate results that are alive. Good methods alone do not make a good design process: another precondition needs to be met in order to make it work.

And this precondition is the way how we assess our design decisions. With our constant assessments we normatively direct our design solutions in a way that the results carry the sought-for qualities (like aliveness or sustainability). But assessments can go wrong – that's why so many designs fail even if the designer had the best intentions. We found out that our assessments have to be qualified by the field in contrast to personal or objective assessments. So what is qualified assessment? Let's start by stating what it is not: it is not 'personal assessment', an assessment based on specific interests, expressing the private interests or the taste of an individual person or a common interest group. This may be necessary or desirable in certain instances but it may also hinder qualified assessments. Nor is it objective assessment: objective assessment in the sense of essentialist science is not possible. Here we agree with [Heinz von Foerster](#): "Objectivity is the illusion that observations can be made without an observer. (von Foerster)"

Instead, qualified assessment arises when those who participate in a generative process articulate assessments made on the basis of their engagement and connection with the field. Qualified assessments can thus be understood as a form of expression of the field (the process), where this expression is based on the common intelligence and field intuition of the participants. This field intuition is only possible when we lock into a field, which requires the active work of establishing a multitude of connections to other (human and non-human) participateurs in the field.

Field theory

At this point it is necessary to explain what I mean by a field: following on from my explanations of generative processes the definition is straight- forward, since the term 'field' only describes a change of dimension. A field is the spatial description of a process – while a process is the temporal and therefore dynamic description of a field. Both descriptions combined give you a sense of an abstract unfolding, growing, transforming, pulsing and finally dying entity in space and time.

Field theory has many roots. The main sources for modern field understanding are theories of magnetism and gravitation in physics. But many philosophers, sociologists and psychologist also use the term in the social sciences. Kurt Lewin , to name but one, was the founder of modern group psychology and of a psychological field theory. This is important in so far as group psychology and its interaction with place plays an important role in participatory and collaborative design processes. Kurt Lewin explored social interaction spaces which he called fields. Those fields, according to him, can influence either individuals or groups in their behavior. He also studied the effects of spaces on human perception and the creation of meaning (which can be seen as an abstract design skill). In one of his essays he explores, for example, the effect that war has on a landscape and its meaning. The same tree, which in times of peace is perceived as a nice resting place, may become a hideout for snipers in war times. The configuration of the forces within the field of the landscape changes according to what is happening in the landscape even when no physical changes occur (Lewin). Many other authors (Husserl, Merleau-Ponty, Scharmer et.al.) also use the idea of fields in their theories. However, in contrast to systems theory, a comprehensive and sound field theory has not yet been written. Still, we think field theory is worth exploring and building upon as it offers an non-mechanic, non-dualistic and non-linear understanding of complex interactions of forces in a given context.

In particular, it shows that we, as designers, have to integrate ourselves into the field of our work in order to understand and resonate with the forces and the conditions they create. Only this immergence into a field enables us to become a driving force for generative transformations within the field.

The Field-Process-Model

We now see an interesting dipole in the qualities of a generative design process: what we want to achieve is emergence – new ideas, designs, concepts, innovations that have not been there before and carry an inherent and sound solution for the field in which we work. In order to get there we must immerge into the field itself. We have to connect ourselves to the field, which means that we have to interact with the forces of the field by becoming a force of the field ourselves. We have to engage in exchange with the other participateurs while becoming a participateur in the process ourselves. There is no emergence without immergence, no diving out without diving in.

But what connects these two poles? What happens in between? In between the transformation takes place. A designer who works in generative processes will never stay the same through his or her work since the transformation takes hold of everything in the field including him or herself.

When we started working in participatory and collaborative settings we often experienced a crisis during the process. The crisis usually happened after the participants had the feeling that they had understood the entire problem, or after they had experienced a place in a profound and personal way or when they reckoned they had gathered all the knowledge of a certain subject. In short, when the state of immergence is achieved, the process often feels dense and problematic to the participants, the problems seem pressing and underlying patterns show their influences (e.g. in the psychology of a group at a certain place). The crisis never manifests in the same way: Sometimes it is a crisis within the group, sometimes it is a crisis with regard to resources, sometimes there is a personal crisis and sometimes it manifests as an intellectual crisis. When this happened in our work we used to think that we were doing something wrong in our facilitation. But we soon learned that the crisis itself, the dense and thick clashing of forces was the true engine of change and transformation. Only by going through this phase and working with it the horizon opened for true emergent ideas and solutions.

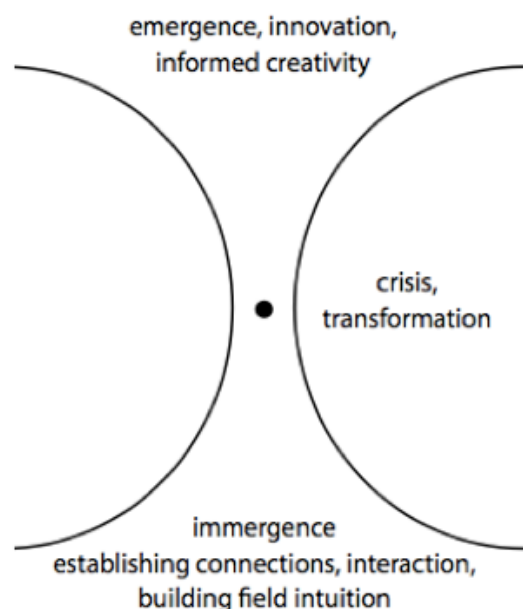So our first model looked like this:

Figure 3: Early form of the IPGs field-process-model

When we reached this point, we were both satisfied and doubtful. We had found a very simple and powerful visualization with

which we could explain what was happening in a generative design process, to a certain degree we could predict what would happen, and we lost our fear of crises completely. On the contrary, we started to expect the crisis and we developed methods to work with it in a productive way in order to move along with the process through the dense and narrow nucleus of the field, knowing that on the way out of it, the field would widen to a multitude of new perspectives and ideas.

Also we could prepare our participants better for what would happen with and to them in the course of the process and give them courage to not shy away from deep experiences and personal transformations during the design work. We knew that even if it was getting rough, it would all pay off in the end.

We also derived from our understanding that the most important thing facilitators of design processes can do, is to not control the process (e.g. by preventing it from reaching a crisis) but to enable everyone to resonate with the field and to connect with it. Immergence can be achieved by a huge variety of methods, which have to be carefully chosen and developed according to the process itself.

Moreover, we also understood why it is impossible to look beyond the point of crisis. When you enter a generative process, you just do not know the results you will get in the end. The point of transformation is a point where not only the direction of the game changes but also its rules. It is as if you were trying to look beyond the big bang: it is not possible as the rules and laws of nature itself change (and emerge) at this very point.

Every generative process displays this rhythm: sometimes it is strong and powerful as if something is shrinking to a dense nucleus and then exploding in a big bang; sometimes it is as soft and gentle as breathing in and breathing out. The beauty of it is that the side of emergence is always a relief, a fountain, a creative burst and a horizon full of unexpected opportunities and innovations.

Our doubt was whether with our model we could be misunderstood as presenting yet another design procedure, yet another scheme. But we were not interested in suggesting a new step-by-step guide. Our interest was in understanding the patterns and qualities of generative processes themselves, so that we could explain and teach generative design.

So we explored our model further and searched for helpful analogies and patterns to broaden our comprehension of the model. As pattern recognizers we got back to a chapter on pattern understanding in Bill Mollison's Designers Manual where you can find this chart:
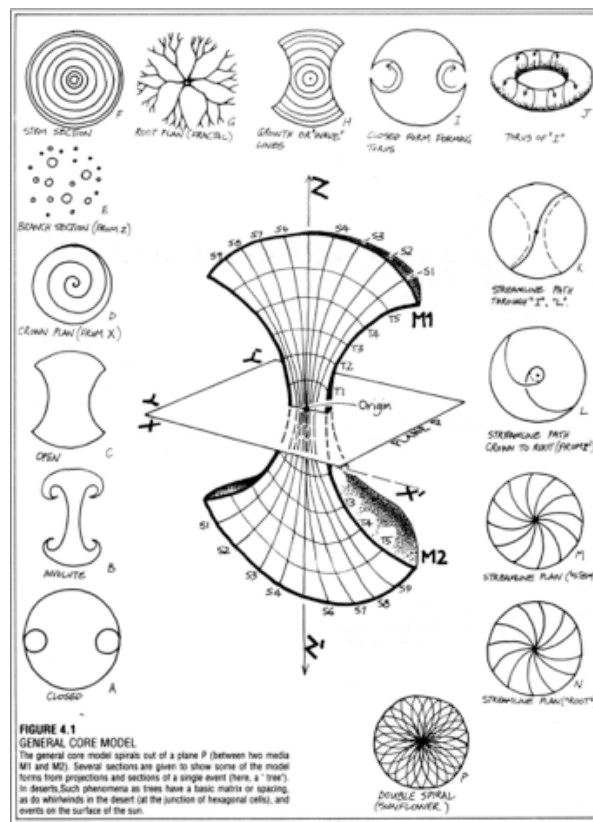

Figure 4: General Core Model by Bill Mollison (p.73)

Bill Mollison calls the figure in the middle the 'general core model', and explains how its basic structure gives rise to the patterns shown around it. You can find a number of analogies and metaphors for this core model:

- the magnetic fields of cosmic bodies such as planets and stars
- the gravitational fields of galaxies
- the magnetic field of an inductor coil or an electronic motor or transformer

- an apple (with the seeds in the torus section)
- a tree with roots, stem and branches
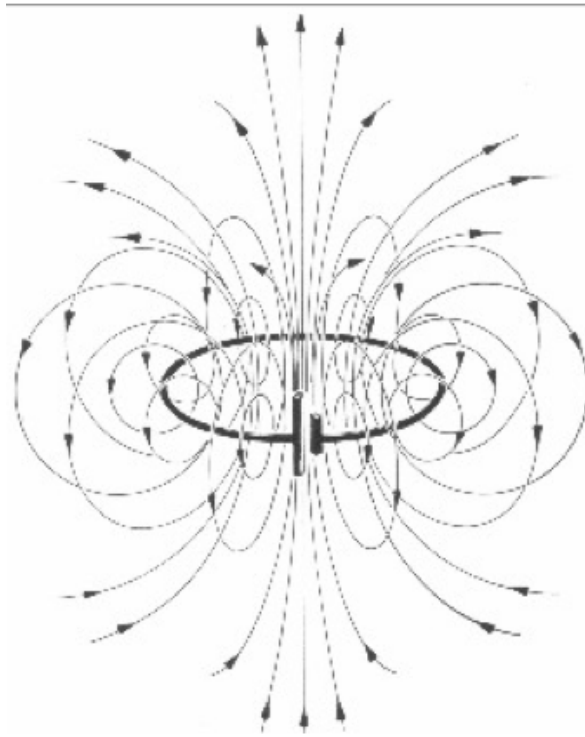- an explosion and the big bang
- Leonardo da Vinci's vitruvian man

Figure 5: a magnetic dipole field (Piontzik)

Through studying natural patterns and their unfolding according to Bill Mollison's general core model, and our analogizing this model in respect to our process understanding it became clear to us that our initial attempt had only been a part of the whole picture.

We started to see our model in four dimensions to get the whole picture. Three dimensions represent the field as an abstract space in which various forces interact in nonlinear ways. The fourth dimension represents the dynamic interaction of forces in time – thus creating an internal flow in the field, which is responsible for the emerging patterns and structures.

In this way we learned, for example, that we had been missing the outer sphere, which embodies the stem with the nucleus inside: the crust of the earth and the skin of the apple in the analogies. With this outer sphere a fourth quality came into the process: the cultivation.
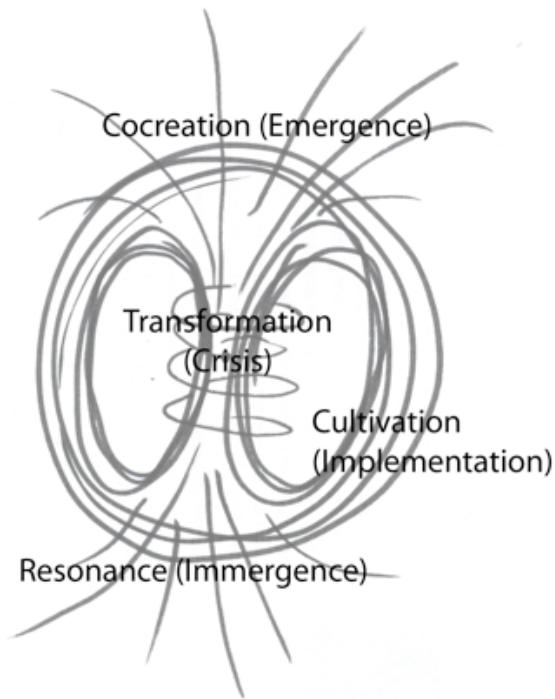
Figure 6: The full IPG field-process model: qualities and activities

With the field-process model in this form we are able to present a four-dimensional map of generative design processes and are able to understand and explain certain qualities during the design process. It is important to understand though, that these qualities are all present during the whole process and are not steps following each other in a linear way: we can change our positions in the model, much like the location of an electron in an atom can be found at different probabilities in certain areas of the atom.

Instead, we hope that the field-process model gives orientation to everyone working with generative design processes. It is like a map of qualities, which does not describe the stations on a journey but rather the songlines helping the traveler in his orientation. The participateurs are like particles, which are in a state of one of the qualities at a certain probability. Immergence, Transformation, Emergence and Cultivation are always there but their respective strengths change over time.

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[Prozess-Behindert und Meta-Erkrankt « benjaminaaron](#) l am 12. Dezember 2011 um 14:43 Uhr

[...] This post is in German, sorry to those who don't understand. I regained the appreciation of my nuanced expressive capacities in my mother tongue. See the field-process-model of the IPG here. [...]

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