

Product Design and Intentional Emergence facilitated by Serious Play

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Abstract

In this paper we discuss the phenomenon “intentional emergence” in a product development process context. We point to play as an enabler for intentional emergence and report on experiences with the Lego Serious Play method. Following our initial empirical experiences we identify six central and comprehensive concepts that are considered essential to improve our understanding of the phenomenon intentional emergence, and, furthermore, are essential in our effort to improve the facilitation of the intentional emergence process. We point to the need for further and more thorough research to develop the methods further and to provide more solid scientific evidence.

Keywords: *intending emergence, collective conceptualization, serious play*

1 Introduction

We often assume that product development is intentional. The standard notion of intentionality is that it is presupposed that product development refers to actions that are deliberately directed towards the achievement of some purpose. More specifically, within product development, the purpose can be defined as the matching of external customer requirements or needs with internal and external competencies to deliver product offerings in response to these requirements and needs.

The connection between needs and product offerings seems logically and is often described as a linear connection with causal relationships. Most product development textbooks offer such a linear causal explanation. Indeed, in retrospect most product development processes can be

explained as causal. However, there is substantial evidence that these causal patterns in the stream of product development activities mainly exist in retrospect [1].

We can alternatively assume that product development is emergent. This implies that product development proceed not only from the intentional activities but to a larger degree from ideas that were never intended, and from what emerged during the process. In the extreme this leads to a fatalistic understanding of product development activities. Most professionals will intuitively refrain from such an interpretation but they will acknowledge the existence of substantial elements of emergence in the product development processes.

The two extremes – intentional and emergent – serve as important frameworks for a better understanding of the product development process. Our research assertion is that they need to be understood as complementary phenomena in a complex interplay. This is in light of previous work we have done in examining the role of play in the development of corporate strategy. In particular we used the serious play method to facilitate several corporate strategy meetings and found that far from the meetings following a predefined agenda, the participants often discovered new issues which they considered important to work on.

The purpose of this paper is to focus on the relationship between serious play and the complex interplay of intention and emergence. We frame our focus “intentional emergence”. In particular we ask the questions:

1. Whether it is possible to intend emergence?

And if it does make sense:

2. What are the critical concepts involved in intentional emergence and serious play?

2 Emergence and intentional emergence in product development processes

Emergence has been theorized extensively within the field of complex adaptive systems [2]. Here, the idea is that complex systems, defined as systems of agents, experience non-linear interaction among themselves and tend to exhibit sudden and often surprising behavior at another level of scale. Just as the pattern of the ground appears to change as you take off in an airplane and gain height, complex adaptive systems exhibit the same kind of shift of patterns. This “emergent” effect is seen in natural as well as social systems [3].

Stacey [3] portrays emergence as the unintended, unpredictable outcomes of intentional behavior of actors in social systems “that cannot be produced from the local rules of behavior that produce them”.

The emergence phenomenon is closely related to decision making based on imperfect information. In situations like these a variety of diffuse knowledge structures have been found to influence the decisions made [4]. Concepts like mental templates, mental models, or cognitive filters have been used to frame these diffuse knowledge structures. They provide the context in which individuals view and interpret new material, and help determine which information already stored in their memories is applicable to the new situation. Although these diffuse knowledge structures enable the identification and selection of appropriate courses of action, they can also hinder the consideration of certain data outside the interpretive coverage of the knowledge structure. Thus, although they provide structure and reduce complexity, they can also be the source of blind spots.

The discussion above documents the relevance of incorporating the emergence phenomenon when we discuss product development. Emergence can be seen as a powerful source to increase our understanding of the complex interplay between team-member when making decisions in product development processes [5]. It is evident that emergence can not be fully controlled; however it appears that it can be facilitated to a certain extent [6].

Intentional emergence then becomes the sum of the actions we make to facilitate emergence. This is both with the purpose to improve the conditions and equally with the purpose to break with conventional and/or habitual patterns of thought.

3 Playing seriously

There is a long tradition of using play as a method of developing adaptive human potential [7]. In short, research indicates that play has:

1. The cognitive benefit of drawing on the imagination to develop new insight [8], [9].
2. The social benefit of developing new frames for interaction [10].
3. The emotional benefits of providing positive affective associations as well as a safe context in which to take risks, to try on new roles, and to explore new potential forms of practice [11].
4. The tendency to lose sense of time and engrossment resulting in increased involvement [12], [13].

In view of these multidisciplinary research findings, serious play has been introduced in professional organizations as a process to facilitate emergence. In particular three theoretical concepts have advanced to explain its benefits:

- Constructivism – a theory of knowledge developed by Jean Piaget, his colleagues and his institute in Geneva, Switzerland, [8].
- Constructionism – a theory of learning developed by Seymour Papert and his colleagues at MIT in Cambridge Massachusetts, USA, [9]
- Flow Theory – a theory developed by Mihály Csíkszentmihályi, [12].

Piaget discovered that children are not just passive absorbers of experience and information, but active theory builders. Children are not just empty vessels into which we can pour knowledge. Rather, they are theory builders who can construct and rearrange knowledge based on their experiences in the world. His theory of knowledge, stipulating that knowledge is built or constructed by the child is known as constructivism [8].

Seymour Papert was a colleague of Piaget and wanted to extend the theory of constructivism to the fields of learning. Papert eventually called his theory constructionism. It included everything associated with Piaget's constructivism, but went beyond it to assert that constructivist learning happens especially well when people are engaged in constructing something external to themselves.

Papert also developed his own and Piaget's ideas to cover not only children learning. It applies to adults as well. Constructionism is a way of making formal, abstract ideas and relationships more concrete, more visual, more tangible, more manipulative, and therefore more readily understandable. At the core of both ideas is the notion that when we "think with objects" or "think through our fingers" we unleash creative energies, modes of thought, and ways of seeing what most adults have forgotten they even possessed [9].

Csíkszentmihályi outlines in his "Flow" theory that people are most happy when they are in a state of flow— a state of concentration or complete absorption with the activity at hand and the situation. The idea of flow is identical to the feeling of being in the zone or in the groove. The flow state is an optimal state of intrinsic motivation, where the person is fully immersed in what he or she is doing. This is a feeling everyone has at times, characterized by a feeling of great freedom, enjoyment, fulfillment, and skill—and during which temporal concerns are typically ignored [12].

Organizational engagement, knowledge sharing, and thereby decision opportunities seems to be strongly correlated with the existence of physical models. In his book, *Serious Play*, Michael Schrage [14] praises many aspects of physical prototypes and models for speeding up processes etc. and mentions examples of great breakthroughs supported hereby. The following extracts provide exemplary viewpoints his book on *Serious Play* [14].

- When talented musicians improvise, you don't look inside their minds; you listen to what they play. When talented innovators innovate, you don't listen to the specs they quote. You look at the models they have created.
- The challenge of converting uncertainty into manageable risks or opportunities explains why serious play is often the most rational behavior for innovators.
- Serious play is about improvising with the unanticipated in ways that create new value.
- Prototypes engage the organization's thinking in the explicit. They externalize thought and spark conversation.
- Prototypes force confrontation with the tyranny of trade-offs.
- The conventional wisdom that "innovation processes" drive prototype development is misleading. Empirical observations of organizations with effective innovation cultures confirm just the opposite: changes in prototypes and simulations drive the innovation process.
- Prototypes are machine tools for producing choice.
- Most companies have formal prototyping processes and informal prototyping cultures.

Schrage argues against the common assumption that "great teams make prototypes" and suggests that instead one should realize that "prototypes make great teams". The making of great teams goes beyond the individual team, but helps create teams out of people with different backgrounds by creating "shared space". Shared space is the common ground where people can meet on even terms and objectively discuss matters.

4 LEGO Serious Play

LEGO Serious Play (LSP) is being developed as a response to these theoretical insights and as a potential facilitating method for emergence. The background for LSP is that the president and owner of LEGO were dissatisfied with the results of his strategy-making sessions with his staff. He had the experience that while the business of LEGO was about imagination, the results from the strategy-making sessions were decidedly unimaginative.

LEGO created a separate subsidiary called Executive Discovery based on the seemingly simple idea to use building with LEGO bricks as means for tapping into unconscious knowledge and to communicate this knowledge in narratives.

The development of the LSP concept is an ongoing process. Most effort has been devoted to develop applications to facilitate strategy-making.

In 2005 we started to apply LSP to facilitate innovation and product development processes. We have until now been engaged in more than 60 workshops with very different organizations. The scope of the workshops has differed from specific product development projects to development of product development organizations. In the following we will report some of the experiences from the workshops.

5 The LSP workshop

Before engaging in LSP workshops we typically have a discussion with an organizational leader (sponsor) who has a problem he/she thought required some kind of innovative process to address. The initial discussion clarifies the degree of openness of the problems that are going to be addressed. Furthermore, we discuss who is going to participate. We experience four different types of workshops that need to be facilitated differently:

- Focused questions with a homogeneous group
- Focused questions with a non-homogeneous group
- Open-ended questions a homogeneous group
- Open-ended questions with a non-homogeneous group

In a typical LSP session, participants start with a few warm-up exercises to learn how to stimulate different types of imagination. This exercise would drive people's hands into the materials as quickly as possible, and familiarize them with the various ways that the materials could fit together. Some participants exhibited a greater learned familiarity or natural skill with haptic activities, so the warm-up enabled everyone to develop a certain minimal level of skill in manipulating the materials.

At first the participants are only building to get familiar with the three-dimensional possibilities. Next, they start to couple narratives to their constructions. After approximately an hour they feel comfort with the bricks and have experienced that they are able to generate rich narratives based upon their constructions.

Then the real-life exercise starts. Based on the initial discussions before the workshop the participants are asked to construct a LEGO model representing their perception of the specific focus. This part would last from half an hour to several hours. During the building process several powerful metaphors are generated. The act of building and describing these metaphors often sheds light on complex problems in ways that simple verbal communication often miss. The process of construction also inspires each individual to come up with new ideas, and in the process colorful bricks and figures take on new, amusing and often very insightful associations. Participants are often taken aback by how familiar issues are seen in new light or how new ideas are literally handcrafted by participants.

When all board members have built their models the members take turns to explain their models to their colleagues. Colleagues will typically engage deeply in the stories and will ask questions such as, "why did you pick a transparent brick to symbolize our marketing campaigns?" This all ensures a much more engaged and lively discussion of the topic at hand. Almost invariably, participants reported gaining *new insights* into the unit of analysis that the process focused on. People would consistently jump up from their chairs and rove around the room to gain different perspectives on the model as others built and described it. For example, once a five-member team saw their organization laid out on the table in three dimensions, they realized that they had previously held at least four different understandings of their "market". In another case, participants realized that an important customer service initiative meant very different things to different people in the organization. In such cases, the insights led participants to reconsider the problem that had driven them to engage in serious play in the first place.

The sequence of establishing the individual understanding of the chosen problem before moving to the collective understanding allows a broad range of perspectives to come out, unbiased and untainted by others.

Participants also consistently reported experiencing *positive emotions* during the sessions than would be typical of a normal meeting of those same individuals. Most commonly, participants exhibited the kind of affective dynamics associated with having fun, as manifested by laughter, smiling, excitement, and unbridled enthusiasm to continue. For example, the HR director of one company drew everyone's attention to his good humor by climbing up onto the table to add a component to the emerging construction. Some participants claimed that they had "never had so much fun" and others made jokes about how they should not "let their colleagues back at the office know how much fun" they had during the process. Beyond the general climate of light-heartedness, participants also consistently expressed higher levels of emotional commitment and acceptance of the serious issues on the table. In several cases, people reported associating positive emotions with the other participants who had shared the experience, and in at least two cases, participants reported feeling better about the organization as a whole because it provided a place for them to engage in serious play. As one participant wrote in a comment sheet, process participants could get "to know each other in a more genuine way" and start "to commit as people, and not as status, role, power, etc."

Once the individual models have been reported the participants will build a shared “landscape”. They will rebuild their models to one model or a scenario of models. They have to agree fully on the shared landscape. This session can last up to two hours. The final shared landscape can now be used for scenario building, prioritization, identification of problems/possibilities, etc.

6 Empirical experiences with LSP

We have observed two main types of paths that the LSP workshops do follow. These are illustrated in figure 1.

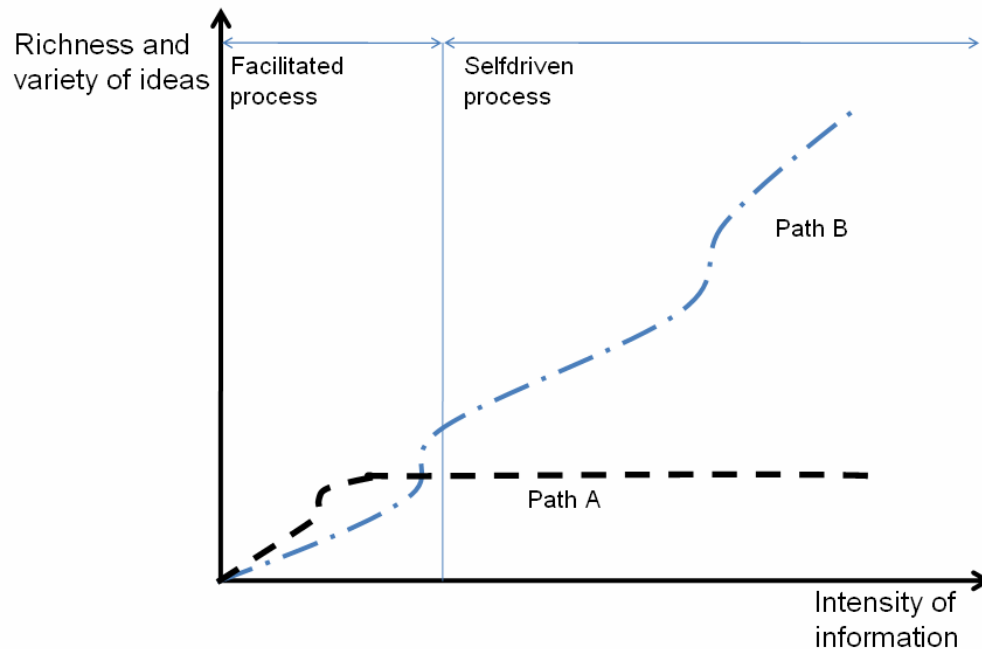


Figure 1. Different paths of LSP workshops

In figure 1 we have mapped the observed “Richness and variety of ideas” against the observed “Intensity of information”. Furthermore we distinguish between the facilitated and the selfdriven part of the process. Our distinction between the facilitated and selfdriven part of the workshop refers to the point where the team goes deeper into their predefined real-life exercise. At this point the facilitator role mainly comes down to keeping track of time.

In the facilitated part of the process the two main types follow more or less the same path. The participants are always a bit sceptical and at first take it as some kind of game. As the warm up exercises progress they become involved and the intensity of information increase as well as the richness and variety of ideas.

The last part of the facilitated path is where the participants start to work with their real-life problem.

The workshops following Path A typically ends up with a landscape that reveals relevant and critical parts of the predefined problem. When the landscape has been established the team would engage in discussing different perspectives and details of the landscape. They feel comfortable with the result and the discussions but do not continue to build. In cases where we urge them to continue the building process there is a tendency that the “Richness and variety of ideas” will not increase even though the “Intensity of information” continues to grow. The situation can be described as redundant (in a positive meaning). Typically, the workshop will last between half a day and a full day.

The emergence phenomena occur when the participants build their models and deliver their narratives and when they engage in building their shared landscape. Participants report that the “emergence” mostly occur when they realize how much they know and how detailed they are able to articulate it.

The teams all evaluate the process as a positive experience. Based on the shared landscape they are able to establish a shared understanding of a complex problem. They are able to prioritize actions to be taken to move on with the complex problem, they are able to identify potential solutions, and they are able to identify potential risk associated with the solutions.

Figure 2 illustrates a typical situation from such a workshop. During the building of the shared landscape the team came up with the concept of “double doors” between two parts of the organization. This problem where later prioritized by the team to be one of five important problems to be elaborated further.



Figure 2. A model from a LSP workshop Path A

The workshops following Path B initially follow a path similar to Path A. However, during their exercise of building their shared landscape they synchronously use the bricks and discuss. They will reframe their initial understanding and use this to generate new ideas. The new ideas might be elaborated in separate shared or individual models or they might just be integrated as very rough representations (maybe only a few bricks rapidly put together). The process is mainly selfdriven and the facilitator only needs to make sure that the models are shared between the participants.



Figure 3. A model from a LSP workshop Path B

Figure 3 illustrates a situation from a Path B workshop. During the workshop the team identifies an unnoticed problem illustrated with the four larger bricks in the left picture. The team acknowledges that it is critical to understand the problem further and decides to focus specifically on this problem in a short separate workshop. The result of this separate workshop (which last more than one hour) is illustrated in the right picture. After agreeing on the detailed model of the specific problem the team resumes the original workshop theme.

The emergence phenomena occur as described in Path A. In the continued process the emergence phenomena mostly occur as collective experiences

In order to discuss the emergence phenomena in further details we will in the following identify some important concepts that support our understanding of the emergence situations. This is to be able to facilitate the process more precisely in the future.

7 The important concepts in intentional emergence

We have identified the following six concepts to be discussed further:

- The bricks as a neutral language
- The democratic process of participation
- Shared experience of conceptualizing or sense making
- Shared experience of improvising
- Possible impact of the experience on collective commitment
- Possible impact of the experience on team identity formation.

The first four of these concepts can be seen as an attempt to level the playing field by emphasizing equal levels of skill, equal voice since every participant gets to have a say, and equal levels of control in conceiving and improvising.

The emergences that take place in the initial facilitated part of the process can partly be explained by seeing the bricks as a neutral language that facilitates the articulation of complex and tacit knowledge. In this sense the bricks could be replaced by yellow notes or even a blank sheet of paper. The strength that we see in the bricks is that they evoke an emotional feeling in the team. This also point to some of the limitations of using bricks. If the initial problem is specific there might be more suitable neutral languages available (e.g. budgeting).

The emergence might also be supported by the democratic setup of the process. This is realized by giving participants time to reflect upon a specific problem and by giving them time to explain their model of the chosen problem to the other participants. Thereby the team is given time to thoroughly consider all options. Relatively more introvert persons are also given the same conditions as relatively more extrovert persons.

The collective conceptualization or sense making is supported by the physical models, the narratives, and the embodied metaphors. Metaphors are special in a LSP workshop because they can be induced as well as natural occurring. Sense making has for a long time been a recognized discipline in organizational development theory. Karl E. Weick highlights the importance of two-dimensional maps as devices of sense making [15]. Maps can serve as triggers or focal points of reference and meaning negotiation in open-ended conversations, and it is primarily the communication around the mapping process that seems to trigger fruitful conversations and insight [16].

Michal Polanyi distinguished between explicit and tacit knowledge [17]. Nonaka and Takeuchi further contributed to this distinction and has been undertaken some research in how explicit and tacit knowledge is handled in teams [18]. They assume is that knowledge is created and expanded through social interaction between tacit and explicit knowledge. This assumption enables them to postulate four different modes of knowledge conversation: socialization, externalization, internalization, and combination. In particular externalization has been neglected by research.

One of the warm-up exercises in a LSP workshop is to compare the power of building in three dimensions to communicating in two dimensions. The participants unambiguously report that the three dimensional perspective creates more meaning and is easier to communicate. It is therefore relevant to assume that adding a spatial dimension can facilitate more powerful discursive processes of meaning making and communication.

Weick also pointed to the relationship between the existence of the some kind of mapping and the ability for a team to improvise [17]. The existence of physical Lego models and the associated narratives increase the awareness of the ideas of other participants and place it in a shared context. It can be relevant to compare to improvisation in the performing arts, for example jazz music. In the words of Welsh [20], “Jazz is a vitalism founded on aesthetics; on creativity, integrity, and energy in the face of societal limits; and on individual failures, limits and mistakes...jazz emerges from the awareness of who the other musicians are, what they are doing at the moment, and their particular configuration of strengths and weaknesses”.

Howard Gardner has recently pointed to the area of team creativity as an important field that is been underestimated due to a research bias on the individual [21]. Gardner questions whether our the ideas about creativity need to be refashioned to take into account the increasing number of projects and realms where the individual contribution seems less critical, the group mind more crucial. He points to improvisation as a critical concept in terms of bringing team creativity to the fore. To facilitate improvisation he calls for appropriate methods that support the abilities to come to know individuals quickly, to forge a working relationship and to handle issues of conflict and credit [21].

Patricia Shaw relates the nature of team spontaneity to improvisation [16]. She involves drama and story-telling in her work and reflects on her experiences in a way that resembles our experiences during the LSP workshops: “Although we were drawing on our experiences in different ways, we did not set up our activities in advance of engaging in them, we moved into them, exploring and creating them together and learning in them as we went along” [16].

The first four concepts derived from our empirical experiences with LSP: neutral language, participation, conceptualization, and improvisation have proven to be highly relevant. Furthermore, our review reveals that the facilitation of these concepts is currently considered insufficient.

Our future work will be focused on creating a parallel theoretical and empirical insight of the concepts with the purpose to improve the facilitation of LSP. In this process we will include the last two concepts: collective commitment and team identity formation.

8 Implications and conclusion

In this paper we have discussed the phenomenon of emergence and the Lego Serious Play method as a way to induce intentional emergence. We have presented our experiences in a rather anecdotal form. This is due to the qualitative nature of our documented research.

We have identified six concepts that frame the role of Lego Serious Play in facilitating intentional emergence. These concepts are considered powerful but we also have to admit that they are broad and would require input from different fields of study in the sciences and the arts as well as a cross-disciplinary approach.

Due to the complexity of such cross-disciplinary concepts we need to design more thorough research while still conducting broad application oriented case-studies in organizations.

There still is a lot to be learned about the facilitation of the process and we are fully aware that the Lego medium is not a panacea.

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