Creation toward Quality Without a Name
— Sociological Analysis of Pattern Language —

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Abstract

In this paper, we explain the mechanism of creation toward "quality without a name"(QWAN) with pattern languages from the viewpoint of sociology. For the porpose, we propose the concept of "creative thinking", "creative action", and "creative communication", based on the social system theory proposed by Niklas Luhmann. Creative thinking means the creation by imagining or thinking something in his / her brain. Creative action means the creation by drawing or building something with his / her body. Creative communication means the creation by communicating with some others. With using this concept, we analyze the mechanism of pattern languages, which was proposed by Christopher Alexander in architecture and is applied to software engineering, as a method to share the tacit knowledge of creation.

1 Introduction

The fundamental principle of creation through collaboration and the way to encourage it are the main points in this paper. Collaboration is the action of cooperation by more than one person that brings added-value which can not be achieved by one. In organizations and teams that successfully operate the process of creation through collaboration, communication in the organizations and teams gains "momentum," and it sympathizes and amplifies in a nexus. Along with this effect, connecting the path of communication one by one, it is possible to bring up unexpected remarkable idea and innovation.

However, the creation through collaboration is a matter of emergence, that unable individual to understand with existing theories, and is often taken as suspicious and mysterious thing. Thus, this study would clarify the principle of creation through collaboration based on the social system theory of Niklas Luhmann. In addition to this, this study would also examine the way of "pattern language" to encourage creation through collaboration.

2 Creative thinking, Creative action and Creative communication.

We generally think that to "create" something is a creation through the process of "thinking" and "action." Indeed, this idea is enough to understand "creation" if it is done by just one person, however, in the case of creation through collaboration by more than one person, it easily encounters some incoherence. If creativity only lies in personal thought and action, then the result of collaboration would be nothing but a combination of individual thought and action. Understanding collaboration in this way, it would be most likely to lack the essence of collaboration, which is the dynamism of interaction. If collaboration is something different from individually divided tasks to achieve goals, then there is a need for another way to understand collaboration not as a combination of individual thought and action. Therefore, in order to clarify the idea of creation through collaboration, this study gives different perspective from conventional approaches which seek creativity in subjects. That is the idea of "creation as communication" based on Niklas Luhmann's social system theory.

Niklas Luhmann advocated an epoch-making perspective which is that the component of social system is neither individual nor action, but it is communication [15]. Preceded communication brings another communication, and one after another; society is a system of "autopoiesis" that is a nexus of communication. In addition, behind the social system like this, there is "nexus of consciousness" which means that preceded consciousness brings another consciousness. Social system and psychic system mutually affect on each other, however, in terms of action, they are both closed to each other (Figure 1).
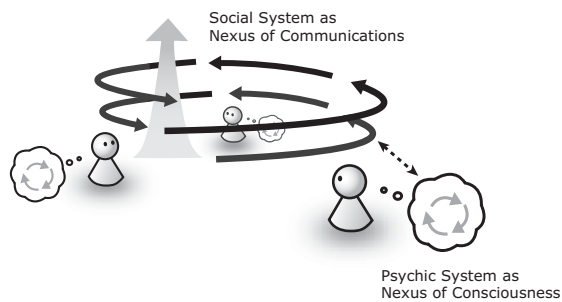
Figure 1. Social System as nexus of communication and Psychic System as nexus of consciousness)

Figure 2. Communication as the synthesis of three selections

Based on this theory of Niklas Luhmann, these three key points, "creative thought", "creative action" and "creative communication", should be examined. Creative thought indicates that creation occurs through the nexus of consciousness due to psychic system such as to picture things on your mind and thinking of some idea. Creative action indicates that creation is done by an action such as to draw and write. Those two, creative thought and creative action, can be done by just one person. On the other hand, creative communication is creation that is done by having communication. Considering and discussing idea, plans and design with more than one person is an example of creative communication.

In order to understand "creation through communication", brainstorming, one of group creativity techniques, makes it easier. In "brainstorming", the point is to gather as much idea as possible without turning any of them down, and then it increases synergy, and eventually brings a storm of idea. This technique has been implemented in various fields such as planning and product development in business, and research in academic field. It has been known that idea created through brainstorming is worth than a combination of individual's idea. This way of creating idea is what "creation through the nexus of communication" is.

3 What is Creativity in Communication

In order to understand the idea that to communicate itself is creation, it is necessary to understand the concept of "communication" precisely in the social system theory. In the social system theory, it does not define communication as "transference metaphor". Transference metaphor is one way to define communication based on the idea that information (message) passes through pathways in communication. However, Luhmann sees the limits in this perspective because the idea is prepossessed with existence of information. In transference metaphor, there is a concern that
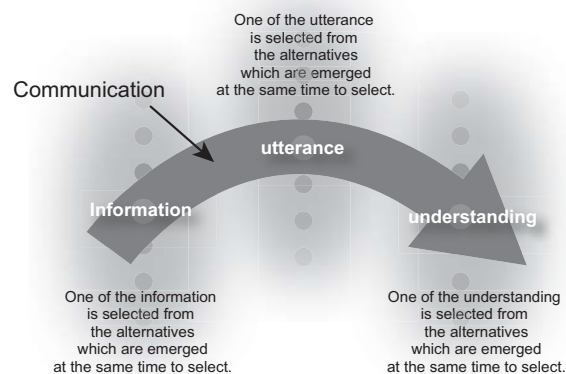
the information transferred between sender and receiver is thought to be the same one [15, p.218]. If communication is just about transferring information, it may be impossible to understand that communication is creative. In that case, creativity can be found only during the time of producing information (in their mind) that would be transferred.

Social system theory takes communication as a whole of three choices, "information", "transmission" and "understanding" [1] (Figure 2). This way of understanding communication is not from a perspective of human being but from a perspective of communication itself. Thus, the first step is to understand that "communication is to select", and then there would be rooms for creativity in communication. It is because creativity can be incorporated into the contingency of selectivity. Additionally, selectivity in this sense does not mean to select from given choices, rather it means to create choices by itself at the same time. As Luhmann states that "Communication grasps *something* out of the actual referential horizon that it itself constitutes and leaves *other things* a side." [15, p.140].

4 Pattern Language as the Language for Creation

There are various ways to encourage creative thinking, creative action and creative communication, and "pattern language" is one of them. Experience on creation is organized into "patterns", and pattern language is a systematized group of patterns. Patterns are consisted of three aspects, "situation", "problem" and "solution" [2]. Situation defines

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[1]Communication as a whole is raised as one "meaning", thus it can not be resolved. These "selection of information", "selection of transmission" and "understanding information and transmission" occurs at the same time, therefore it can be said that communication is the phenomenon of emergence.

when to apply patterns to. Problem is what needs to be solved, in other words, it seeks a purpose for applying patterns to. Solution is formed with elements of designing, and the relation, responsibility and coordination between them. It says that "Each solution is stated in such a way that it gives the essential field of relationships needed to solve the problem, but i a very general and abstract way — so that you can solve the problem for yourself, in your own way, by adapting it to your preferences, and the local conditions at the place where you are making it." [1, p.xiii]. In addition to this, by naming each problem and solution briefly, patterns can be produced. Those patterns are organized and addressed in what is called the pattern "catalogue" [2].

There are two main purposes of using patterns. One is that the skill that is acquired from their own experience of experts is stipulated, thus it makes beginners easier to solve problems in the most efficient and cultivated way. The other is that it provides common vocabulary on designing principle of the problems, therefore, it can be easily pointed out the relation between problems.

Once, an architect Christopher Alexander observed certain things which were seen repeatedly in the shape of buildings, he found that the relation between those things is pattern. Later, he supposed that there are not that many patterns to consist buildings and cities, and he stated that buildings have two or three dozens of patterns, and cities have between two to three hundred patterns [2]. [1] released two hundred and five patterns of construction work and designing from his previous eight years of work, and also explained that "You can use it to work with your neighbors, to improve your town and neighborhood. You can use it to design a house for yourself, with your family; or to work with other people to design an office or a workshop or a public building like a school." [1, p.x]. His plan was to explore "the idea and principle of the process of designing by mass," and "to create a common language for designing and construction, in order to establish a process to let everybody participate in creating their own environment in "non-industrialized era." [14, p.17].

The usefulness of this idea has been known in the field of computer software development. The representative thing in the field of computer software development is "design pattern" that is a written form of well designed object and its structure during the stage of designing [3]. Eric Ganma who introduced pattern language to computer software development explains that "Each design pattern systematically names, explains, and evaluates an important and recurring design in object-oriented systems. Our goal is to capture design experience in a form that people can use effectively."

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[2]For the detailed catalogue, please refer to [1] and [18] for architecture, and [8], [6], [21], [17], [9], [16], and [4] for computer software.

[3]In addition to this software pattern, there are "analysis pattern", "architecture pattern" and "programming pattern."

[8, p.2].

These days, patter language has been produced not only in the field of architecture and computer software development, but also in various fields. Patterns of project management toward developing system and process have already been introduced [4] [5], and there is also one for usability of World Wide Web. My research team has been developing and introducing pattern language for creation in various fields [11, 10, 20, 7, 12]. It is expected that there will be further development of patter language in various fields.

5 The Mechanism of Pattern Language

In order to understand the mechanism of pattern language and the way it functions, this study borrows the idea of the social system theory. First, as it says, pattern language functions as "language" (Figure 3). Language is "the medium that increases the understandability of communication beyond the sphere of perception" [15, p.160], it enables to understand what others are thinking in the communication of the social system. It also has certain role in structuring consciousness of the psychic system. Language has been shrinking its own multiplicity due to the limits of possible combinations between symbols, "this concerns a very special technique with the function of *extending* the repertoire of understandable comunication *almost indefinitely in practice* and thereby guaranteeing that almost any random event can appear and be processed as *information*" [15, p.252]. Language couples the social system and psychic system while it plays its roles. Thus, the social system and psychic system do not merge in the process, however, they can affect on each other indirectly through pattern language.

5.1 Encouraging Creative thinking and Creative Action

Pattern language encourages creative thinking and creative action. Using patterns enables the psychic system of each person ' s to structuralize the nexus of consciousness. According to Alexander, this is what human thought is supposed to do. He states that "*At the moment when a person is faced with an act of design, he does not have time to think about it from scratch.* He is faced with the need to act, he has to act fast; and the only way of acting fast is to rely on the various rules of thumb which he has accumulated in his mind. In short, each one of us, no matter how humble, or how elevated, has a vast fabric of rules of thumb, in our minds, which tell us what to do when it comes time to act. At the time of any act of design, all we can hope to do is to use the rules of thumb we have collected, in the best way we know how." [2, p.204]

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[4]It is not a new thing to analyze organizations with patterns (in the general meaning), [5] introduced creative patterns for the first time.
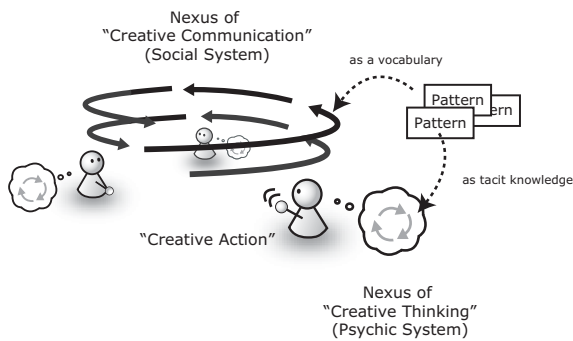
Figure 3. Mechanism of Pattern Language for Supporting to create something

In addition to this, the experience would not be stored only in the psychic system of one person, but it would be addressed and shared in pattern language. Moreover, by using it, it encourages creative thinking and creative action [5]. Alexander describes that "as in the case of natural languages, the pattern language is *generative*" [2, p.154]. That is that "the same patterns in our minds are dynamic. They have force. They are generative. They tell us what to do; they tell us how we shall, or may, generate them; and they tell us too, that under certain circumstances, we *must* create them." [2, p.186]. Needless to say that pattern itself does not have any power to create, but it gains the power once it fits into autopoiesis of the psychic system. The reason why patterns are written based on "problems" is because "A pattern is in a sense formulated to activate the reader to continue the inquiry" [14, p.24].

Addressed pattern language affects on the psychic system of others, and helps structuralizing it, thus even beginners can experience the nexus of consciousness as experts do. It also plays a role to reduce the composition of the world by making a part of possible options of a solution conspicuous. By making a pathway on the nexus of consciousness, each individual becomes able to think efficiently [6]. Therefore, by helping to structuralize the nexus of

consciousness, pattern language is capable of encouraging creative thinking and creative action.

5.2 Encouraging Creative Communication

Pattern language also encourages creative communication. By using pattern language, it enables each individual to refer to complex designs. Eventually, designing becomes nothing but to define the relation. However, natural languages people handle have vocabulary to indicate things and actions, but there is not enough to point out the relation [7]. In fact, there is no precise, detailed word to help discussions on designing, so that is where pattern language is capable of complementing. Pattern language increases common vocabulary on designing, and it encourages communication.

There has been a question that it might be difficult to use pattern language as a communication tool on user participated designing. Ingrid King answers to this question that "it works extraordinarily well. It is not particularly *easy*, but it is extremely rewarding." [14, p.92]. When it comes to Japan, there has been town developments based on Alexander's theory, and in those developments, easy "key words" that could be understood by middle school kids are used. According to several architectures including Noriyoshi Igrashi, they state that the most important meaning to participate in "language" is to clear the meaning of things that would be created to everybody [13, p.134], so that residents can participate in the designing more efficiently than before when designing was described with "lines, colors and numbers" by the standard construction and city planning law.

In the field of computer software development, the pattern name is brought up as vocabulary in discussions of designing process often. In such situation, it is understandable that pattern language has become the vocabulary of communication already.

There are always three uncertainties, uncertainty of understanding others, uncertainty of achievement and the result of communication, but the point in here is the way to overcome uncertainty of understanding others. In other words, it is the problems of difficulty in general to understand what others are thinking since the psychic system is

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[5]There are critics that those Alexander's opinion slights freedom and creativity. On the other hand, Alexander introduced rules not as regulations but to focus on the side of creativity. In order to understand that "It is the language they could create nothing. It is the language which *makes* them creative" [2, p.206], Alexander brought up the example that words and grammars in natural languages are not what prevent freedom and creativity of people. "The rules of English make you creative because they save you from having to bother with meaningless combinations of words", so he says "The rules of English steer you away from the vast number of nonsensical sentences, and towards the smaller — though still vast — number of sentences which make sense; so that you can pour all your effoet into the finer shades of meaning" [2, p.207].

[6]In the field of computer software, quantitative evaluation has been done on designing with patterns and the effects of encouraging communication. According to [19], there was improvement on quality, and 25

percent less work in the group with the knowledge of patterns than in the group without it.

[7]Before introducing pattern language, Alexander has already made sense that it is the pattern that could be seen repeatedly in buildings and cities. In buildings and cities, "*the "elements," which seem like elementary building blocks, keep varying, and are different every time that they occur.*" so that "these so-called elements cannot be the ultimate "atomic" constituents of space." [2, p.84]. He also focuses on that "there are relationships between the elements which keep repeating too, just as the elements themselves repeat." [2, p.85]. This is connected to the idea of patterns that are relations between elements.

closed to others in terms of action. However, with pattern language, a language medium, communication on designing can be easily come into existence.

6 Conclusion

Indeed, there has been some critics concerning about producing uniformed results that are lead by pattern language. In fact, it is completely misunderstood. Pattern language is different from well written manuals and text books, and it is not expected to lead to one right standard process of creation. Each individual is expected to create by selecting patterns and putting it together in situation by situation. Putting patterns together in this context does not mean to put "modularized unfinished parts" together that can be seen in modern production system [8]. Pattern is defined and written abstractly, and users have to add concreteness to it. Pattern language does nothing but to encourage the action, so that each user is expected to add their creativity.

The idea of pattern language was introduced as an alternative tool to the uniformed production due to the modernization. Alexander points out that the problem of modern production system is that "Present systems of production are organized in such a way that most decisions are made very much "at arm's length." Decisions are made by people remote from the consequences of the decisions." in each situation [3, p.39]. He also states that "the house is no longer an "object" which is manufactured, but a thing of love, which is nurtured, made, grown, and personal." [3, p.66], so that it leads to the idea that "families would design their own houses." [3, p.79] [9]. Thus, in order to let each family to control their environment directly, the idea of pattern language was introduced.

The way of pattern language is not irresponsible way to leave all up to individual ' s ability. It is considered as the way that tolerates individual ' s ability while making a good use of abstract rules of past experience. This idea is connected to not only Niklas Luhmann's perspective toward society, but also it might be connected to Friedrich Hayek's spontaneous order by "law" and "knowledge" that are defined abstractly, however, it is expected to be discussed in the future.

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[8]Borrowing Alexander's words, "*It may be hard to believe that one might make a work of art by simply combining patterns.* It sounds almost as though there was a box of "magic" parts, so powerful, that anyone can make abeautiful thing, simply by combining them. This is absurd, because, of course, it is not possible to make something beautiful, merely by combining fixed components." [2, p.223].

[9]Alexander thought that constructing and reconstructing it by ourselves, so that "as a matter of feeling, each house becomes a genuine life base, a place for the heart, a place in which the family, as a unique being in society, may be anchored and nourished." [3, p.118].

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