Pattern Illustrating Patterns:
A Pattern Language for Pattern Illustrating

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This paper is a challenge to clear the importance and specific theory of drawing illustration for pattern language, and recommend pattern writers to draw them. In this paper we introduce pattern illustration, as visual expressions on pattern language for human action, like education, organizational design and so on. In order to draw better illustration, we present 6 patterns of all 28 patterns in Pattern Illustration Patterns, which are No.0 *Pattern Illustration*, No.1 *Essential Message*, No.2 *Moving Characters*, No.3 *Iconic Representation*, No.4 *Center Words Hunting*, and No.13 *Lively Peak Capture*.

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1. INTRODUCTION

Recently, the field of pattern language is developing in various domains. Starting from the field of architecture, it was applied to the field of software design. Some of the pattern languages of software design are, *Design Patterns: Elements of Reusable Object-Oriented Software* [1], *Pattern Languages of Program Design (Software Patterns Series)* [2], and *Design Patterns Smalltalk Companion, The (Software Patterns Series)* [3]. It was then applied to the field of human action. In 2004, *Fearless Change*, pattern language for creating change in organization, was released in USA, and due to its needs, translated versions was released in 2014[4]. There are also patterns like, Learning Patterns [5], Collaboration Patterns [6], Presentation Patterns [7], Personal Culture Patterns [8], Global Life Patterns [9], Educational Patterns for Generative Participant [10] Change Making Patterns [11], and pattern language for *the Art of Being with Dementia* [12] produced and is used. Moreover, due to increment of people who want to write pattern language, seminars on the way to write patterns are held for interested businessmen. From these movements, we can see the rapid progress of pattern language in society these days.

  When we take a look at the history of pattern language, Christopher Alexander first proposed it in the field of architecture, and its methodology was later applied in the field of software design. In both fields, patterns were expressed with sentences and visual aids. There were photographs or diagrams utilized in architecture patterns, and source-codes and screen transition diagrams were utilized in software design patterns. In the study of Cognitive Theory of Multimedia Learning, it is said that people "can learn more deeply from well-designed multimedia messages consisting of words and pictures than from more traditional modes of communication involving words alone"[13]. By having visual expression, it helps the readers learn about the pattern more deeply. However, visual aid for human action pattern language is still unclear on its definitions and methodology. This paper introduces Pattern Illustration as the visual aid of pattern language for human action, and Pattern Illustrating Patterns to support the creation. This paper is a succession of our paper, "The Nature of Pattern Illustrating: The Theory and the Process of Pattern Illustrating," presented in 2014 [14].

2. THE IMPORTANCE OF VISUAL AID

As there were visual aids in all of the pattern languages in the past, Christopher Alexander repeats his proposal on pattern and its form. In his work, *Note on the Synthesis of Form*, he stated that "it is an abstract pattern of physical relationships which resolves a small system of interacting and conflicting forces, and its independent of all other forces, and of all other possible diagrams" and these diagrams are called as "pattern"[12]. Stephen Grabow mentions in the book on biography of Alexander that "Alexander suspected that the source of the difference had something to do with how forms were perceived and represented in the brain and what the difference was between the ones that seemed whole and the ones that were not whole" [13].

So, Alexander claims that a good pattern has wholeness and inspires some kind of form in the readers' mind. We can see from here that he considered that the relationship between a pattern and its forms are important. This is the reason why he stated, "If you can't draw a diagram, it isn't a pattern" in his work, *Timeless Way of Building* [14]. His thought for transporting message of the complicated patterns is to "capture the invariant field" of the pattern, and "express and visualize a pattern as a kind of fluid image, a morphological feeling, a swirling intuition about form." From this, patterns that cannot be visualized, or expressed as diagrams are no longer patterns.

To summarize, Alexander had focused on the importance and relationship between a pattern and its form from the beginning of his research. If a good pattern perceive the readers' brain some kind of form, the "form" is what we deal here, visual expression of pattern language.

From these evidences, study of visual expression of pattern language has its meanings.

3. PATTERN ILLUSTRATION

We define Pattern Illustration as the visual expression of pattern language for human action as below.
1. It expresses the essence of the pattern.
2. It includes character(s) that express human movements and feelings through body language and facial expressions.
3. It is a iconic representation of the pattern that does not connect multiple scenes with arrows.

The illustration that meets these three requirements is what we call, Pattern Illustration. Figure 1 is the Pattern Illustration of Learning Pattern, which is the pattern language of creative education [15].

4. PATTERN ILLUSTRATING PATTERNS

This chapter introduces Pattern Illustrating Patterns to support drawing good Pattern Illustration. It is created based on our experiences of drawing them in various types of pattern languages. Each pattern is constructed with "solution" to a "problem" in some kind of "context," along with "force" that describes the factors of causing the problem, "action" that describes specific action to take, and "consequence" that describes the hypothesis after the action. Also, it contains "pattern name" that directly describes the pattern with attractive and memorable names, and "illustration" that supports imaging the contents of the pattern.

We will now present the whole figure of Pattern Illustrating Patterns and the actual patterns (figure 2). It begins with pattern No.0 that introduces Pattern Illustration, and 3 patterns come after to specifically define it. Then, the main 3 phases, "drawing elements," "determine the scene and space," and "finishing touches to raise the quality" are supported each with 6 patterns. The last set of patterns concludes with "assist when you are stuck" and "things you should care in daily life," constructed each with 3 patterns, which sums up to 28 patterns altogether.

Of all these 28 patterns, this paper introduces 6 patterns, which are No.0 *Pattern Illustration*, No.1 *Essential Message*, No.2 *Moving Characters*, No.3 *Iconic Representation*, No.4 *Center Words Hunting*, and No.13 *Lively Peak Capture*.
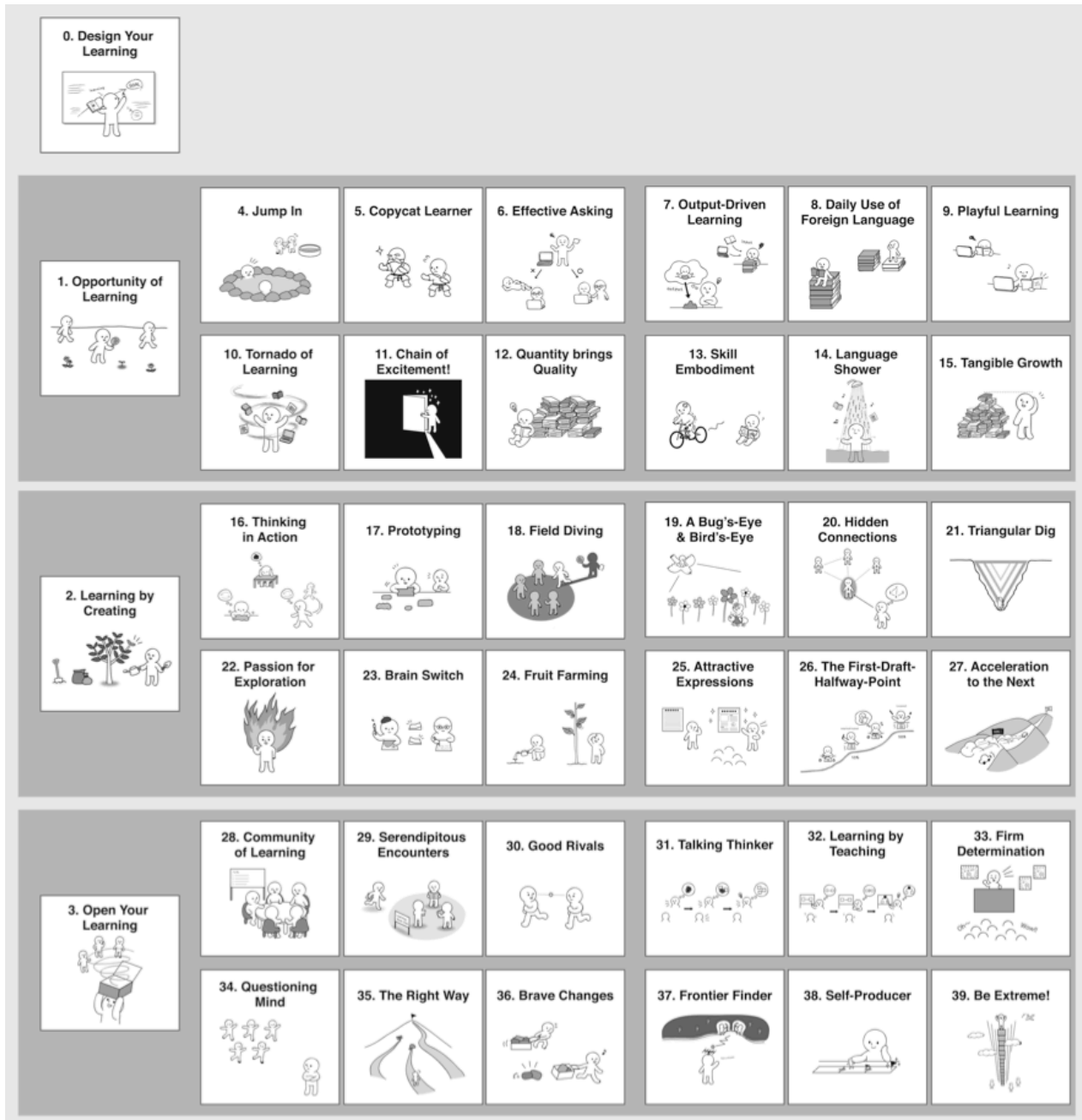
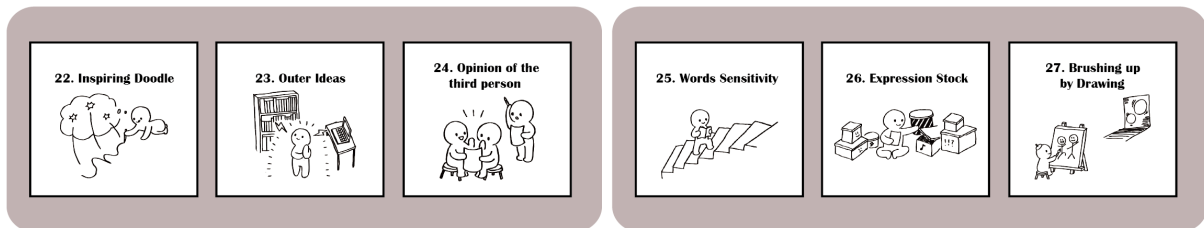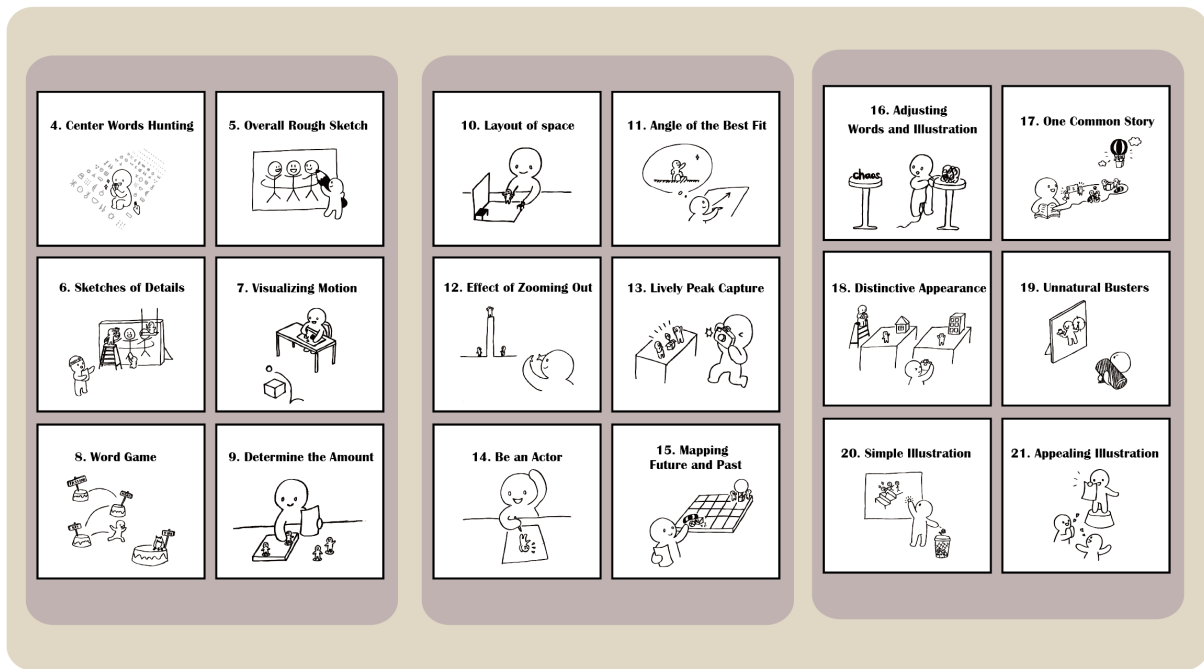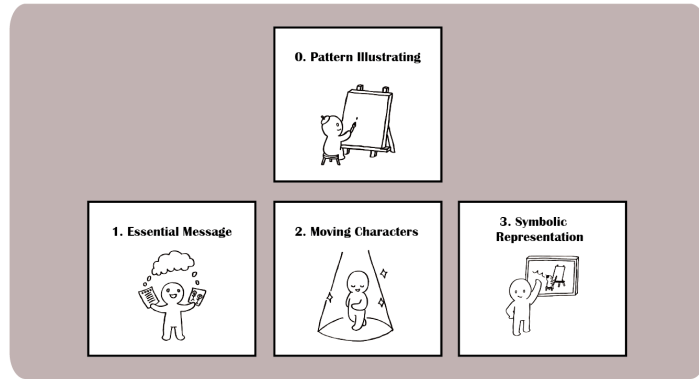Figure 1. Pattern Illustration of Learning Patterns

Figure 2. Whole figure of Pattern Illustration Patterns

Pattern Illustrating

You are writing the pattern description.

<p align="center">▼ In this context</p>

You have something to tell through the pattern, but it's hard to make it understandable and appealing to readers. Patterns for human action encourage real change and suggest new perspectives. To achieve this goal, you should explain the pattern in detail. However, long descriptions confuse readers with their complexity, while short descriptions do not fully explain the pattern's contents.

<p align="center">▼ Therefore</p>

Draw Pattern Illustrations to express the pattern visually. Pattern Illustration is the pattern's *Essential Message*, and it is also a *Symbolic Representation* of illustration, in which *Moving Characters* appear. To draw these, use patterns from Pattern Illustrating Patterns. For the main flow, do *Center Words Hunting* to grasp the pattern's essence, and draw the *Overall Rough Sketch*, *Layout of Space,* and *Lively Peak Capture* to express the pattern as lively literature.

<p align="center">▼ Consequently</p>

When patterns are introduced visually, readers can easily imagine the pattern's broad picture and read the sentences with interest. Visual expressions also leave an impression on readers' minds, and this supports their recall of the pattern. Moreover, compared to pattern sentences, pattern illustration better depicts the pattern's "life," stirring readers' excitement and motivation.

Essential Message

You want to draw Pattern Illustration.

▼ In this context

The illustration will only be something extra for the sentences or just a figure unless it describes the pattern's content. Each pattern description includes a Context, Problem, Solution, and Consequence. These elements should also be presented in the illustration describing the pattern content. If only some elements are presented, the pattern illustration cannot stand alone and will be just a supplement to the description.

▼ Therefore

Consider pattern illustration as having the same value as the pattern description; try drawing an illustration that contains the pattern's essence. These essences are expressed in the pattern description, in what we call "center words." First, try *Center Words Hunting* when starting to draw the pattern illustration. You may find center words anywhere in the pattern description, not only in the solution. By collecting center words, you can recognize what needs to be drawn.

▼ Consequently

Similarly to the pattern description, the pattern illustration includes the pattern's essential message. As a result, readers can easily remember the pattern just by the pattern name and illustration. Readers may recall the illustration in their daily lives, triggering the pattern content, and thus the illustration will help them use the pattern.

Moving Characters

You want to draw a pattern illustration that expresses the pattern's *Essential Message*.

▼ In this context

Drawing only the pattern's context cannot express how the reader should act and the consequences. Even if you draw the pattern's scenery or key object, the reader won't know what kind of action to take and why the pattern is important. If you can't help readers understand these two elements, you haven't succeeded in drawing the pattern's *Essential Message*.

▼ Therefore

Draw a character that embodies the pattern's *Essential Message*. Pattern functions as a tool showing readers how to solve a problem in a particular context. So use a character to express what kind of action to take to solve the problem. By drawing a character, you can express actual movements, facial expressions, and emotions such as excitement. Also, it's better if you can create a simple character—these are easy to draw and look friendly to readers.

▼ Consequently

Through the character's expressions, you can show readers what to do or potential consequences after taking action. Readers may be able to understand the pattern by projecting themselves into the character's motions and expressions.

Iconic Representation
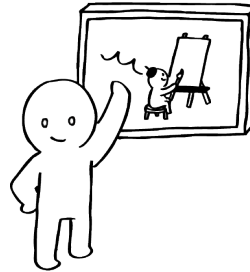
You want to draw a pattern illustration that expresses the pattern's *Essential Message* by presenting *Moving Characters*.

▼ In this context

Multiple scenes provide too much information for readers to focus on the pattern's *Essential Message*. Pattern language for human action transforms individuals or communities to a positive state. In such a process, it is natural to describe the transition visually. However, connecting some scenes only with arrows or presenting them comic style would require readers to interpret or judge patterns, thereby preventing their intuitive apprehension. It is also stated in the research of redundancy effect that redundant information would interfere the learning performance [19].

▼ Therefore

Draw the most important scene that solves the problem within the context. Pattern illustration should inspire readers to instantly recognize possible solutions. So describe the scene that solves the problem, rather than the problem itself. This helps emphasize the solution, which is the consequence of solving the problem. Also, by introducing *Moving Characters* to add vivid and emotional elements, the illustration may include a sense of there being potential good results.

▼ Consequently

The illustration will represent the most important part of the pattern, consisting of the pattern's *Essential Message* and action suggestions. This way, you can depict a pattern illustration that shows the *Essential Message* constructed with elements of context, problem, solution, and consequence. Readers will be encouraged to use the pattern when attractive expressions are used in the illustration.

Center Words Hunting
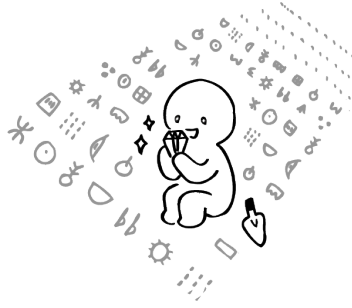
You are going to draw the Pattern Illustration.

▼ In this context

Drawing all of the pattern's elements doesn't express the pattern's essence. Patterns for human action are constructed with Context, Problem, Solution, and Consequence. This information includes what readers should do, when readers should act, how readers might feel using the pattern, and so on. However, if you draw all this information, readers won't be able to grasp the pattern's meaning.

▼ Therefore

Identify essential strong words or phrases to grasp the pattern's essence. We call these words or phrases "center words." Center words appear mostly in the Solution and Consequence, but they are also found in Problem and Context, so read the whole pattern several times. Also, the pattern description isn't always perfect, so reconsider suitable words that best describe the pattern. Communicate with the pattern writer to find out what he/she most wants to tell readers or try to describe the pattern in your own words.

▼ Consequently

You will be able to discover and express *Essential Message* that compose the pattern and transform them into illustrations. Also, while you address the pattern content in various ways, you might detect more suitable words for the pattern. *Polishing Word Sense* is important for good hunting of center words.

Lively Peak Capture

You already know which elements to express from drawing the *Overall Rough Sketch* and *Sketches of Details*.

▼ In this context

You can't express the pattern's lively atmosphere. If a character in the pattern looks lively, the reader may want to use the pattern. Also pattern illustration should attract the reader by showing the bright future within the consequence. However capturing lively moments with illustration depends on the drawn scene, which is difficult just like capturing the best scene with the camera.

▼ Therefore

Imagine time flowing in the pattern and trim the peak of the character's liveliness and excitement. Along the axis of time in the pattern, think, "Which scene best expresses the most lively scene." For example, whether the character's mouth is open or closed, whether the character is trying to run, or is running, and so on. Explore the motions or facial expressions that appeal to readers and decide which scene to trim.
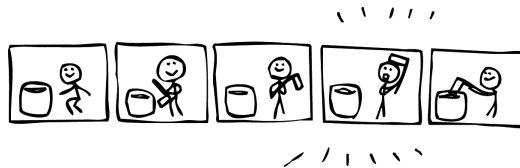
▼ Consequently

You will be able to draw an illustration that projects the pattern's lively atmosphere. A character's facial expressions and motions represent that atmosphere. Such details will motivate readers to use the pattern.

5. CONCLUSION

In this paper, we introduced pattern language for drawing good Pattern Illustration. In doing so, we looked at the history of pattern language to show the importance of visual aids, and introduced Pattern Illustration as the visual aid of pattern language 3.0. Besides Pattern Illustrating Patterns, we have published a storybook on the definitions and process of drawing the Pattern Illustration (Harasawa, et.al, 2015).

Our research began with the motivation that *Pattern Illustration has the same value as the pattern description* while we drew them in various pattern languages 3.0. In the process of creating the methodology, we discovered advantages and disadvantages of both pattern description and Pattern Illustration, which deepened our belief that *language and illustration aren't counter part that create a conflict, but actually a pair of wheels to deliver essential message*. However, specific way to improve pattern description by drawing the illustrations are still vague, so there is a need for further research.

We hope this paper would trigger people who are considering or who create pattern language, to deeply think about including Pattern Illustration as an approach for visual aid.

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APPENDIX: SUMMARY OF PATTERN ILLUSTRATING PATTERNS

The Core Patterns

No.0
Pattern Illustrating
You are writing the pattern description. In this context, you have something to tell through the pattern, but it's hard to make it understandable and appealing to readers. Therefore, draw Pattern Illustrations to express the pattern visually.

No.1
Essential Message
You want to draw Pattern Illustration. In this context, the illustration will only be something extra for the sentences or just a figure unless it describes the pattern's content. Therefore, consider pattern illustration as having the same value as the pattern description; try drawing an illustration that contains the pattern's essence.

No.2
Moving Characters
You want to draw a pattern illustration that expresses the pattern's *Essential Message*. In this context, drawing only the pattern's context cannot express how the reader should act and the consequences. Therefore, draw a character that embodies the pattern's *Essential Message*.

No.3
Iconic Representation
You want to draw a pattern illustration that expresses the pattern's *Essential Message* by presenting *Moving Characters*. In this context, multiple scenes provide too much information for readers to focus on the pattern's *Essential Message*. Therefore, draw the most important scene that solves the problem within the context.
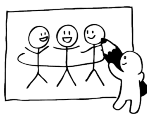
Patterns for Drawing Elements

No.4
Center Words Hunting
You are going to draw the Pattern Illustration. In this context, drawing all of the pattern's elements doesn't express the pattern's essence. Therefore, identify essential strong words or phrases to grasp the pattern's essence.

No.5
Overall Rough Sketch
You are drawing the illustration using the words or phrases found from the process, *finding center words*. In this context, trying to visualize each center words won't make up wholeness to the illustration. Therefore, draw rough sketch of the pattern illustration while you imagine what it would turn out to be like as a whole from the relationship between each center words.

No.6
Sketches of Details
You are drawing the illustration using *Overall Rough Sketch*. In this context, you can't put detailed shade of information in the illustration. Therefore add lacking elements and adjust the parts so that it'll strengthen the attraction of illustration.
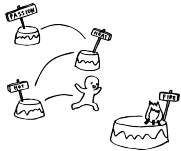
No.7
Image of motion
You are thinking about how to visualize the center words that describes motion. In this context, it is difficult to visualize the center words like "getting closer", "jump over", which describes motion of the pattern. Therefore use simple figures, or arrows to express the image of the motion.

No.8
Word Game
You are trying to visualize center words that describes concept while doing *Overall Rough Sketch*. In this context, words like "passion," "idea," and "information," cannot be drawn since it doesn't have specific shape. Therefore do word association game to find the image that best matches to express the concept.

No.9
Deciding the Amount
You are working on *Sketches of details*, and you are about to decide the amount of information or the number of characters to include in the illustration. In this context, there are no center words that refer to numbers or amounts, so you do not know how many of each element to draw in the illustration. Therefore imagine specific situations in which the pattern will be used in to decide the number or amount of elements to draw.

Patterns for Determining the Scene and Space

No.10
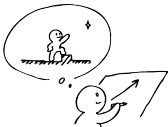### Layout of space
You already know which elements to express by drawing *Overall Rough Sketch* and *Sketches of Detail*. In this context, character's action does not look real. Therefore draw the illustration as if you are coordinating the 3D space.

No.11
Instinct Direction
The *Layout of Space* of the pattern illustration, which describes the contents of the pattern, is starting to become clear. In this context, it is hard to decide on a good angle of the illustration that would effectively convey the message of the pattern. Therefore choose an angle to draw the illustration that matches the natural physical sensations.
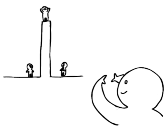
No.12
Zooming out
You are doing *Layout of Space* in order to draw a spatial illustration. In this context, it is hard to effectively illustrate velocity or the relative size of objects in the space you are drawing. Therefore zoom out to capture a wider area so that you can put emphasis based on comparison.

No.14
Acting Illustrator
You are doing *Lively Peak Capture* and you are trying to capture the lively actions of the patterns with the illustration. In this context, the expressions of the characters seem the same in all of the patterns, and the illustrations seem to rack reality. Therefore put yourself in the shoes of the characters, and act out their role to get a better image of how their expressions would really look like.
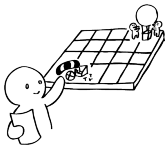
No.15
Time Symbol
You are drawing your pattern illustration to make it a *Symbolic Representation*. In this context, you drew the solution scene of the pattern, but the scene itself does not convey the message of the pattern completely. Therefore draw the most important scene as the main part of the illustration, but include in it something that symbolic of the past or the future.
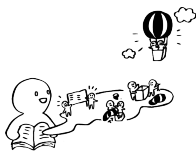
Patterns for Finishing Touches to Raise the Quality
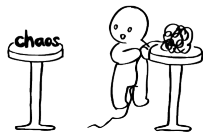
No.16
Mood Unity
You have finished drawing a pattern illustration. In this context, some slight differences between the nuance of the illustration and the pattern name exist and are making the pattern hard to remember. Therefore adjust the image of the pattern name and the illustration so that they match.

No.17
Consistent Story
You have finished drawing a couple of pattern illustrations from a pattern language. In this context, the situations that the illustrations use have no connections in between, and do not have unity as a pattern language. Therefore imagine a story that has to do with the topic of your pattern language, and use consistent motifs to draw different scenes from the same story.

No.18
Composition Differentiation
You have finished drawing a couple of pattern illustrations from a pattern language. In this context, there are a couple of illustrations that at a glance look similar. Therefore change the point of view from illustration to illustration to give variety to its compositions.
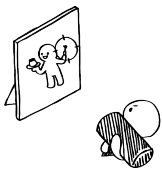
No.19
Strangeness Busters
You have finished drawing a pattern illustration. In this context, you are satisfied about the illustration from the feeling of accomplishment, and overlook points of improvement. Therefore check your illustration again with the question "is there any points that are strange and unnatural?"

No.20
Simple Illustration
You have finished drawing a pattern illustration. In this context, if you put in too much information, the readers will not be able to understand the message of the illustration. Therefore keep the amount of information in the illustration to a minimal.

No.21
Illustration Fans
You have finished drawing your pattern illustration, and also finished checking if it is a *Simple Illustration*. In this context, you feel the illustration is lacking something and is not attractive. Therefore stand in the shoes of the audience, and draw an illustration that is attractive and fun to look at.

Patterns for Assisting When You are Stuck

No.22
Intriguing Doodles
You are wondering what kind of an illustration to draw. In this context, you couldn't figure out what to draw, and your thoughts have stopped. Therefore keep on moving your hand and doodle to generate ideas and get inspired from it.

No.23
External Inspirations
You are in need for some inspirations for what to draw for a pattern illustration. In this context, you try to think by yourself, but nothing comes to your mind. Therefore look at outside sources for ideas about what to draw.

No.24
Third Person View
You have finished drawing a pattern illustration, and you are somewhat happy with it. In this context, you want to improve the illustration even more, but you don't know where it can be made better. Therefore show the illustration to someone unrelated to the pattern, and get fresh ideas from them.

Patterns for Things You Should Care in Daily Life

No.25
Polishing Word Sense
You want to become able to draw good pattern illustration. In this context, you always have trouble looking for center words and looking at their relations, and using metaphors to think what to draw. Therefore consciously take time to read and write in your everyday life to polish up your word sense.

No.26
Stock of Expressions
You want to improve your pattern illustration skills. In this context, it is hard to draw an illustration that expresses the atmosphere and meanings of the pattern so that anyone can understand. Therefore take notes and create a stock of the expressions you meet and the feelings you got rom it.
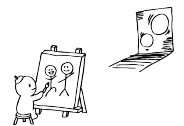
No.27
Creating by Drawing
You want to become a better pattern illustrator. In this context, even if you have sufficient experience with pattern illustrating, you still cannot draw an attractive and memorable pattern illustration that conveys the meaning well. Therefore through the process of making a pattern illustration, improve the word expressions of the pattern itself.