

15 Design Patterns for Pattern Illustrating

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This paper presents fifteen design patterns for Pattern Illustrating, which support people to create good pattern illustrations. Pattern Illustrating is a process of visualizing the essence of each pattern symbolically, conducted after Pattern Mining and Pattern Writing in the process of pattern language creation. This process requires pattern writers to recapture the essence of each pattern, and thus encourages them to review and revise what was written down in Pattern Writing. Therefore, the quality of each pattern is likely to get improved significantly through the process of pattern illustrating. In addition, good pattern illustrations provide readers with a better understanding of the contents of patterns. In this paper, we present fifteen design patterns to create such good illustrations. We also explain how they were found out with a KJ clustering approach, using 333 pattern illustrations created by Iba Lab members. We hope that this attempt makes people feel it easier to conduct pattern illustrating in their own practice of creating patterns.

Additional Key Words and Phrases: design patterns, pattern illustrating, KJ method, pattern language creation

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1. INTRODUCTION

Visualizing ideas often helps people understand something new and abstract. In the study of Cognitive Theory of Multimedia Learning, it has been shown 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” (Mayer 2002).

In the field of pattern language, photographs, diagrams and sketches have been effectively utilized to help readers understand the ideas better. Such visual aids also encourage people to recall patterns and practice them in their daily lives. We, Iba Lab, have also created more than 1,600 patterns of human actions with illustrations, since the publication of *Learning Patterns* in 2008 (Iba et al., 2009; Iba and Iba Lab 2014) (Fig.1). In our pattern languages, the essential message of each pattern is visually expressed with a special character named *Manabukun*, through his actions and facial expressions (Miyazaki 2015) (Fig.2).

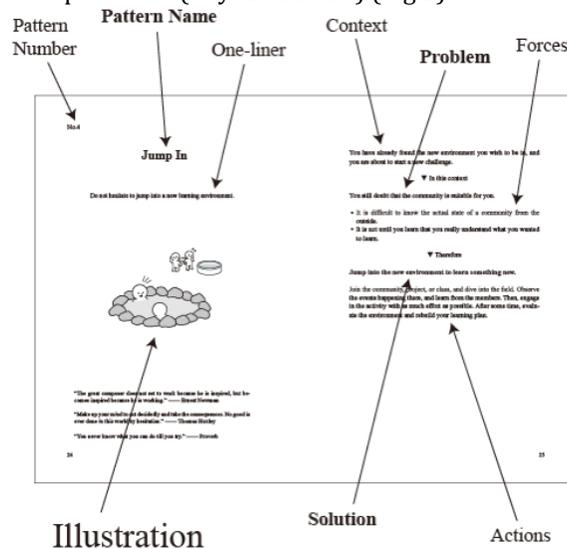


Fig. 1. Pattern format designed by Iba Lab



Fig. 2. Examples of illustrations (Manabu-kun) in Learning Patterns (2008): *Tornado of Learning* (No.10), *Prototyping* (No.17) and *Community of Learning* (No.28)

We call this process of visualizing the essence of each pattern using such a character, Pattern Illustrating. It is conducted after extracting knowledge of practice from people's experiences (Pattern Mining) and writing them down in the form of pattern language (Pattern Writing). In our Lab, although we collaboratively carry out Pattern Mining and Pattern Writing with at least 4 to 8 members, Pattern Illustrating has been conducted only by a few people who are good at drawing pictures and known as "good illustrators".

"The more the people read and give feedback, the better the quality of pattern language gets". If it is true for illustrations as well, the process of Pattern Illustrating should be opened to more people. In order to enable this, we created *Pattern Illustrating Patterns* (2015) to help people draw good pattern illustrations (Miyazaki 2015). They were created based on the practices of pattern illustrating conducted by Iba Lab members who have experienced pattern illustrating several times for different themes.

However, because this set of patterns only focuses on the important "mindset" for Pattern Illustrating and does not imply any good "structure" of illustrations in detail, it was still difficult for many people to come up with good pattern illustrations which correctly capture the essence of each pattern and provides readers with a better understanding of the contents.

Therefore, in order to make it easier for pattern writers to join the process of Pattern Illustrating, we decided to share the basic structural patterns of pattern illustrations, which Iba Lab has found as our own style. We therefore created fifteen design patterns for Pattern Illustrating. They were created based on 333 pattern illustrations created by Iba Lab for 11 different themes. In this paper, we introduce this set of patterns, and explain how it was created and how it effectively works in the practice of creating a pattern language.

2. PATTERN LANGUAGE AND ILLUSTRATION

The attempt to add a visual expression to the description of pattern is not something very new and special. Christopher Alexander, the inventor of Pattern Language, has stated "if you can't draw a diagram, it isn't a pattern" in his book of *The Timeless Way of Building* (1979) (Alexander). In order to share the patterns which are very complicated to be precisely described with words, he stressed the importance of "expressing and visualizing a pattern as a kind of fluid image, a morphological feeling, a swirling intuition about form" (Alexander 1979). In *A Pattern Language* (1977), therefore, he used a lot of visual images such as photos and sketches in the description of each pattern.

The importance of visual aids has been recognized not only in the pattern languages for structural design such as architecture and software, but also in the field of pattern languages for human actions (what we call *Pattern Language 3.0*). Illustrations put abstract ideas and concepts, which are often very difficult to be described in words, into a visible form, and help readers understand and implement the practices written in patterns (Miyazaki 2015).

Moreover, the process of pattern illustrating effectively works for pattern writers as well, when they want to improve their own patterns. "This process presupposes the descriptions of patterns, but it also asks the improvement and modification of themselves. In this sense, this process is very unstable. Because of this instability, the process of pattern illustrating works very well not only for making the patterns more understandable for readers, but also for improving the pattern themselves" (Harasawa 2015). What it means here is that drawing pattern illustrations requires pattern creators to read the patterns again, recapture the essence of patterns and compress it in a visible expression. If they find difficulty in this process, it often means

that the message of the pattern expressed in words is still ambiguous and not “strong” enough as a pattern, and it needs to be reconsidered and improved.

In fact, in our practice of creating a pattern language for middle leaders in nursery¹, pattern illustrating played a significant role (Fig. 3). When each member independently drew an illustration for a single pattern and then showed it to other members, it became obvious how ambiguous the pattern description at that moment was. For example, Fig.4 shows rough sketches drawn by us individually, for a pattern called “Everyday-Chat”. When showing them to each other, we recognized that they all looked quite similar, and concluded that the message of this pattern was already clear and strong enough. This pattern was therefore ended up with the illustration which was elaborated further as shown in Fig.5.



Fig. 3. Pattern Illustrating for a pattern language for nursery

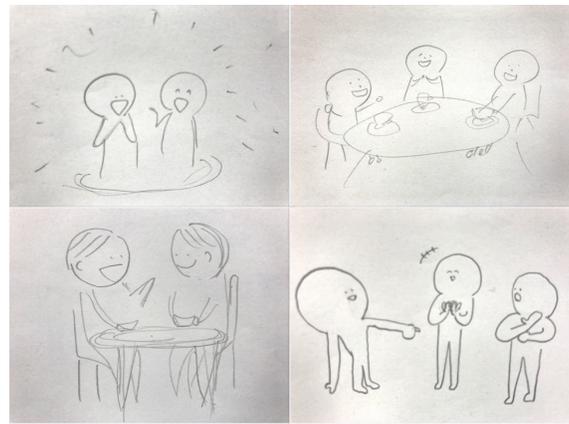


Fig. 4. Pattern Illustrations for “Everyday-Chat”, drawn by different project members

¹ This is our on-going study with The Center for Early Childhood Development, Education and Policy Research in Tokyo University.



Fig. 5. Finished Version of the Pattern Illustration for “Everyday-Chat”

On the other hand, when we drew sketches for another single pattern, “Bridging Trust”, they all looked very different (Fig.6), implying that the description of pattern was still ambiguous. We therefore needed to discuss and explore further what the point of this pattern was. Through the deepened discussion, a better understanding of this pattern was constructed among us, and both the pattern description and illustration were updated as a result (Fig.7).



Fig. 6. Pattern Illustrations for “Bridging Trust”, drawn by different project members



Fig. 7. Finished Version of the Pattern Illustration for “Bridging Trust”

In a nutshell, Pattern Illustrating is a significant process in creating a pattern language, not only for making patterns more intuitively understandable for readers, but also for pattern writers to doubt what is already written there, recapture the essence of each pattern and improve the quality of language as a whole. In order to

open this meaningful process to more people, we introduced *Pattern Illustrating Patterns* (2015) in the PLoP Conference in 2015 as our first attempt.

3. PATTERN ILLUSTRATING PATTERNS (2015)

Pattern Illustrating Patterns (2015) were created to help people draw pattern illustrations which express the essence of each pattern and make it easier for readers to understand the patterns better (Iba, T. and Iba Lab 2015). 28 patterns were created based on the experiences of pattern illustrators in Iba Lab, and categorized into five groups. Here is the overview of the patterns.

The core group consists of the following patterns which describe the essence of pattern illustrating in Iba Lab style. **Essential Message (No.1)**: Consider pattern illustration as having the same value as the pattern description; try drawing an illustration that contains the pattern’s essence. **Moving Characters (No.2)**: Draw a character that embodies the pattern’s essential message. **Symbolic Representation (No.3)**: Draw the scene that solves the problem within the context.

The next three group consists of 18 patterns for identifying what to draw, determining the scene and space, and finishing touches to raise the quality. Here are the examples. **Center Words Hunting (No.4)**: Identify essential strong words or phrases to grasp the pattern’s essence. **Layout of Space (No.10)**: Draw the illustration as if you are coordinating the 3D space. **Consistent Story (No.17)**: Imagine a story about your pattern language’s topic and use consistent motifs to draw different scenes from the same story.

The last group of 6 Patterns describe the important mindset as a pattern illustrator. **External Inspiration (No.23)**: Look at outside sources for ideas about what to draw. **Third Person View (No.24)**: Show the illustration to someone unrelated to the pattern to get fresh ideas. **Improving by Drawing (No.27)**: Through the process of creating a pattern illustration, improve the verbal expressions of the pattern itself.

Although these 28 Pattern Illustrating Patterns work well in terms of sharing the way of thinking necessary for pattern illustrating, they do not refer to any detail of the “structure” or “form” of good illustration. In order to encourage everyone to join the process of Pattern Illustrating, however, we found it important to have design patterns for pattern illustrating which describe the underlying and implicit structural patterns of our pattern illustrations.

4. DESIGN PATTERNS FOR PATTERN ILLUSTRATING

We have created design patterns for pattern illustrating, based on the illustrations drawn for 333 patterns in the following eleven themes: *Learning Patterns* (2009), *Presentation Patterns* (2012), *Collaboration Patterns* (2013), *A Pattern Language for Surviving Earthquakes* (2013), *Words for a Journey: A Pattern Language for Living Well with Dementia* (2014), *Cooking Patterns* (2016), *Project Design Patterns* (2016), *A Pattern Language “Ways of Everyday World Making”* (2016), *Active Learning Patterns for Teachers* (2017), *Life Transition Patterns: A Pattern Language for Shaping Your Future* (2017) and *Open Dialogue Patterns* (2017). These pattern illustrations were created by multiple people as shown on the following table.

Table 1 List of patterns used for creating Design Patterns for Pattern Illustrating

Title of Pattern Language (year of publication)	Total number of patterns	Pattern Illustrators
Learning Patterns (2009)	40	Toko Miyake & Takashi Iba
Presentation Patterns (2012)	34	Kaori Harasawa, Rinko Arao & Takashi Iba
Collaboration Patterns (2013)	34	Kaori Harasawa, Rinko Arao, Ayano Tamefusa, You Ikeda & Takashi Iba
A Pattern Language for Surviving Earthquakes (2013)	20	Kaori Harasawa
Words for a Journey: A Pattern Language for Living Well with Dementia (2014)	40	Arisa Kamada, Tasuku Matsumura & Takashi Iba
Cooking Patterns (2016)	27	Yuma Akado, Rika Sakuraba & Takashi Iba
Project Design Patterns (2016)	32	Kaori Harasawa

A Pattern Language “Ways of Everyday World Making” (2016)	34	Kaho Takahashi & Takashi Iba
Active Learning Patterns for Teachers (2017)	45	Takashi Iba & Yuma Akado
Life Transition Patterns: A Pattern Language for Shaping Your Future (2017)	27	Takashi Iba
Open Dialogue Patterns (2017)	30	Takashi Iba

Here are the 15 design patterns for pattern illustrating. Each description consists of Context, Problem and Solution. These patterns can be chosen and used, based on what kind of pattern they want to illustrate and what should be emphasized as the message of each pattern.

No.1 Direction to the Future

The pattern you want to illustrate emphasizes the importance of doing something with being aware of a specific future. In this context, it is difficult to draw the current situation, recommended action and consequential future all together on the same plane, making sure that they can be clearly distinguished. Therefore, draw the future-related event in upper-right corner, and express the change as time flows from bottom left to top right.

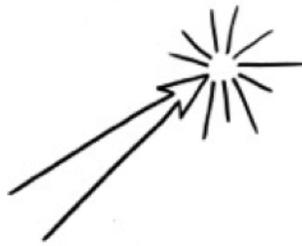


Fig. 8. Direction to the Future

No.2 Visible Form

The pattern you want to illustrate puts significant emphasis on the emotion, words or something invisible and conceptual. In this context, because they have no visible form, it is difficult to illustrate them and how they relate to the recommended action. Therefore, represent them in the form of bubbles, and let the character touch or transform them, in order to illustrate the specific action described in the pattern.

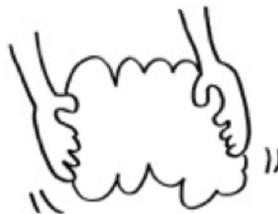


Fig.9. Visible Form

No.3 Three Examples

You want to show the variety of something or different options. In this context, you may try to draw things as much as possible, but it makes the illustration chaotic, and thus the important message of pattern is likely to be blurred. Therefore, draw only three of them as representative examples.



Fig. 10. Selected Three

No.4 Standing on the Same Side

The pattern implies that there are multiple people who are in the same situation, sharing something together and working collaboratively. In this context, if you just draw multiple people, such relationship cannot be well represented. Therefore, draw a few people from the back side and emphasize that they are facing in the same direction.

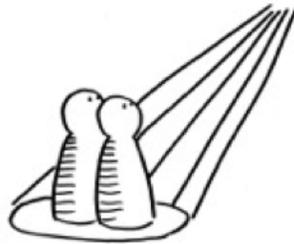


Fig.11. Standing on the Same Side

No.5 After Selection

The pattern asks readers to prioritize something or choose something from among many. In this context, if there is only the selected one drawn, readers may not be able to see the importance of the action behind it. Therefore, draw the things unselected as well to emphasize that it is the one selected.

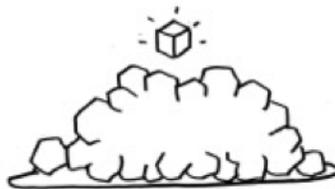


Fig.12. After Selection

No.6 Sharing in a Circle

The pattern emphasizes the significance of collaboratively working with others. In this context, it is hard to express the sense of unity on the illustration, as it is invisible. Therefore, let them make a circle and face each other. In this way, readers can imagine that people share their time, space and opinions with each other in a collaborative way.



Fig. 13. Sharing in a Circle

No.7 Emotional Arms

You want to show the important feeling which is coming along when taking the action written in the pattern. In this context, although people often try to express such strong emotion only through the character's facial expression, it is likely to be misunderstood. Therefore, you should not only express the important feeling through the character's facial expression, but also make their arms characterized as well. For example, you can let the character make a fist and raise the arm above the chest, to show the importance of taking action passionately.



Fig. 14. Emotional Arms

No.8 Rapid Change

The pattern encourages readers to make a big change within a relatively short period of time. In this context, drawing the changing process or the changed situation when the pattern is implemented, would not be enough to tell readers the rapidity of growth. Therefore, draw the representative thing expanding from the bottom to the top, with the small starting point and the bigger goal.



Fig. 15. Rapid Change

No.9 Mind-full Action

The pattern encourages readers to take action mindfully. In this context, it is difficult to visualize the inner state of the person. Therefore, draw the character with its eyes closed and the hand on the chest, to express his concentration.



Fig. 16. Mind-full Action

No.10 Extensive Network

You want to illustrate the relationships among people or things. In this context, if you just draw lines in between different elements to represent the network in one place, different levels of strength of the relationship cannot be well illustrated. Therefore, draw the network extensively to show the depth of the network from a specific point of view.

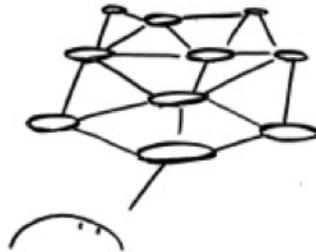


Fig. 17. Extensive Network

No.11 Expansive Spiral

The pattern encourages readers to take action expansively. In this context, if you draw only the finished state, it would not explain enough about the process in which something is expansively progressing. Therefore, draw a growing spiral which spreads gradually from the bottom to the top.

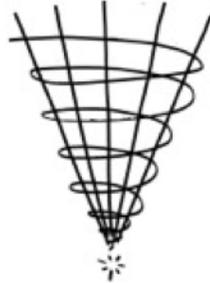


Fig. 18. Expansive Spiral

No.12 Active Leaning

The pattern emphasizes the importance of taking action positively and actively. In this context, if you just draw a person who is taking action, it would not tell enough about the positive attitude towards the practice within the pattern. Therefore, let the character a little bit lean forward.

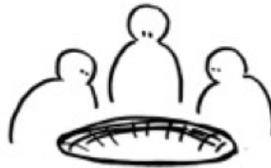


Fig. 19. Active Leaning

No.13 Challenging Darkness

The pattern offers a challenge. In this context, simply drawing the consequence of the pattern would not be enough to tell readers that they have to challenge difficulties. Therefore, paint the back in black and brighten the direction for pioneering.



Fig. 20. Challenging Darkness

No.14 Accumulation of Actions

The pattern encourages readers to make a progress a little by little. In this context, simply drawing the consequence of the pattern would not be enough to tell readers the importance of its gradual progress. Therefore, draw the act of piling up small pieces of something such as blocks, to emphasize that the goal has to be achieved with small steps.

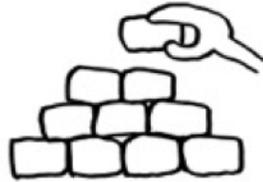


Fig. 21. Accumulation of Actions

No. 15 Repeated Practices

You want to recommend readers a repeated use of the pattern. In this context, simply drawing the consequence of pattern would just seem like suggesting a temporary use of the pattern. Therefore, draw the character sitting in front of a desk to emphasize that the pattern should be practiced repeatedly to achieve the goal.



Fig. 22. Repeated Practices

These 15 Patterns make it easy to draw the fundamental structure of a pattern illustration as a rough sketch. The sketch can then be elaborated further and drawn nicely as a final version by people who have experienced in drawing. In this way, every pattern language creator can join the process of pattern illustrating, regardless of how good they can actually draw the character, making it more collaborative.

Furthermore, this illustrating process is very consistent with the Christopher Alexander's idea of creation, in the way that it asks people to elaborate the design further based on the initial rough sketch to create a completed one. In his own words, this process can be rearticulated as "differentiation (Alexander 1979)", where the design object is seen as an individual whole, and all the details of the structure is developed later as a sequence. "It is not a process of addition, in which pre-formed parts are combined to create a whole, but the process in which every individual act of building differentiates the space. It is a process of unfolding, like the evolution of an embryo, in which the whole precedes its parts, and actually gives birth to them, by splitting" (Alexander 1979 p384). In "The Timeless Way of Building" and "The Nature of Order", Alexander stressed that the differentiation of the whole is the very essence of designing. We also believe that pattern illustration can achieve the "Quality Without a Name" in this way.

5. HOW PATTERNS WERE FOUND

Design patterns for pattern illustrating were created, using the KJ method (Kawakita 1967). KJ Method was originally invented by Jiro Kawakita, a cultural anthropologist, to organize data collected from various cultures. We have used this method as a foundation of our pattern clustering method² (Iba, et al. 2017).

In this project, we carried out the KJ Clustering with pattern cards where the description and illustration of each pattern is printed on. First of all, all the pattern cards were placed on a piece of craft paper randomly (Starting from Chaos) (Fig. 23). We then compared pairs of cards, looked at their illustrations and brought together if they have similar ones (One-to-One Comparison) (Fig. 24). Here, it is important to keep in mind that feelings rather than rational thinking play a significant role in the KJ Clustering. Simply moving cards with existing classification standards such as “-ish” and “-related” is not expected. Rather, the idea is to grasp the essence of what is drawn on the illustrations. When the classification of the illustrations made sense to all of us, we circled each group of cards to clarify the “islands” which would become seeds of patterns (Discovering the Islands) (Fig. 25).

As a result of our KJ Clustering, 36 islands were found out (Fig. 26). Most of them had unclear and uncertain “problem-force”, and we have got only 15 patterns so far, in which we were able to write the full CPS Summary (Context, Problem and Solution). However, because there are plenty of ways to cluster the pattern illustrations in the KJ Clustering, there is no doubt that we could find more seeds of patterns using the same cards. We may also be able to elaborate the design patterns further, by adding more pattern illustrations from other pattern language communities.



Fig. 23. Starting from Chaos

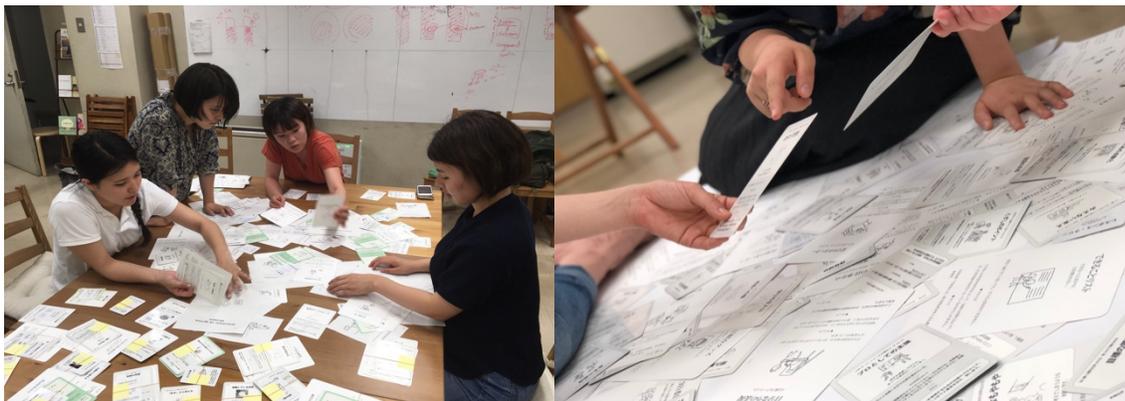


Fig. 24. One-to-One Comparison

² The application of KJ Method in pattern language creation is explained in more detail in our previous paper, “Philosophy and Methodology of Clustering in Pattern Mining: Japanese Anthropologist Jiro Kawakita’s KJ Method (Iba et al. 2017)”, presented in the 24th Conference on Pattern Languages of Programs (PLoP2017).



Fig. 25. Discovering the Islands



Fig. 26. Islands emerged after KJ Method

6. CONCLUSION

In this paper, we introduced 15 design patterns for pattern illustrating and emphasized the importance of pattern illustrating as a process of revising patterns, not only as a visual aid for readers. Using these design patterns, we are now planning to design a pattern illustrating workshop for EuroPLOP2019. We hope that this attempt will encourage pattern creators to practice pattern illustrating and start feeling it as an important process for improving the quality of their own patterns.

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