

A Pattern Language for Pattern Illustrating

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In this paper we present a pattern language for pattern illustrating, to help visualize what patterns mean and share the feeling of being alive of the patterns. This language is composed of seven patterns describing tips for drawing inspiring illustrations for a pattern language. The patterns are as follows: *Inspiring Illustration*, *Three-Step Drawing*, *Expressing Solution*, *Metaphor Matching*, *Design Rules*, *Consistent Styles*, and *Graphical Diversity*. We anticipate that these patterns will help pattern writers draw inspiring illustrations for their patterns, subsequently their patterns will become more understandable and more attractive.

General Terms: Pattern Languages

Additional Key Words and Phrase: Pattern Illustrating,

ACM Reference Format:

1. INTRODUCTION

A pattern language describes in a natural language, the practical knowledge of design in a certain domain. Christopher Alexander, the original proposer of the idea, uses visual representations such as photographs, sketches, or diagrams when publishing his pattern language (Alexander, 1977). Alexander used many photos in his 1979 book with the belief that photos were particularly important in sharing with readers, the feeling of “being lively” (Alexander, *et. al.*, 1979). Photos were not used as much when pattern languages were later introduced in the field of software design, but its significance is recently re-appreciated by many pattern writers in the field: J. O. Coplien, N.B. Harrison (2004) and J. Kerievsky (2008) to raise a few.

Although photos are effective in sharing the feelings of being lively, the photos may sometimes give a different visual than what the patterns actually mean. For instance, it is quite difficult to visualize the meanings of patterns concerning immaterial things like software, thinking, or human behaviors (Iba, 2011). To take this into consideration, an alternative way to visualize patterns and share the feelings of being lively is required.

In this paper, we will focus on illustrations as an alternative way, and propose a pattern language for pattern illustrating. Of course illustrations can share the feeling of being lively, but that is not all. Illustrations can also visualize the technical solutions, i.e. artworks can express solutions concretely and explanatory. This will not be accomplished by using photo. And these patterns are extracted from our experience of making several pattern languages: the Learning Patterns (Iba, *et. al.*, 2009; Iba and Miyake, 2010; Iba and Sakamoto, 2011; Iba and Learning Patterns Project, 2011), the Presentation Patterns (Iba, *et. al.*, 2012), and the Pedagogical patterns for creative learning (Iba, *et. al.*, 2011). The cute illustrations used in these pattern languages have been well received both in the pattern community and by general readers.

As Meszaros and Doble (1997) said, a certain problem is proposed: if a pattern contains a lot of words or detailed description, potential readers may be limited, but if a pattern contains minimum words or rough description, readers can be misled. Applying illustrations to pattern languages is an effective way to solve this problem. In this sense, this pattern language in this paper will benefit all who writes patterns.

2. THE STRUCTURE OF THE LANGUAGE

The pattern language presented in this paper describes the practical knowledge for drawing inspiring illustrations for a pattern language. It describes the tips on how to visualize patterns and also on how to keep both of consistency and diversity among the patterns. The structure of this pattern language is shown in Figure 1.

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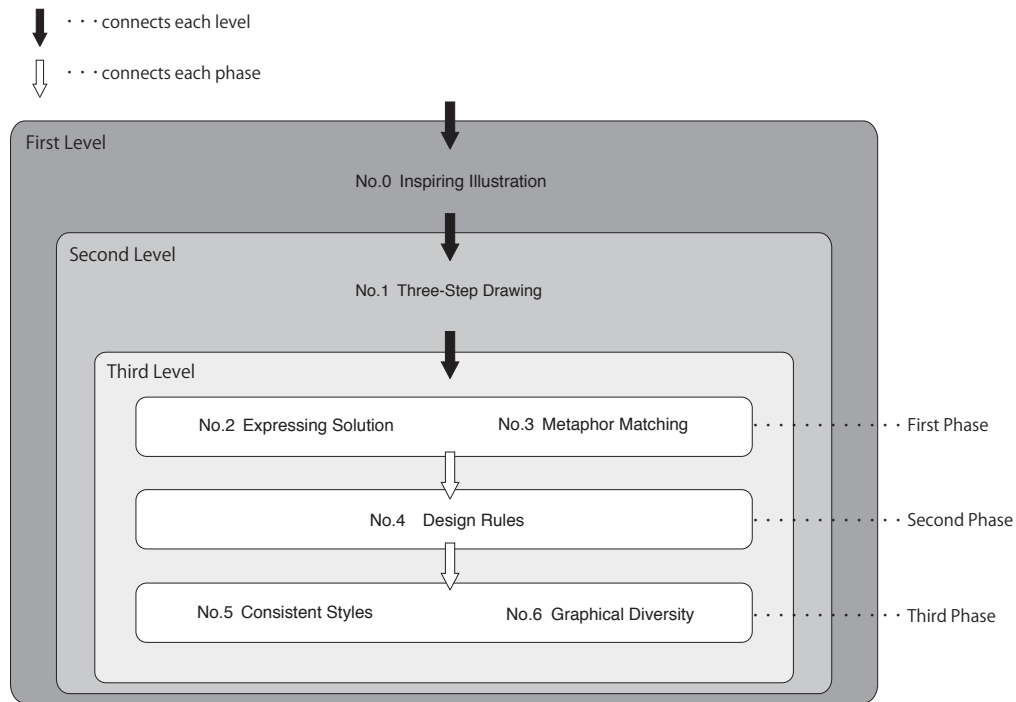


Fig. 1. The structure of the language

The structure consists of three levels: the needs for drawing illustrations, its process, and finally, the tips. *Inspiring Illustration* (No.0) is presented in the first level to introduce the patterns following it. In this level, the reason and aim to use this pattern language for pattern illustrating is described. In the second level, *Three-Step Drawing* (No.1) is presented, as things illustrators must pay attention to. And finally in the third level, the practical ways of how to draw illustrations are described (No.2-6). This level is broken into three steps: coming up with ideas about the illustration (No.2, No.3), brushing up your illustrations (No.4), and polishing each illustration and making them have the consistency as a language (No.5, No.6).

In Figure.1, the black arrows represent the flow from one level to the next. To distinguish, practical phases for drawing pictures are shown by white arrows. Also, the three levels are differentiated with separate shading. The lightest groups (containing No.2-6) that are connected with white arrows represent that there are three phases in the third level.

Each pattern is written in the same form: Pattern Name, Context, Problem, Force, Solution, Action, Consequence and Example. The Pattern Name is the attractive and memorable names that could be used as building blocks for the thinking process and as a vocabulary for communicating about the way of illustrating patterns. The Context describes the conditions for when illustrators should apply this pattern. The Problem describes a difficulty that often occurs in the context and is not easy to overcome, and Forces are unavoidable laws that make the problem hard to solve. The Solution describes how to solve the problem, with Actions offering concrete methods to put the solution into practice. The Consequence describes the result of applying this pattern. Finally, the Example demonstrates the pattern by introducing our experience on pattern illustrating. We will give our experiences on illustrating the Presentation Patterns as the examples, since the authors of this paper drew the illustrations in the Presentation Patterns.

In what follows, the Problem is written in bold, just after the heading “▼ In this context,” and the Solution is shown also in bold after the heading “▼Therefore.” And the Consequence is written after the heading “▼Consequently.”

3. THE PATTERNS

In the following, we will present the seven patterns for pattern illustrating: *Inspiring Illustration* (No.0), *Three-Step Drawing* (No.1), *Expressing Solution* (No.2), *Metaphor Matching* (No.3), *Design Rules* (No.4), *Consistent Styles* (No.5), and *Graphical Diversity* (No.6).

No.0

Inspiring Illustration

You are writing patterns of a pattern language, considering how to express them.

▼ In this context

It is hard to express the idea of the pattern by only using text. People are apt to forget the pattern's impression. With many words or detailed descriptions, readers have to read the pattern over a few times before fully understanding its meaning. On the other hand, with too few information or little words, readers might misunderstand what the pattern wants to say.

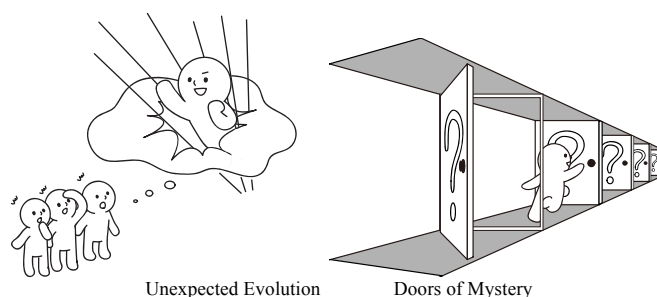
▼ Therefore

Add an inspiring illustration that visualizes the pattern's solution to make a reader-friendly pattern. An illustration helps the reader to understand the essence of the pattern with ease. If the illustration were funny and lively, the pattern would be likely remembered, since it gives stimulus to the eye.

▼ Consequently

You can make your pattern language more memorable and more attractive. Readers will be able to understand the meaning of patterns easily, and will feel intimacy to your patterns. But, if an illustration were drawn in a faulty way, it would mislead readers.

For example, in the pattern “Unexpected Evolution” of the Presentation Patterns, a situation where a presenter breaks the audience's expectation is drawn. If this pattern is just written in words: “exceed audience's expectations”, its image would quite not reach the reader. But with this illustration, people can understand the essence of this pattern and solution at a glance. Another example is the “Doors of Mystery”. This illustration not only represents the solution of this pattern, but also has a strong connection with its Pattern Name. This allows the reader to remember the pattern name and the illustration as a pair.



No.1

Three-Step Drawing

You are trying to draw an illustration, but you are not good at drawing using a computer.

▼ In this context

You try drawing your illustration on a computer, but end up making an illustration that are just the sum of various parts and lacks the balance as a whole. The artwork drawn on a computer can be reserved in good condition, because that is a digital data. But it is difficult to draw lines as expected on a computer, because you can't look at a line and your hand at the same time. This makes it difficult to draw illustrations on a computer, even if you use a tool like a pen tablet.

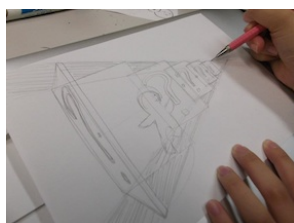
▼ Therefore

Follow the three steps of drawing an illustration: Pencil, Pen, and then PC. There are two steps in the handwritten phase. First, draw the illustration in pencil. In this phase, draw the illustration again and again until you are satisfied with the composition of the lines. Second, trace over this illustration in pen. Make sure that the lines are in the same thickness as the final illustrations. After the handwritten phase, scan these illustration and trace on a PC.

▼ Consequently

You can draw an illustration with a balance as a whole, i.e. your artworks will not be looked like the sum of various parts. However, it takes a lot of time to draw illustrations, because it takes three times longer to finish drawing an illustration.

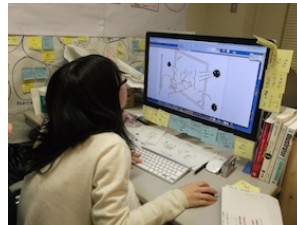
For example, in the Presentation Patterns Project, we first drew the illustrations on paper with a pencil (left figure), and then trace over the drawing in pen (center figure). After that, we made the final version of the illustration on a computer, tracing the lines of the scanned illustration (right figure).



Drawing in Pencil



Drawing in Pen



Drawing on PC

Expressing Solution

You are drawing an illustration of a pattern.

▼ In this context

You can't decide what kind of drawing would best express the meaning of the pattern. There is much information in the pattern, and this makes it hard to consider what kind of expression can show an exact meaning of a pattern.

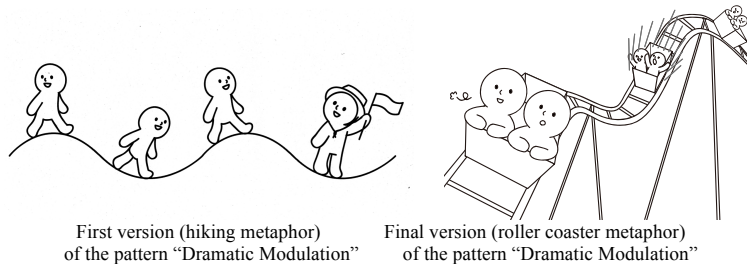
▼ Therefore

Work out a motif by considering the meaning of the Solution. Focus on the action of the pattern. Consider what consequences the solution has. Think of a metaphor that expresses the meaning of the Solution.

▼ Consequently

The illustration you draw will have closer relation with the content of the pattern. By this relationship, reader can remember the meaning of the pattern with ease. However, if an illustration expressed a different meaning from the pattern's solution, it would confuse readers.

For example, in the pattern "Dramatic Modulation" of the Presentation Patterns, we first came up with the metaphor of hiking, drew an illustration based on it (left figure). In the illustration, there is a bumpy road, but it is moderate, not dramatic. We decided that this pattern's emphasis was on making *dramatic* modulations to keep the audience interested. So, we got rid of the hiking metaphor and drew an illustration with more dramatic movement with a new roller coaster metaphor (right figure).



Metaphor Matching

You are drawing the illustrations, and you get a good metaphor expressing the meaning of the pattern.

▼ In this context

The metaphor has a different interpretation as the pattern name, so you hesitate to adopt the new metaphor to the illustration. The metaphor you come up with while thinking of ideas for the illustration does not always go with the pattern name. And also the pattern name at that time isn't always the best one.

▼ Therefore

If that metaphor would well express the meaning of the pattern better than the current Pattern Name, change the Pattern Name. The pattern names are not completely fixed. Choose the way that would make the pattern more memorable.

▼ Consequently

A metaphor of a pattern becomes more appropriate. And the change of the Pattern Name alters the content of the pattern also. However, changing the Pattern Name only in accordance with the picture causes confusion, i.e. mismatching of the Pattern Name and the content will happen.

For example, in the pattern “Mind Bridge” of the Presentation Patterns, at the beginning we drew an illustration showing the audience having an “*aha!*” moment (left figure), because at that time the name of this pattern was “Aha-Plug.” We then thought this illustration is confusing because it is unclear if it is either the presenter or the audience that has the “*aha!*” moment. So we started to explore new metaphors, and finally and finally reached the metaphor of a “bridge,” where the presenter builds a bridge to share their idea with their audience. After drawing this illustration with the bridge metaphor (right figure), we changed its pattern name to “Mind Bridge.”



Illustration when the pattern name is
“Aha-Plug”

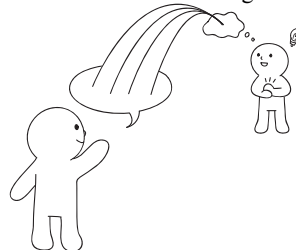


Illustration when the pattern name is
“Mind Bridge”

Design Rules

You are drawing illustrations for your patterns, but they seem unattractive, or you feel there is still room to improve.

▼ In this context

You don't know what part of the illustration should be changed or how to improve the patterns to make them look more attractive. Even if you feel something is wrong, to put the feeling into words is difficult, and this makes it difficult to apply an effective way of modification.

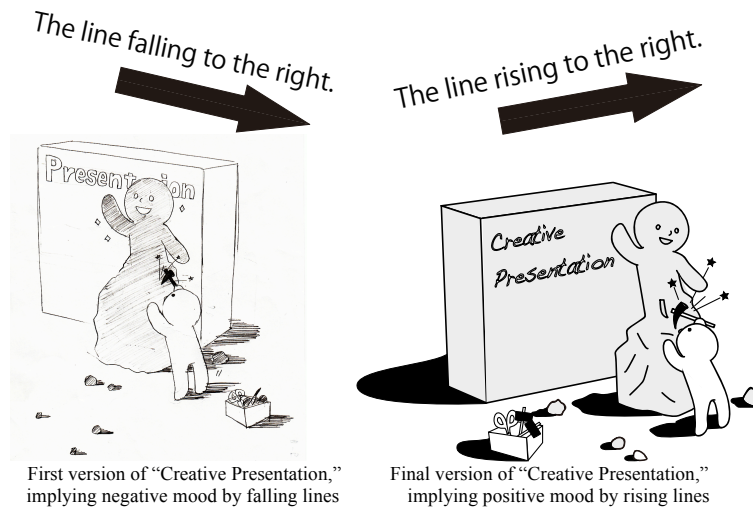
▼ Therefore

Refer to the fundamental rule of the graphical design, for example, “the line rising to the right implies positive.” Read books written about composition, balance, and relation between visual representations and impressions. And take in ideas and methods that would improve your artwork. For example, the book “Art and Visual Perception,” “Principle of Visual Perception,” or “The Hidden Order of Art” will provide you with useful information.

▼ Consequently

You can brush up your illustrations by an accurate way. And your illustrations will be able to appeal to a reader's feeling. But, if you have no book to refer or no chance to get the information about the design rules, you can't improve your artworks immediately.

For example, in the pattern “Creative Presentation” of the Presentation Patterns, we first drew the illustration shown in the left figure. Although this illustration is sufficient for expressing the meaning of the pattern, we tried to improve composition. According to the fundamental rules of the graphical design, the line rising to the right implies positive. Taking that into account, we redrew the illustration from an angle that would emphasize the rising mood, which is shown in the right figure.



Consistent Styles

You have already drawn some illustrations of the patterns.

▼ In this context

The character, the motif, or the style of the illustrations may differ from one to the next. Such situations occur when multiple people are working on the illustrations, or you are taking a long time on your illustrations.

▼ Therefore

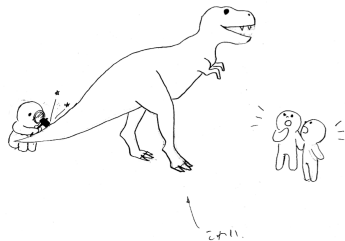
Compare each illustration of the patterns, and check whether there is consistency among them. Comparing each illustration makes the style for all illustrations. And at the same time, draw each picture according to the consistent style. In this phase, interaction and adjusting two approaches of drawing art works is important. If inconsistency exists, redraw some of the drawing so that they have the integrity.

▼ Consequently

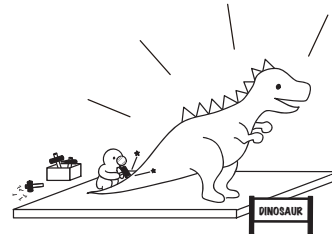
You can get consistent figures. However, checking illustrations takes time and may delay the publication of your work.

For example, in the pattern “Quality in Details” of the Presentation Patterns, at the beginning we drew the illustration of a dinosaur shown in the upper left figure. But we made the dinosaur look too realistic and intimidating, causing a shift from the impressions of the entire illustrations. At this time, the consistent style is being determined by drawing each illustration. For example, illustrations of “Reality Sharing” and “Triggering Blanks” give readers an impression of intimacy. It is because creatures in respective patterns are drawn with roundish lines. So we redrew the dinosaur with round lines to give it a more cute image, which is shown in the upper right figure.

No. 7 詳細部へのこだわり



First version of “Quality in Details,”
which is too realistic.



Final version of “Quality in Details,”
which is cute.

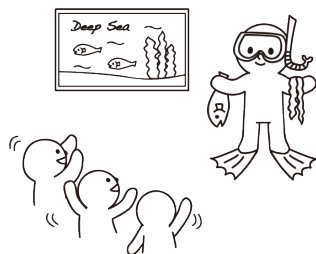


Illustration of “Reality Sharing,”
which contains fish.

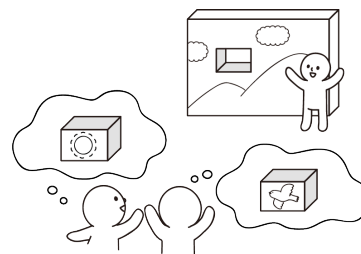


Illustration of “Triggering Blanks,”
which contains a bird.

Graphical Diversity

You have already drawn some illustrations of the patterns.

▼ In this context

Several of the patterns have similar illustrations, and it becomes difficult to tell the difference among the patterns. For instance, the expression of *thought clouds*, *comparison*, *time sequences*, or *surprised expressions of people* are frequently used. If there are multiple illustrations with similar expressions, the readers will confuse and hardly recall the meanings of the pattern exactly.

▼ Therefore

Try to make each illustration unique to differentiate between each pattern. You should check whether there are illustrations having similar representations. If there are patterns with similar drawings, think which pattern is more appropriate for the image, and try changing the other image.

▼ Consequently

You can avoid a situation where several of the patterns have similar illustrations. This makes each pattern characterize, so each pattern become more impression. However, if your pattern language were composed of many patterns, it takes a hell of a time to check patterns.

For example, in the pattern “Touching Gift” of the Presentation Patterns, at the beginning we drew an illustration representing the person thinking with a cloud balloon (the upper left figure). There is, however, an illustration of another pattern that also use the cloud balloon: the pattern “Image of Success” (the upper right figure.) We thought that this similarity would cause the reader confusion. We considered which pattern is better described with the cloud balloon, and employed the elimination method. We referred to the main message of each pattern.

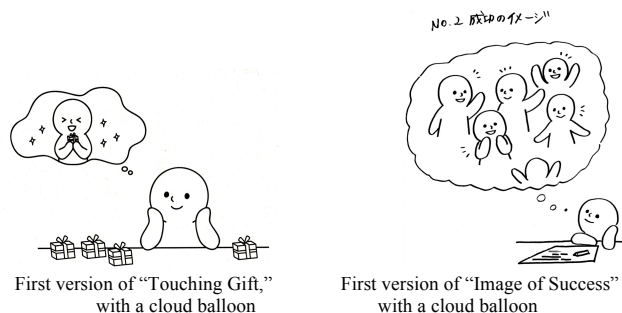
“Touching Gift”

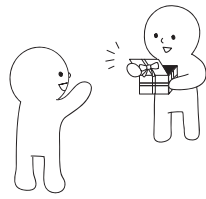
This pattern guide the reader to focus on who the audience is and think how to make them impressed by your message. As this suggests, the situation where a listener of a presentation is delighted by receiving a present (in here, the “present” is a metaphor of the “presentation.”) is needed to draw. This doesn’t always call for the representation with cloud balloon.

“Image of Success”

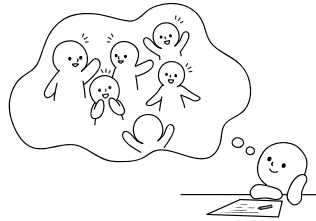
In this pattern, the key point is “‘imagining’ a success of your presentation.” In order to emphasize the presenter who is “‘imagining the success,” expression with cloud balloon is needed.

As a result, we decided that the pattern “Image of Success” (the lower right figure) gets to keep the expression, and the other must be changed. Thus, the illustration of the pattern “Touching Gift” (the lower left figure) is changed to a scene where the presenter gives a present for the audience.





Final version of "Touching Gift,"
WITHOUT a cloud balloon



Final version of "Image of Success"
with a cloud balloon

4. CONCLUSION

In this paper, we proposed a pattern language for pattern illustrating to represent patterns symbolically and share the feelings of being lively.

This pattern language is not complete yet and this work is expected to continue. As more people draw illustrations for their pattern languages, this pattern needs to evolve and more patterns must be added. At least for now, these patterns will help you draw and brush up your illustrations, and your pattern language will become more attractive and creative.

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