

AN INTRODUCTION TO
VISUAL VARIATION
FOR BETTER LEADING, LEARNING, AND LIVING

The Powerful Principle for
Clear Explanations and Creative Explorations
in Business, Society, and Life



MARTIN J. EPPLER

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Publisher: MCM Institute of the University of St. Gallen, St. Gallen, Switzerland

Blumenbergplatz 9, 9000 CH-St. Gallen Switzerland

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ISBN Nr. 978-3-9525612-0-1

E-book ISBN Nr. 978-3-9525612-1-8

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PREFACE

**“You should make things as simple as possible,
but not simpler.”**

Albert Einstein

We live in complex times, where our ability to keep up with new approaches, concepts, or discoveries is often put to the test. It's not just that life is getting more complex; we are also witnessing an accelerated growth of knowledge. Examples of this trend abound – from learning about the latest blockchain or artificial intelligence applications, understanding viruses and their mutations, or mastering the newest social media marketing tools to comprehending climate change and its mitigations.

So, what can we do to cope with this increasing need for rapid understanding?

What is a good way to clarify complex issues concisely?

How can we learn more swiftly, keep our focus, and share what we have learned with others more seamlessly?

Is there an approach that not only helps us represent current insights but even allows us to go beyond them and actually fosters creativity?

Yes, there is.

In this book, we present a time-tested approach for clarifying the complex, and this for the first time in a systematic, accessible, and entertaining manner.

We call this approach Visual Variation, a powerful principle to make the complex clear and think beyond the obvious.

The visual variation principle introduced in this book is backed by years of rigorous academic research into learning and knowledge representation. It has been tested in dozens of projects and application contexts, ranging from education and business to personal to societal issues.

It is quite probable that you have already come across several examples of visual variation in magazine articles, online blogs, textbooks, presentations, internet memes, or instructional videos, without noticing the underlying mechanism or paying attention to this powerful principle – and what it could do for you.

This concise book shows you how the visual variation mechanism works and how it can be used for more effective learning, teaching, communicating, or ideating. It does so with the help of examples ranging from business and personal to science and culture.

Our hope is that these instructive examples, together with our clear set of instructions, enable you to represent insights visually, even if you do not know how to draw or use sophisticated graphics software. We believe that visual variation will allow you to develop ideas more swiftly and more collaboratively – thanks to the useful suggestions and constraints that the principle provides. So, whenever you face a challenging problem or have to explain a complex issue in a short amount of time, don't worry – vary!

Let us know how visual variation has worked for you. Share your thoughts, prototypes, or improvements with us, and be sure to check out the additional examples and the variation vanguard at www.visualvariation.com. This website also provides an opportunity to see the visual variation approach in action and connect with like-minded others. We wish you many happy discoveries on your variation voyage.

St. Gallen, August 2022

Martin J. Eppler

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INTRODUCTION

VISUAL VARIATION FOR CLARIFICATION

In this short chapter we introduce the visual variation paradigm and its background. We show examples of how this looks in practice, as well as the key principle behind it. You will also learn for whom this approach is useful and in which situations you can use it.

“You do not understand anything, until you understand it in more than one way.”

Marvin Minsky (MIT professor, artificial intelligence pioneer, cognitive scientist)

This is a book unlike any other that you may have read before.

This book is not just read.

It's viewed, explored, pondered, inscribed, modified, and extended, rather than simply read.

It's not a book about a singular topic, tool, or domain; it's about a universal principle that you can apply to many (and we mean many!) radically different contexts. This principle is called visual variation. Visual variations are to qualitative information what bar charts are to numbers – a universal, simple and concise format to represent insights visually.

This book is about a clever way to think and communicate – through images. It's about a way to approach *complexity through simplicity*. It's a book about the value of multiple perspectives and how to build variation into your routines, whenever explaining something, solving a problem, or trying to understand a complex phenomenon. Visual variation is a way to frame an issue in multiple ways – simultaneously.

As mentioned in the preface, we see an unprecedented rate of change in business and society. We truly live in a VUCA world that is characterized by volatility (fluctuating circumstances and prices), uncertainty, complexity (i.e., many dependencies and chain reactions), and a high degree of ambiguity (i.e., multiple possible interpretations of the same situation).

To make sense of this VUCA world, we need *swift communication* formats that help us understand problems, shift perspectives, generate options, and grasp multi-faced phenomena, often across language or cultural barriers. Visual variation is that kind of a rapid and clear communication approach. It is based on the idea that you can understand anything better if you first see it in its most familiar or straightforward form – which can then be varied and made more complex.

The **paradigm** of visual variation is based on many years of research on how we learn (see the Appendix for more on this) and a corresponding theory called “**Variation Theory**.”

Variation Theory suggests that our experience of the variations of a phenomenon is the key element to building understanding. Swedish professor of education Ferenc Marton, one of the founders of Variation Theory, explains this approach below in a nutshell:

“It is the patterns of variation and invariance among examples, instances, cases, illustrations and so on, which is the aspect of teaching that Variation Theory singles out as a key to better learning.”

For Marton and Booth (the other pioneer of Variation Theory), the notion of learning is all about the awareness that what is being learned both stays the same and varies. ***We gain knowledge about the world by being aware of its variations (and invariance).*** What should be varied are the crucial aspects of a phenomenon, the differences that make a difference. Once we literally see those key differences, we are more likely to understand a topic fully. This is also what the late MIT professor and AI pioneer Marvin Minsky meant by saying that we do not understand anything until we understand it in more than one way.

The implication of this paradigm is that we make use of the natural human behavior of varying the way we experience things. We should be aware of – and profit from – the various ways to experience something. And talking about experiencing, it's one thing to write or speak about visual variation and why it is so powerful, but it's quite another to see variation at work.

So let us show you what we mean by visual variation right away.

The picture of a visual variation (as in Figure 1) can be quite simple. Our first example is a visual variation in the realm of business, economics, and sustainability.

Have you ever wondered how our economy must change to stop global warming and the overconsumption of our natural resources? The current consensus is that the only possible solution is a so-called circular economy. What is a circular economy? It's a marketplace where we do not use up natural resources and recycle a small part of them, but rather a business ecosystem where products are repaired rather than discarded, packaging is returned rather than thrown away, and base materials are reused rather than thrown away.

The visual variation below makes that idea clear at a glance. It begins with a simple linear economy on the left, where we take resources from the environment, make products out of them, use these, and then deal with the resulting waste by throwing it away. A recycling economy, depicted in the middle, works the same way, but at least recycles some of the resulting waste and makes something new out of it (think of recycling glass to make new bottles). Finally, a circular economy, shown on the right, strives to avoid any waste not just by recycling material but by returning products to their producers for repair, reassembly, or reuse. This can dramatically reduce our consumption of natural resources.

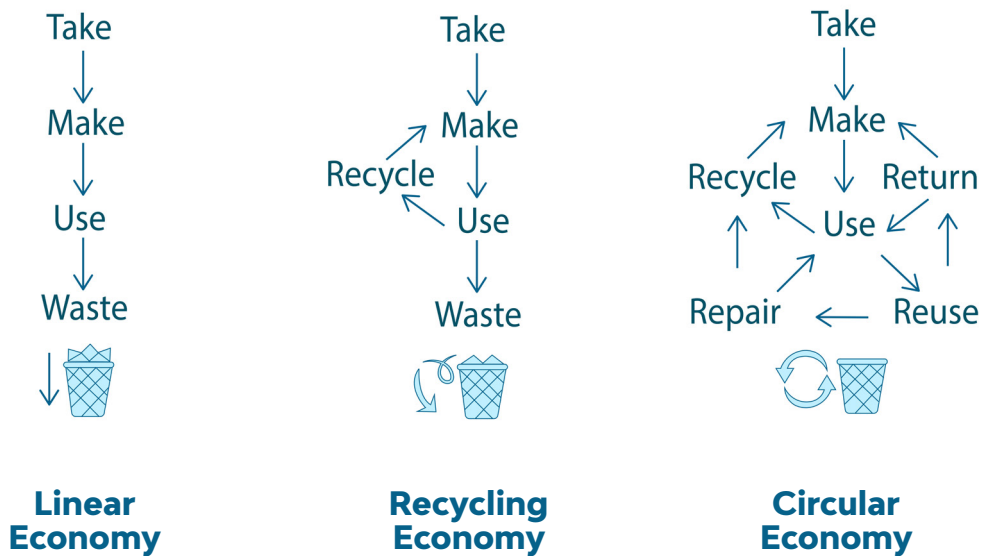


Figure 1: A starting example of visual variation: moving from a linear to a circular economy

Let's take an example that is much more immediate and personal than what will save our planet: your way of coming up with ideas. You will have heard the expression "thinking outside the box." Taking this saying as a starting point for a visual variation, we can mutate this notion and not just think outside the box but also explore the box (work with existing solutions), exploit it (work with your existing resources), shake it up (question our assumptions about the problem), reframe it (use your tools in a different way to solve it), take it to another place (to get inspiration), combine it with other boxes (learn from other contexts), think in new boxes (radically different solutions on another level), put the box (= constraint) in another box (= additional constraints), or give chance a chance by 'shuffling' it.

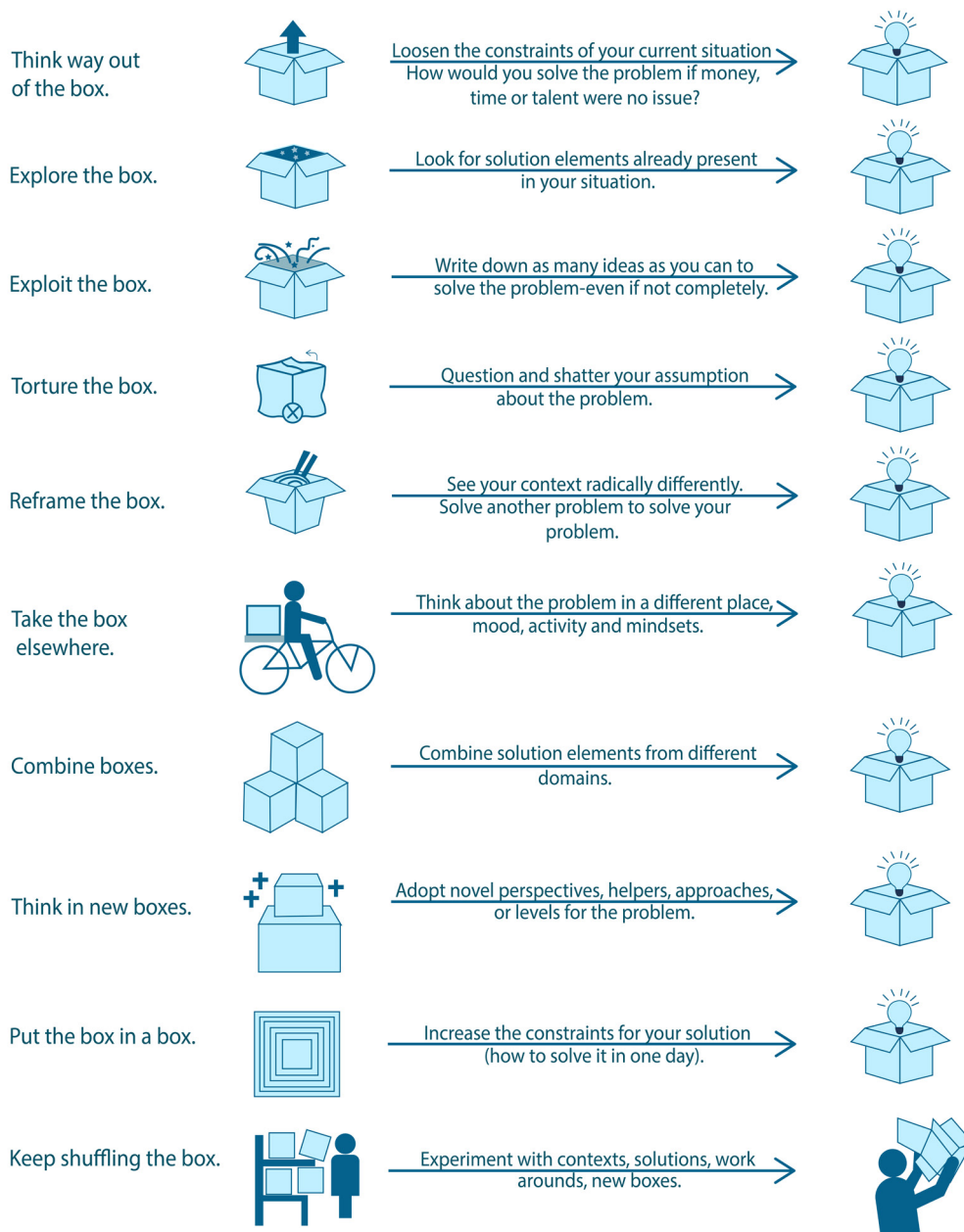


Figure 2: A visual variation for creative idea generation

→ 2.1 THE PROCESS TO CREATE A VISUAL VARIATION

Producing a visual variation is a straightforward process, albeit often an iterative one, where you refine your solution as you go along and expand your understanding of a topic. Reduced to its bare essentials, it consists of just *six steps*.

Let us present these steps with an illustrative example: understanding differences to leading a team. They are shown in the figure below (inspired by the Australian Leadership Foundation) in the form of a visual variation, more specifically as so-called configurations, where the B represents the 'boss' (team leader) and the solid dots their employees. The arrow designates the type of influence (commanding, checking, instructing, etc.), and in this way, we can easily distinguish different leadership styles. You will see the more hierarchic styles on the left and the less hierarchic ones on the right. The variations in Figure 3 need not be mutually exclusive. They can be combined or shifted according to the situation. Nonetheless, managers tend to have a dominating style among the following eight (which one is yours?).

How do you get to this simple visual variation? There are six steps (the six P's) that you can follow below. For each one, we describe its main activity, a key question that you need to ask yourself in that step, and a possible answer to that question that relates to the example given in Figure 3.

1. **PURPOSE:** First think about the **topic** you want to focus on in your visual variation.
 - Key question: What do I want to show to whom and for what purpose?
 - Example: Identifying different possible leadership approaches.
2. **PATTERN:** Second, pick one of the five **patterns** that best fits your topic and purpose. A pattern is a type of visual variation that we will explain in detail below.

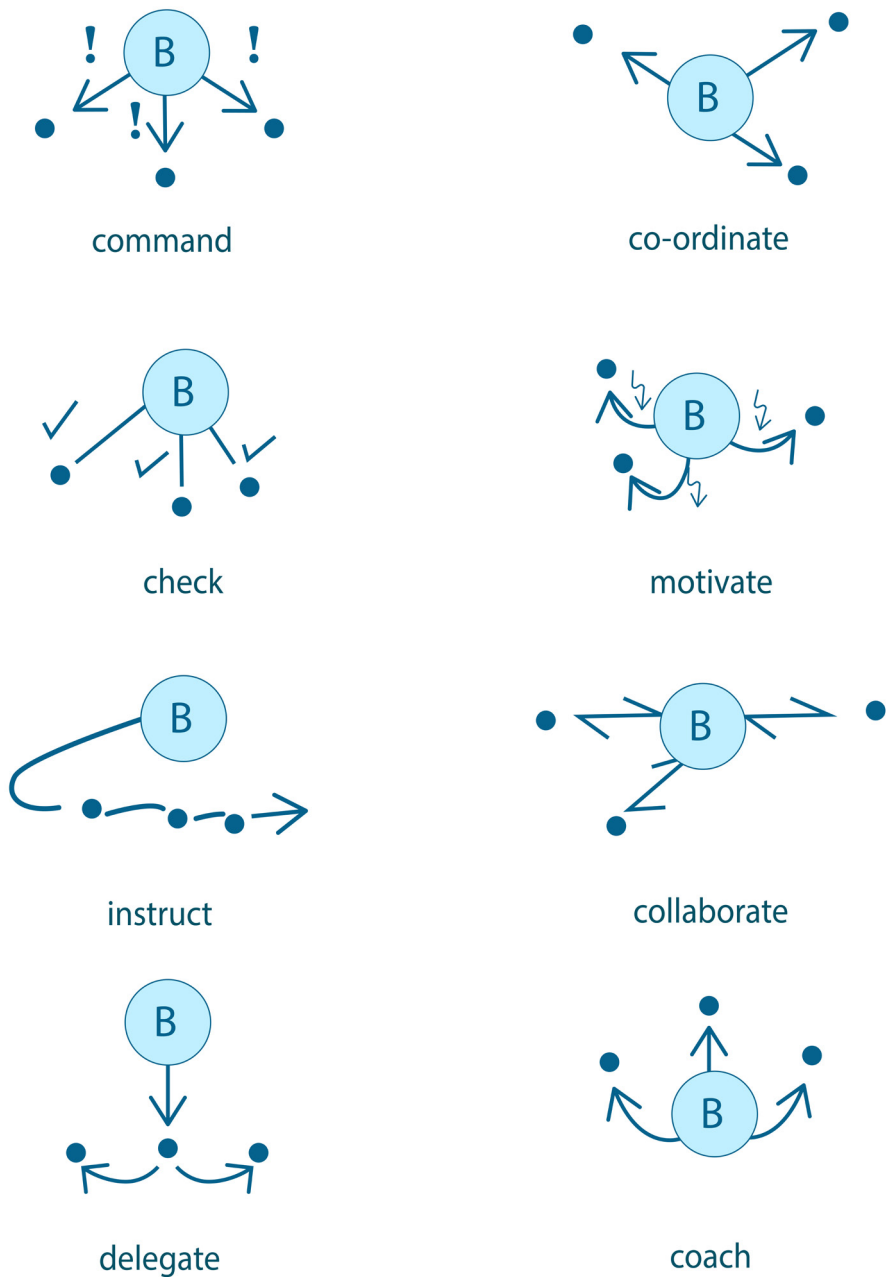


Figure 3: Leadership styles as a visual variation

- Key question: Which format can best clarify the topic?
 - Example: Configuration pattern.
3. **PARTS:** Third, identify the **elements** that you want to show or explore – and their relationships:
- Key question: What are the essential topic parts to depict?
 - Example: Boss, employees, different kinds of influence.
4. **PRESENTATION:** In this step, **arrange** the elements visually in a meaningful way using self-explanatory icons or other graphic symbols.
- Key question: How are the elements related?
 - Example: (Big and small) circles and arrows that connect horizontally or diagonally
5. **PERSPECTIVES:** Think about the **variations** of how these elements can play out in real life and add a short text explanation to each one.
- Key question: Which types or versions should I distinguish?
 - Example: Commanding top-down, collaborating laterally, instructing, etc.
6. **PROGRESSION:** Put the variations in a logical and meaningful **sequence** (usually from top to bottom)
- Key question: In what order should I show the types?
 - Example: From traditional to modern leadership styles; on the left hierarchic, on the right without hierarchy.

In Step 2 above, we mentioned that you need to pick a variation pattern that best suits your topic and your (explanatory or exploratory) purpose. There are five patterns that you can choose from at this stage. In the next section, we will describe them and give you more insights into each of them.

Our brain frequently takes mental shortcuts – so-called **cognitive biases** – leading to sub-optimal decision-making and deviations from rational choices. Therefore, it is vital to be aware of some of the most frequent and harmful biases that can affect decision-making. The visual variation below summarizes eight influential cognitive biases with the help of the scenario pattern.

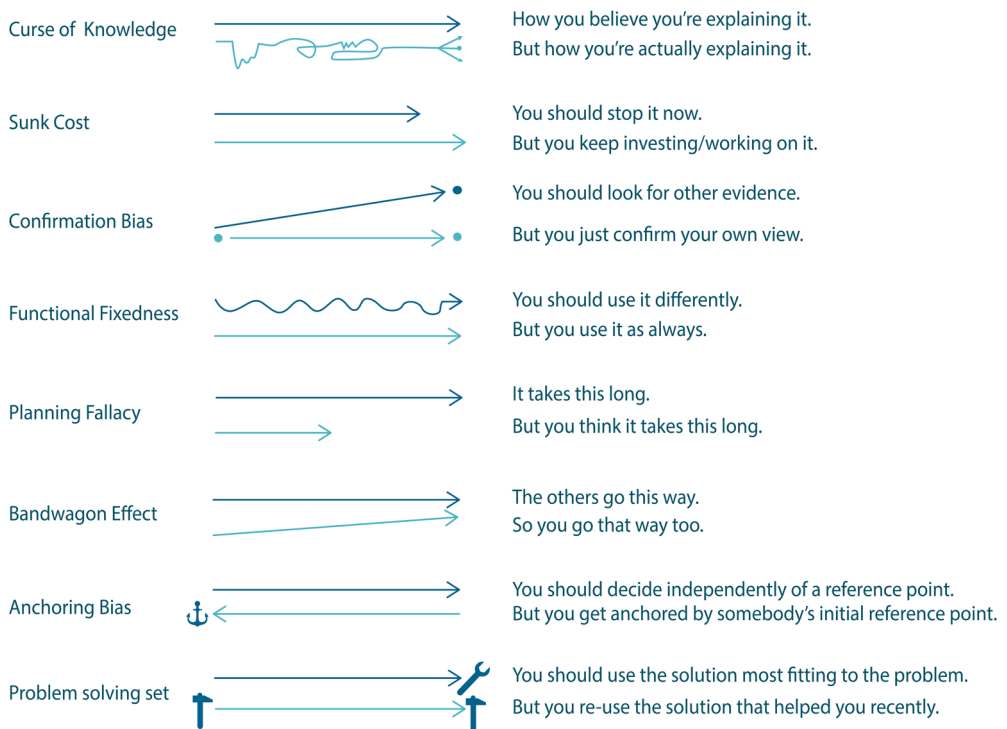


Figure 13: Important cognitive biases in management

The *sunk cost* bias happens because of our aversion to realizing losses – we keep on investing in projects or people because we have already invested too much and don't want to cut our losses. We do not want to admit that the investment will never pay off so we “throw good money after bad.” The counter-strategy to this is “when in doubt, get out.”

The *confirmation* bias reflects our tendency to seek self-confirmation. To achieve this, we give more weight to evidence confirming our established point of view, and we neglect (and even don't look for) evidence suggesting

time to take a long-term view or big picture perspective on our career. This is why it makes sense to look at a visual variation of possible career trajectories that can serve as food for thought.

A traditional **career path** may feel like climbing a single ladder step-by-step (within the same industry or organization). This, however, has become only one of many possible career paths, as more people follow their interests and may radically re-orient their careers by switching functions, industries, or even hierarchic levels. People also differ concerning their timing. While some feel driven to move upwards in their organization early on, others take more time to advance. Both approaches come with risks (such as burn-out or lock-in) and benefits (such as a rapid gain in influence or a more extensive support network). How would you draw your career path up to now? How do you think it will or should evolve? Add possible career paths that make sense to you to the visual variation below and use this variation as a coaching tool when others ask you for career advice.



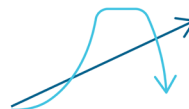
Traditional career



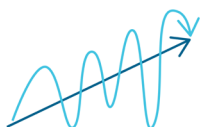
Radical re-orientation



Late bloomer



Burn out



Rollercoaster career



Returning to what you like

Figure 29: Different possible career paths

in his law of the vital few (also known as the Pareto principle). So focus on the correct 20 percent of all possible activities, and this will get you to an 80 percent result (but achieving the final 20 percent might require the other 80 percent, which is sometimes needed).

3. Steven Covey reminds us always to start a new endeavor with the final goal in mind and align everything we do to that goal. This keeps us not only focused but also motivated.

4. This is one of the core credos of positive psychology (and stoic philosophy). Do not lament or complain, but instead focus on our resources and make the best use of them.

5. This is another from Steven Covey (who claims this is one of the traits of highly effective people) – create synergies among your goals. In other words, think about how you can tweak one goal so that it helps you with another.

Here's an idea: Create a synergy between this book and your life and visualize your own life principles using visual variations.

Before closing this application chapter, think about which of the five variation patterns has resonated most with you. Then, I would encourage you to also give the others a try. The final information box below gives you some good pointers on how each can be used.



BOX: Taking the five patterns to work

An alternative logic for this chapter would have been to structure it entirely by the variation patterns and how you can make the best use of each one of them. That may be a more clear-cut distinction than the one between leading, learning, and living (which become ever more intertwined in today's world). You may also have particular preferences, such as the simple approaches pattern or the systematic configurations patterns. To allow for this or go beyond your current selections, you will find a few pattern-specific suggestions below as well as in the Appendix (in the Starter section).

Use the Approaches variation pattern whenever you...

- don't have a lot of time on your hands;

- want to keep it simple and accessible;
- want to show different ways to solve a given problem or reach an objective; or
- want to highlight what works and what doesn't.

Use the Scenarios variation pattern whenever you...

- want to explore how things might turn out;
- try to think about possible problems or roadblocks;
- want to compare an ideal future to a probable future; or
- believe it's important to break free from the status quo.

Use the Segments variation pattern whenever you...

- need a diagnostic approach to a process, event, workshop, habit, or task;
- want to compare different sequences that lead to a specific result; or
- need to reflect systematically about the sequential elements of a solution (and if they could be arranged differently or some even left out).

Use the Mutations variation pattern whenever you...

- address a larger audience that might otherwise not pay attention;
- want to foster a creative way to think about a topic;
- want to instruct as well as to entertain;
- want your audience to extend the variation themselves creatively.

Use the Configuration patterns when you...

- don't have elaborate drawing skills;
- face an analytic or academic audience;
- want to emphasize a systematic and highly deterministic/deliberate variation;
- need an exhaustive variation which considers all the possible combinations that make sense.

The paradigm of visual variation explained above is based on many years of research on how we perceive the world and learn. It builds on the work of Gibson (1986) regarding perceptual psychology (how we start to differentiate when perceiving our environment) and on the seminal work by Marton and Booth (1997) regarding learners' experiences of their domain of study.

Since the 1990s, variation theory has been successfully applied to improve learning in such diverse fields as *economics, chemistry, mathematics, biology, literature, physics, language learning, and law*. It has been applied at various educational levels, from early primary school all the way to university. It is very much a “made for real-life” theory that has been extensively tested, evaluated (and criticized), and further developed since its inception in the mid-1990s. In that vein, visualization has not always played a prominent role in variation theory. Let's examine its role a bit more closely in the next section.

Marton and Booth suggest that a person is said to have learned with respect to a phenomenon when that person is “capable of being simultaneously and focally aware of other aspects or more aspects of a phenomenon than was previously the case” (Marton & Booth, 1997, p. 142). Visual variations help to achieve a gradual expansion of understanding by noticing differences and invariances, as in the angles example above. Marton and Booth explicitly refer to this as “ways of seeing” (Marton & Booth, 1997, p. 142). Marton, Dahlgren, Svensson, and Saljo (1977) conceived of this in their early studies “as a change in the eyes through which we see the world” (p. 23). The premise of variation theory is that powerful ways of acting originate from powerful ways of seeing (Marton & Tsui, 2004, p. 7).

This idea of bringing a concept to life through visual means and emphasizing its properties goes back much further than variation theory or the phenomenographic studies of the 1970s and 1980s. For example, the 17th-century British philosopher Thomas Hobbes suggested (like several other philos-

ophers including Aristotle, Baruch de Spinoza, and Ramon Lullus) that the construction of geometric figures helps us learn more about the properties of a concept. Hobbes thus conceived of thinking as a form of *artistic production* (Berger, p. 173), generating particular concepts materially with the assistance of visual aids (ibid.). Variation theory takes this idea a step further (also based on activity theory by Lew Vygostki) by specifying how to visualize concepts so that they can increase our understanding.

Variation theory asserts that conceptual change depends on highlighting critical elements of a phenomenon by creating variation in these, while all other elements are held constant. Lo and Marton (2012) wrote: “The presence of variation creates a potentially *noticeable contrast* within or between one or more features of a phenomenon. Thus, to discern some aspect of a phenomenon, an individual must experience variation in that aspect. This experience of variation allows the learner to create meaning for the phenomenon.”

This idea of *systematic variation* combined with graphic representations (even for non-material or conceptual topics) can create synergies that allow variation to be even more impactful and immediate. At the same time, visualization as a practice becomes more focused, simple, and streamlined through the variation constraint.

Although many examples in this book are directly inspired by variation theory, it is by no means the only source for the visual variation approach. Other key principles behind visual variation that should be mentioned are as follows:

1. **Repetition** is a key principle of every learning approach based on cognitive psychology and the cornerstone of visual variations.
2. **The observation-question cycle:** First, we observe, then we try to ask why/and how. The visual variation approach feeds directly into these two steps also emphasized by Kolb’s (2014) experiential learning theory.

- 3. Scaffolding and activity theory:** When you have a support structure, you can learn on your own and use this structure to build up understanding progressively, especially when this structure lets you substitute something abstract (like learning about a concept) with a tangible task (such as drawing or extending graphic variations). This is a cornerstone of the didactic thinking of seminal psychologist Lew Vygotski, and it is also at the heart of the visual variation approach.
- 4. Cognitive load theory:** Sweller (2006) found that learning failures are often the result of excessive cognitive load on students and misdirection of attention. By first focusing on a simple graphic representation that is then (step-by-step) made more visually complex (with accompanying descriptions), attention can be better directed, and extraneous cognitive load can be kept to a minimum.
- 5. Dual coding theory/picture superiority effect:** We remember something pictorial better than just a text or something we have only heard because we save it to our memory twice – content-wise and shape-wise. This makes it easier to bring to mind later (Paivio & Csapo, 1973, Paivio, 1986).
- 6. The linguistic theory of graphic variation as social practice:** Professor Spitzmüller (2013, 2015) examined (the research-wise “neglected social practice” of) graphic variation from a linguistic point of view – not simply in illustrations, but mainly in the context of typography and layout. He suggests that graphic variation is a key cognitive mechanism for identity building and knowledge sharing. In his 2015 book, he explores the different forms of graphic variation and their functions, and he presents a typology of graphic knowledge that can be fruitfully exploited.

As the visual variation approach further matures and branches out, it might itself, in return, provide stimulation or enrichment to other theories, techniques, and approaches. Here’s to a lively theoretical and practical debate about the forms, benefits, and limitations of visual variation as a generative individual and social practice!

→ VISUAL VARIATION PROCESS CHECKLIST

1. **PURPOSE:** Think about the **topic** you want to focus on in your visual variation and for whom it should provide value.
 - Key question: What do I want to show to whom and for what purpose? To explore or explain for myself or others, for beginners or intermediates?
 - Caveat: Delineate the topic adequately (correct level of granularity)
2. **PATTERN:** Pick one of the five **patterns** that best fits your topic and purpose.
 - Key question: Which format can best clarify the topic? Approach, scenario, segment, mutation, or configuration?
 - Caveat: Don't commit too soon to a pattern; try out two or more first.
3. **PARTS:** Identify the **elements** you want to show or explore and their relationships.
 - Key question: What are the essential topic parts to depict?
 - Caveat: Make sure the parts you choose are on the same level of detail and, if possible, there are seven elements or fewer.
4. **PRESENTATION:** Now **arrange** the elements visually in a meaningful way using self-explanatory icons or other graphic symbols.
 - Key question: How are the elements related?
 - Caveat: Try to make the graphic representation as simple as possible and self-explanatory (with as little text as possible).

5. **P**ERSPECTIVES: Think about topic **variations** or different viewpoints on the topic and add a short text explanation to each.
 - Key question: Which types or versions should I distinguish?
 - Caveat: Don't overdo it; focus on the 3-10 key variations.

6. **P**ROGRESSION: Put the variations in a logical and meaningful **sequence** (usually from top to bottom)
 - Key question: In what order should I show the types?
 - Caveat: Make the logic explicit – is it from bad to good, or simple to complex, or certain to uncertain? You can do this through color-coding, symbols, or text elements.

VISUAL VARIATION

A Powerful Approach to Clarity in Business and Life

To see things clearly is an invaluable skill in today's turbulent world. This book gives you a versatile and straightforward approach to making the complex clear. 'Visual Variation' is the catalyst for clear analysis, creative ideas, and captivating communication.

With almost forty illustrations, you'll learn through fascinating examples and with the help of concise instructions, simple checklists, provocative thought starters, and instructive information boxes.

You will find snappy explanations on topics as diverse as quantum computing and career paths, lessons from the dying and blockchain, learning styles and project failures, creativity, and fake news. You will increase your understanding of these and other topics through the five visual variation patterns presented in this book:

- The elementary *approaches* pattern for visualizing different ways to reach a goal.
- The expansive *scenarios* pattern for visualizing options, risks, plans, or opportunities.
- The analytic *segments* pattern for a better understanding of processes, routines, meetings, or even your life.
- The entertaining *mutations* pattern for creating and sharing memorable insights and finding novel perspectives.
- The rigorous *configurations* patterns for devising new solutions or rethinking existing ones.

You will learn how to apply these five techniques to your own work and life so that you can be a more effective problem-solver and communicator – and you don't need any drawing skills or specialist software to do it.

The visual thinking approach presented in this book is based on variation theory and makes this paradigm actionable for anyone wanting to extend their communication and thinking toolbox. It has been tested in dozens of projects and application contexts, ranging from education to business and highly personal to societal issues.



Professor Martin J. Eppler, PhD, is the vice president of the University of St. Gallen, one of Europe's top six business schools, responsible for academic affairs and a chaired professor of communications management at the university's School of Management. He is a director of the Institute for Media and Communications Management and an advisor and trainer to organizations such as the European Central Bank, the United Nations, Swiss Re, and many others. He is the author of 24 books on visualization, creativity, and analytics and the inventor of numerous visualization techniques. He has been a guest professor at universities in the US, Canada, China, Finland, Peru, and the United Kingdom.

ISBN 978-3-9525612-0-1



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