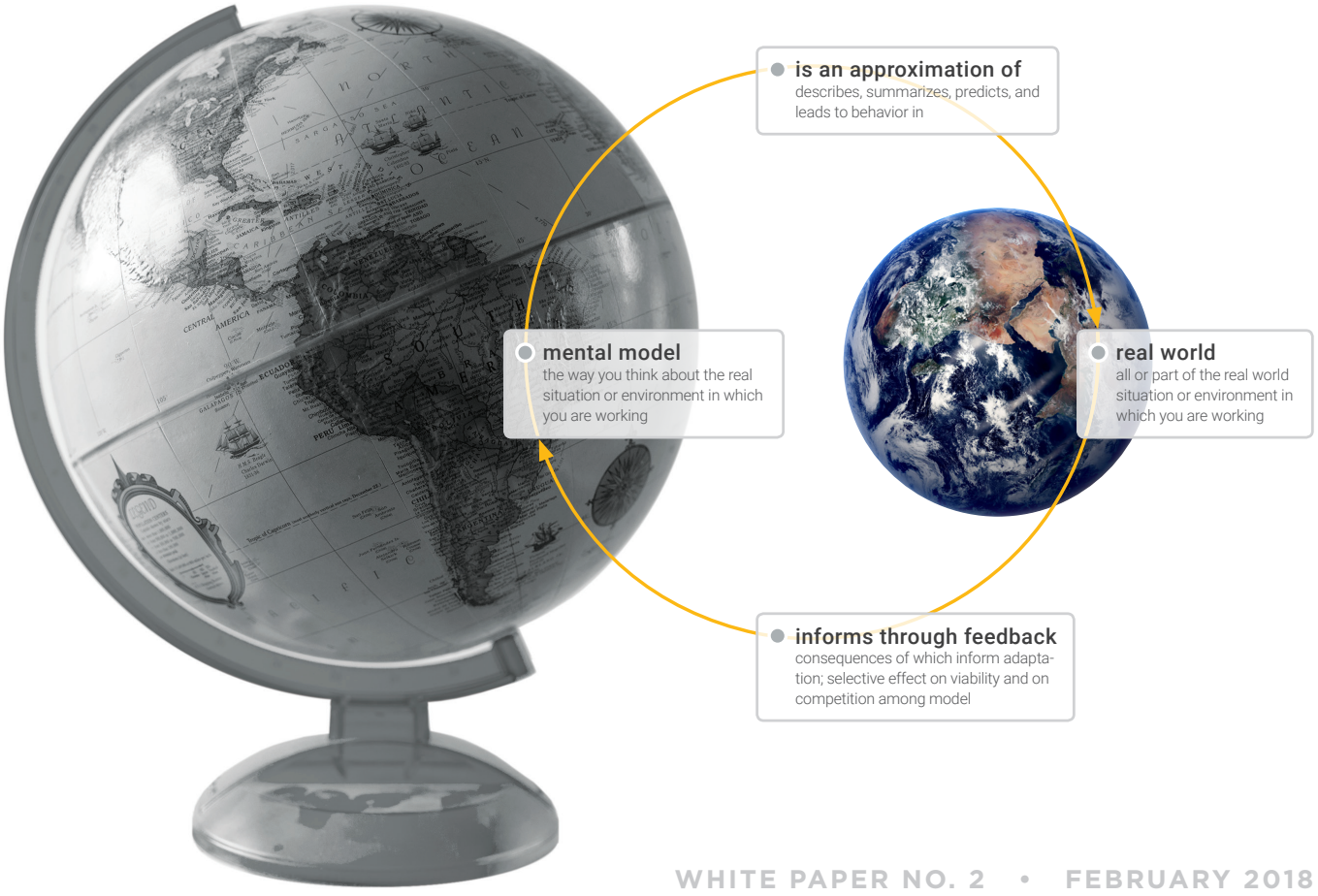
NOT ALL VISUAL MAPS ARE CREATED EQUAL

The Cognitive Style of Visual Maps



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In *Why You Should Map: The Science Behind Visual Mapping* (#1 in a 3-part series of short white papers) you learned why visual/tactile maps are so critically important to your success in any domain. But, not all visual maps are created equal. The best maps:

1. help us align our ideas with the real world and real action, and;
2. help us to avoid costly pitfalls associated with forcing real-world phenomena (square peg) into a particular cognitive style (round hole).

It is important to evaluate the cognitive style that underlies visual mapping tools and techniques before using them to have better ideas that lead to better action.

Visual Mapping Is Powerful When It Is Structured the Way Our Brains Think

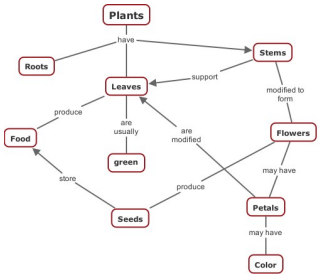
The most powerful maps are constructed based on how we structure our thoughts and ideas. Tools like ThinkBlocks[1] and Plectica mapping software are based on two important scientific findings: (1) visualization and tactile manipulation increase cognitive function and (2) the underlying architecture of these visual and tactile tools should align with our own cognitive architecture. When both of these criteria are met, using technology can enhance human intelligence.

The Cognitive Style of Modern Maps

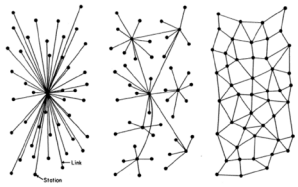
Figure 1 illustrates a few of the most popular approaches to visual mapping: a) mindmaps, b) concept maps, c) network maps, and d) dsrp network maps. Underlying each of these visual approaches is an architecture: the implicit or explicit structure of the map style. This architecture is usually (although not always) predicated on assumptions about how the human mind structures information, or inversely how human knowledge (subject matter, etc.) is structured.

Mind maps (Figure 1a) developed by inventor Tony Buzan rely on an assumption that the underlying structure of human thought is radial (emanating from a central point) and hierarchical (nested parts and wholes).[2] Concept maps (Figure 1b) developed by Joseph Novak, an education and biology scholar at Cornell University, were based on his findings that learning was more effective when students developed hierarchical (descending in generality from the top to the bottom) and relational (labeled concepts connected by a finite set of linking labels) maps.[3] Network maps (Figure 1c) are based on the work of Leonhard Euler, who in 1736 solved real world problems by abstracting their underlying structure to a simple but highly adaptable collection of nodes (things) and edges (relationships).[4] DSRP-network maps (Figure 1d) developed by cognitive scientist Derek Cabrera disrupt these approaches to visual mapping through cognitive architecture based on DSRP, the universal cognitive grammar of how we structure our thoughts and ideas.[5]

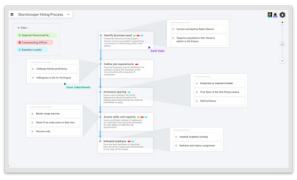
a) A Buzanian mind map based on centralized, radial part-whole architecture



b) Novakian concept map based on hierarchical, concept + linking words architecture



c) Network maps based on a node + edge architecture



d) dsrp-network maps based on recombinant distinctions, part-whole, relationships, and perspectives architecture

Figure 1: Different visual mapping techniques rely on different assumptions about the architecture of human thought or knowledge

The Cognitive Style of Human Thinking is DSRP

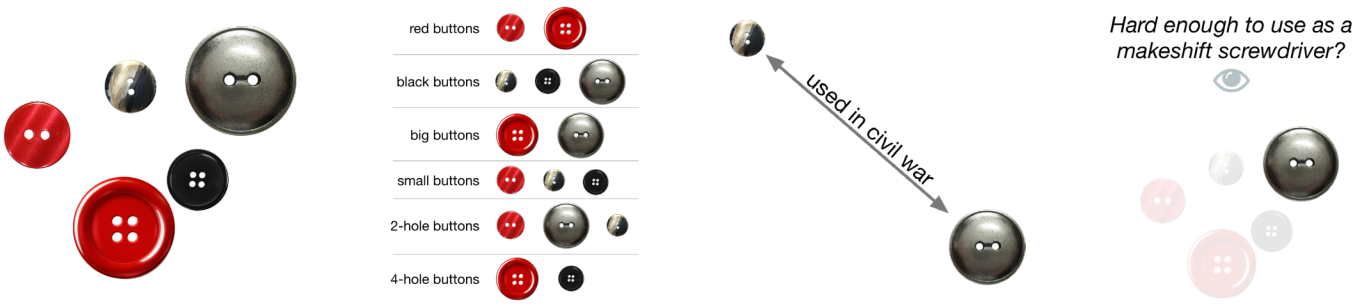
Cabrera's DSRP cognitive theory provides the four simple rules that underlie even the most complex forms of thinking or systems analysis:

1. **Distinctions Rule:** Any idea or thing can be distinguished from the other ideas or things it is with
2. **Systems Rule:** Any idea or thing can be split into parts or lumped into a whole
3. **Relationships Rule:** Any idea or thing can relate to other things or ideas
4. **Perspectives Rule:** Any thing or idea can be the point or the view of a perspective

The four rules can be combined and recombined in any order to create new knowledge. Figure 2 illustrates how the cognitive architecture of DSRP works using a simple example with buttons. Of course, buttons are metaphorical. The same four cognitive actions—combined and recombined—lead to all manner of thoughts, from eureka insights like Velcro and $E=mc^2$ to how to think through your strategy, a new product, a new hire, or any system or process.

Given a set of buttons (Figure 2a), we use our various senses as well as language and abstract thought to distinguish between one button and another. We can distinguish between buttons by labelling them "big red button" or "small red button." We can also organize or group the finite set of these buttons into numerous part-whole groupings, or systems (Figure 2b). How a person groups things matters, because it can lead to different conclusions, meanings, or interpretations. We can also identify relationships between two, distinguished buttons. For example, both buttons pictured (Figure 2c) were used in the Civil War. There could, of course, be numerous perceived or actual relationships between and among the buttons. We can also take various perspectives—not only human perspectives, but also any form of framing device—that cause us to see different distinctions, different part-whole groupings and different relationships. A simple question—"Which buttons are hard enough to use as a makeshift screwdriver?"—can be a perspectival framing device that alters the buttons that are seen or not seen (Figure 2d).

This process of making distinctions between ideas and things, organizing those distinctions into systems, identifying relationships between and among the distinctions, and applying perspectives to frame our view of the distinctions we've made—repeated in various



(a) We use our various senses as well as language and abstract thought to distinguish between one thing and another.

(b) We organize the distinctions we make into part-whole groupings.

(c) We perceive relationships between and among the distinctions we make

(d) We take various perspectives that cause us to see different distinctions, different part-whole groupings and different relationships

Figure 2: Tools should be built based on how humans think

Figure 3: DSRP-network rules are at the root of all types of thinking.

permutations—is the universal cognitive process for human thought and knowledge creation.

DSRP cognitive theory is the root of all systemic thinking, from content mastery and creative thinking to emotional intelligence and design thinking (Figure 3).

Plectica Makes It Possible to Map the Way We Think – So We Can Do

DSRP cognitive theory supports cognition that is based in our physical reality. Our brains did not evolve outside the context of reality, but inside the context of our real, physical experiences on earth. Take astronauts, for example. Much of the training that astronauts receive has the purpose of conditioning their anatomical and physiological bodies to operate outside of the effects of an earth-based reality (gravity). Reality is physical, not conceptual.

DSRP cognitive theory gives us a structure for building mental models about the world that most closely reflect our physical reality. There are real, physical distinctions, systems, relationships, and perspectives in the real world. A chair is a distinct object that is a system of parts (wood, nails, joints, glue) which are related to each other (the nails connect the legs to the seat of the chair, the glue adheres the cushion to the seat) and as a whole are perceived as a functional unit or not. Sometimes the human mind gets it wrong (people run out of a building when they perceive smoke, though in actuality there may be no fire), but this is more a problem of how we approximate reality, not reality itself.

Because DSRP is a cognitive framework that is grounded in physical reality, it bridges the conceptual world and the real-world. DSRP connects with conceptual with the physical reality. In short, if you want to create a mental model that better approximates or simulates reality, you need a

cognitive structure that is grounded to the real-world. You learned earlier that Buzan's maps are based on the assumption that all human thought is radial and hierarchical, for example. Yet, we know that while there are some radial structures in the real-world, not all natural systems are radial. We should therefore avoid shoehorning the entire world into our flawed cognitive frameworks, lest we force a square peg into a round hole. DSRP's modular, fractal, and adaptive, complex network structure mimics real-world structures and is therefore optimal for grounding our ideas.

Plectica has reified DSRP cognitive theory as an accessible online platform for developing DSRP-network maps. When the positive effects of visual and tactile mapping are combined with a cognitive architecture that is in alignment with the complexity in the real world around us, human intelligence is augmented in its attempts to solve problems and innovate. The DSRP cognitive architecture that backs the software allows users to enhance the awareness of their thinking (what scientists call "metacognition") and, subsequently, their intelligence and effectiveness. A wealth of research shows that when individuals are made aware of the way they think, it improves "achievement in all domains."[6] When you take the time to map your thinking, you more deeply understand your thinking.[7] And because actionable ideas must be grounded in reality and directly linked to our understanding of the system in which we're acting, once we have a better understanding of a system through mapping, we are in a better position to put those ideas into action.[8,9]

Conclusion

The cognitive architecture that underlies the mapping techniques and tools you use is important. Not all visual mapping methods are made equal—some are more in alignment with real world complexities and the way your brain thinks. The DSRP cognitive architecture of Plectica provides the most adaptive and complexity-friendly cognitive style for visual mapping. In the next whitepaper in this series (3 of 3) we'll explore how visually mapping with Plectica increases the effectiveness of individuals and teams.

End Notes

[1] ThinkBlocks are 3D dry erasable, nested, relational, and perspectival blocks that allow people to move ideas around with their hands.

[2] Buzan, T. (1993). *The Mindmap Book: Radiant Thinking, The Major Evolution in Human Thought.* London: BBC Books.

[3] Novak, J. D., & Cañas, A. J. (2008). *The Theory Underlying Concept Maps and How to Construct and Use Them.* Pensacola, FL.

[4] Euler, Leonhard. "From the Problem of the Seven Bridges of Königsberg." *In Classics of Mathematics*, Ronald Calinger, ed. Englewood Cliffs, NJ: Prentice Hall, 1995.

[5] Cabrera, D. & Cabrera, L. (2015) *Systems Thinking Made Simple: New Hope for Solving Wicked Problems in a Complex World.* Odyssean Press. Ithaca, NY.

[6] Fleming, S. M. (2014). Metacognition Is the Forgotten Secret to Success Insight into our own thoughts, or metacognition, is key to high achievement in all domains. *Scientific American Mind.*

[7] Tolman, E.C. (1948). Cognitive maps in rats and men. *Psychological Review, 55*: 189-208.

[8] Varela, F.J., Rosch, E., Thompson, E. T*he Embodied Mind: Cognitive science and human.* (1992). MIT Press. ISBN 978-0262261234.

[9] Evan Thompson (2010). "Chapter 1: The enactive approach". *Mind in life: Biology, phenomenology, and the sciences of mind.* Harvard University Press. ISBN 978-0674057517.

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