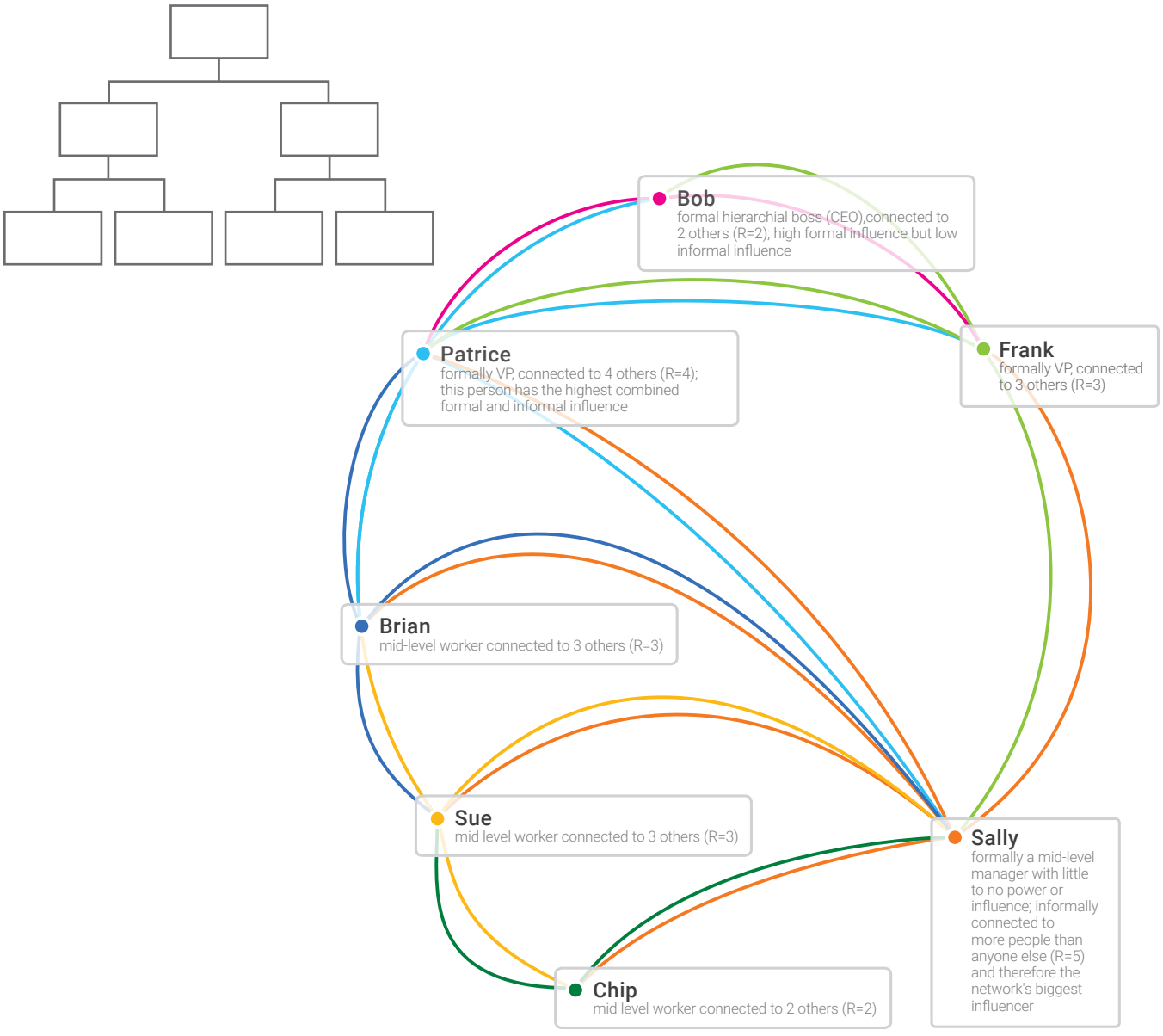
WHY YOU SHOULD MAP

The Science Behind Visual Mapping



WHITE PAPER NO. 1 • FEBRUARY 2018

WHAT IS VISUAL MAPPING?

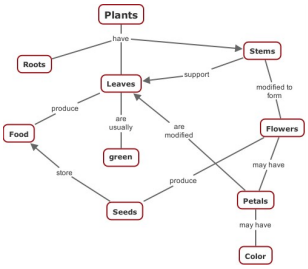
Visualizing ideas dates back to before antiquity to prehistoric times but we are learning more today about the power of visualization, imagistic thinking, and using object-oriented visual grammars to understand, innovate, take action, and push us toward better ideas. You may hear people claim, they're "not visual," but the truth is that our brains have more neurons linking to our visual cortex than to any other part of our body. We are all visual thinkers and learners. But what does it mean to visually map our thinking? There are three important aspects of visual mapping that make it a powerful tool.

1. **Visual Mapping is About Seeing:** Visual mapping turns ideas or things into visual representations you can see using shapes, lines and layout (icons, images, forms). This allows us to see things in new ways.
2. **Visual Mapping is Tactile:** When we visually map our thinking the ability to move the shapes that represent ideas from one place to another makes these maps both tactile and dynamic.
3. **Visual Mapping is Object-oriented:** Visual mapping reifies (physicalizes) ideas as objects (shapes, icons, images, labels, etc.). It gets ideas "out of our heads" making it easier for you and others to manipulate them or break them down.

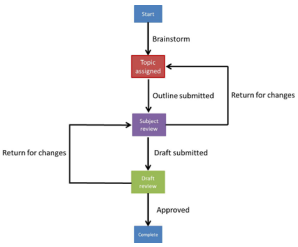
Figure 1. Humans are visual learners

a) A news map showing the possible links between Trump and Russia

b) A mind map showing parts of risk management



c) A Novakian map showing a concept



d) A workflow map showing steps in a process

Figure 2: Examples of visual mapping

There are countless uses for visual mapping, a few of which are shown in Figure 2. Note that these mapping techniques offer various visual styles because their underlying frameworks are based on different cognitive structures. Researchers and cognitive scientists who study visual mapping examine how these underlying assumptions about the visual grammar are more or less effective.

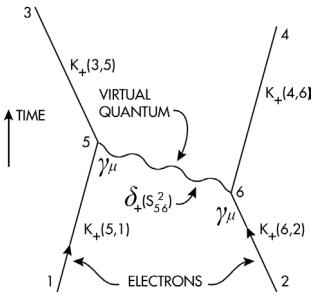
Research Shows Numerous Benefits to Visual Mapping

Using visual maps to elucidate concepts, ideas, workflows, problems, and challenges supports:

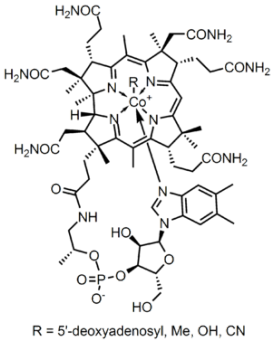
- Comprehension: understand and contextualize concepts to clarify meaning at macro and micro levels;[1]
- Communication: clearly and succinctly explain ideas to make tacit knowledge useful to others;[2]
- Assessment: evaluate comprehension and the degree to which you share the same mental model;[3,4]
- Collaboration: synthesize multiple viewpoints to get on the same page;[5] and

- Knowledge integration: converge expertise and experiences to promote innovation and avoid silos.[6,7]

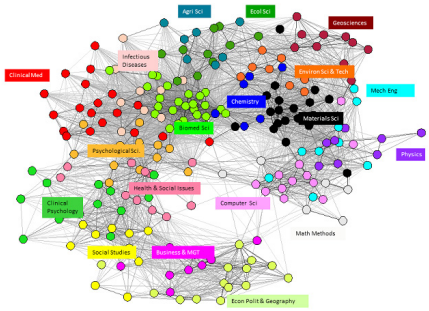
Visual maps help us to push the boundaries of knowledge. The ability to visualize, imagine, create, and improve upon ideas through mapping has led to great advancements in numerous domains. For example, Feynman diagrams (Figure 3a) revolutionized the field of physics.[8] In chemistry, the acceptance and use of a visual grammar of chemical structures (Figure 3b) was a turning point and defining development.[9] Knowledge maps (Figure 3c) have been instrumental in explaining the associations between disciplines, giving way to integrated knowledge.



a) Feynman diagrams describing the behavior of subatomic particles



b) Structural formula diagrams show how atoms are arranged in molecules



c) Knowledge maps show the connections among disciplines of science

Figure 3: Visualization has been an influential driver of scientific knowledge

The impact of mapping goes beyond the sciences. Since the 1920s, business process mapping (e.g., workflow and value stream maps) has served as a way for project managers and

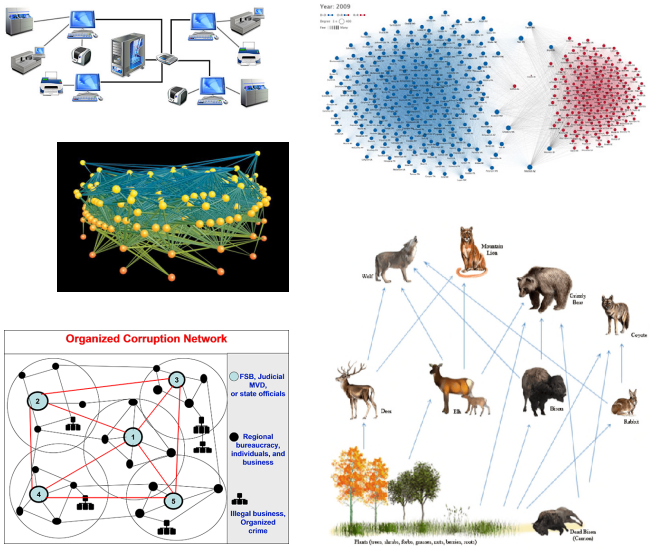


Figure 4: Visual maps can represent a wide array of networks

other staff to increase the efficiency and efficacy of work.[10] And similarly, data flow diagrams popularized in the late 1970s in software engineering visually explicate complex engineering systems.[11] Visual maps not only help us to push our own ideas to make them better, they also push whole scientific disciplines and knowledge itself forward. With the advent of network (graph) theory, the visualization of networks has become ubiquitous. In many ways, network visualizations have become a common visual language used not only by physical, natural, and social scientists but also by business leaders, policy experts, and law enforcement. Visual maps, like those shown in Figure 4, can help to make sense of these complex, interacting networks (or systems).

Visual Mapping Works Because it Aligns with How Our Brains Are Wired

The simple answer to why you should map is that visual mapping aligns with how our brains are wired. There are more neurons linking your brain to your eyes[12] and hands[13] than to any other body parts.[14] This means that our brains receive sensory information primarily from these areas of our bodies. Cortex Man ("cortical

homunculus"), a scientific model of the body that depicts the proportion of neurons allocated to various body parts, illustrates the importance of visualization (seeing with the eyes) and tactile manipulation (grasping with the hands).[15]

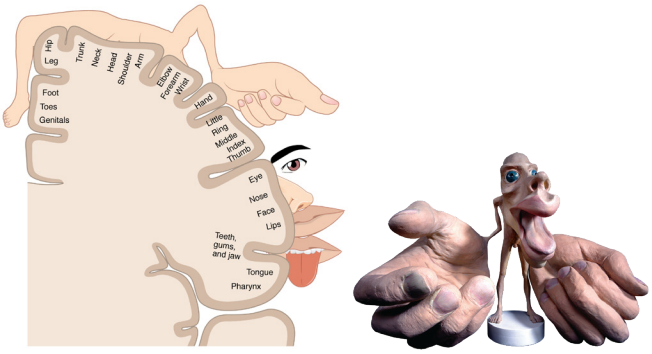


Figure 5: Cortex Man or "cortical homunculus" shows us the way our brain and body are hardwired to create an embodied mind

The tools and resources you integrate into your everyday life should be built on how you process and learn information (think). Visual maps and tactile tools are based on the science of how we think in large part with our eyes and hands. The object-orientation of visual mapping means that your ideas take physical shape; you can move them around on the canvas, substantially change them, and act upon them.[16] Using digital technologies to visually map can provide further tactile and haptic feedback from those interactions.

Your brain – as well as the brains of your employees, children, friends and family – is hardwired to your body in ways that make visual/tactile mapping an essential tool for understanding, ideation, imagination, and innovation. This is seen clearly in the influence of maps in science in general,[17] in specific fields like physics,[18,19] and chemistry,[20] as well as in applied fields such as business,[21,22] and engineering.[23]

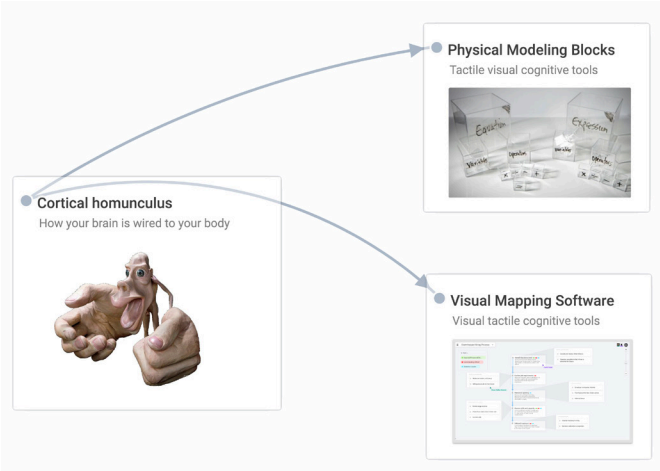


Figure 6: Tools should be built based on how human minds are wired

Conclusion

Our human proclivity toward visual, tactile, and object-oriented thought drives an intuitive desire for mapping. From theory to practical application, research has demonstrated the power which visual mapping can have in shaping how we think about and understand complex systems. Just like you can think about anything, you can map anything: a workflow, a strategy, a new project, a customer perspective, etc. Simply put, using maps to visualize ideas makes those ideas real. If you're not visually mapping your ideas to make them better and more accessible to others, then you, and they, are not getting the most out of your efforts.

How you visually map matters – not all visual maps are created equal. In the next brief we'll uncover how the cognitive architecture underlying visual mapping techniques and tools is crucial to transforming your ideas into action.

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To cite this work: Cabrera, D., Cabrera, L., Sokolow, J., & Mearis, D. (2018). Why you should map: the science behind visual mapping. Plectica Publishing. New York.

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