Choosing and using Mind Maps and Concept Maps

A short conversion course for Mind Mappers

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Concept Mapping and **Mind Mapping** often get mistaken for each other. Some of the Mind Mapping software vendors advertise their tools as Concept Mapping tools, as though Concept Maps were the same thing as Mind Maps. But Mind Maps and Concept Maps have different designs, different purposes and distinct strengths and weaknesses. If you have been using Mind Mapping for a while, and have never really considered Concept Mapping as an alternative in some situations, you are missing out on a very effective technique. This short paper summarises the key differences and best applications, to help you choose and use each type.

Concept Maps are designed for conveying *knowledge*, while Mind Maps are better at capturing *information.* Although neither is constrained to a specific area, you will get further (and faster) by choosing the technique that most meaningfully visualises the issue you are capturing. Mind Mapping or Concept Mapping tools can then make a significant contribution to the process of developing ideas and knowledge, rather than just being the nearest available vehicle for it.

Mind Maps visualise information in a personal way

Although many readers will be familiar with Mind Maps, their working definition is undergoing continuous dilution and expansion as more and more products join the market.

The lowest common denominator of Mind Maps is a tree-shaped diagram, representing a *hierarchy* of information. Ideas or information nearer the centre of the map are more important and provide the basic ordering for the map. Ideas and information further away from the centre are usually regarded as the less important detail.
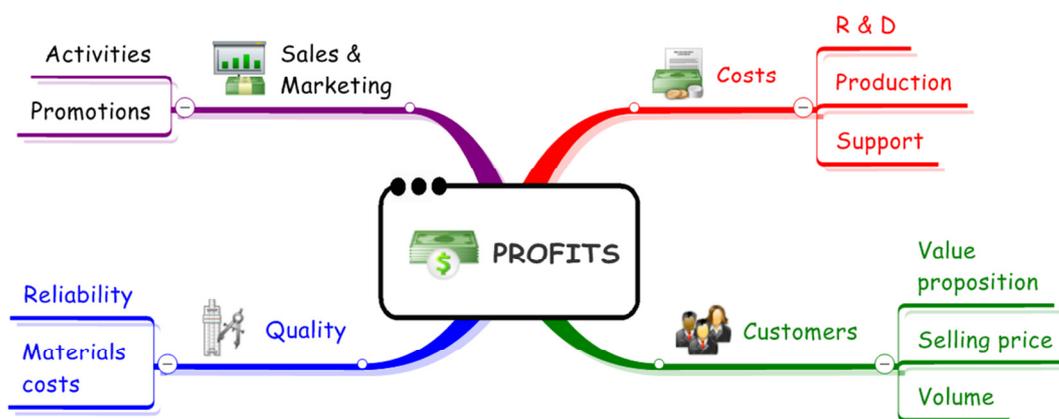
Figure 1: A typical software Mind Map

The example above exhibits many of the characteristics of a Mind Map, although it was drawn with software rather than pen and paper. Colours and graphics bring it to life, and the subject is pretty clear, although the intended purpose of the map is not. The subtopics are certainly related to their parents, but not necessarily exclusively, and the exact nature of their connection is left to the reader to decide. The map is a tree-shaped list of topics around the subject of "Profits", perhaps as an agenda for or as a reminder of a discussion. I am sure you have seen these characteristics in many Mind Maps before.

Mind Mapping developed as a *personal* note-taking and memorisation technique. It is very effective as a study and learning technique, as the rich texture of personalised Mind Maps help greatly with recall.

Tony Buzan is well known for establishing the "Mind Mapping Laws", which include the use of images, colour, curved lines, capital letters and the infamous **One Word per Branch**. This rule in particular is widely misunderstood and often flouted. All today's Mind Mapping software packages allow you to put a phrase on a branch to make things clearer and more specific, something that many business users find advantageous. But this "rule" reflects a critical element of the design thinking - that Mind Maps should help you *to associate and expand* on ideas, not constrain or categorise them. By breaking down propositions into components, and branching out new ideas from these elements, your map can diverge into a rich set of patterns and related ideas that help to trigger insights and creativity.

Consider the following scenario in a Mind Map. First, like many users of Mind Mapping software, you write a self-contained statement rather than a single word on a branch, because it makes a clearer point.

Figure 2: A closed statement on a branch

Then, feeling a bit guilty about this, you decide to split it up, to disrupt the closed and rather definitive nature of this statement.

Figure 3: One Word per Branch (almost)

Aha! This is getting somewhere. Now we can think about what *else* customers might want.

Figure 4: Branching out more and more ideas

The map could grow big and fast around this subject. Where does "good value" come from? Lower costs? Better quality? Higher specifications?
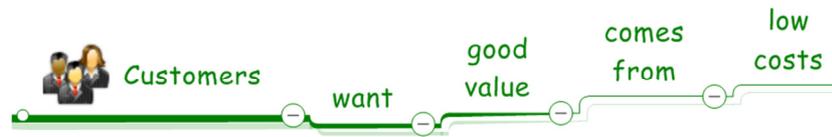
Figure 5: Digression takes hold...

As we develop the Mind Map further, it is easy to digress from the top-level context of "Customers", and embed ideas that are relevant in *many other* contexts, not only to Customers. At some point in the future, you may forget that useful detail about part tolerances (for example) can be found by navigating through the "Customers" section in your map.

Further, we now find that we are writing propositions in reverse, because we cannot add another parent to the "good value" topic. Instead of writing "Low costs lead to good value", we have to write the converse, "Good value comes from low costs."

One Word per Branch is an important factor in discovery and divergence, but it can also be a spanner in the gear wheels of organised context. Self-contained statements or concepts are better suited to arrangement in a well-structured and easily-navigated tree, especially when connections are not explicit. One Word per Branch takes us nearer to Concept Mapping and multiple definitions of concepts, but can easily create trees that are no longer hierarchies of context - and hierarchy & patterning are pretty important when it comes to managing information in trees.

This aspect of Mind Mapping is often marginalised, as business users increasingly use Mind Mapping software for visualising and organising hierarchies of detailed information, or even just for making lists. List-making is one of the core uses for Mind Mapping software today.

Concept Maps visualise and communicate knowledge

Concept Maps were devised by Joseph D. Novak at Cornell University in the 1970s. From the outset, Concept Maps were designed to communicate. A student's Concept Map can be systematically *evaluated* by their teacher, to assess their grasp of a subject. The scope of their maps and their level of understanding of the *relationships* between ideas are a reliable indicator of their "knowledge" - what they have learned and integrated, not just learned by rote. It is one thing to know facts, but relating them to each other and understanding their influence on each other takes us from information towards knowledge. Facts alone do not help us to predict behaviour, whereas knowledge represented by models does.

Concept Maps are not the same as block diagrams or flow charts, because in a Concept Map, concepts are always connected together through *linking texts.* There are no unexplained connections in a Concept Map. This is more rigorous than Mind Maps, because *propositions* are clearly visualised. A proposition is a pair of concepts, connected in a given direction by "linking text" which explains how they are related. A concept may be connected to many others in the same map, helping to define its scope and clarify its meaning.
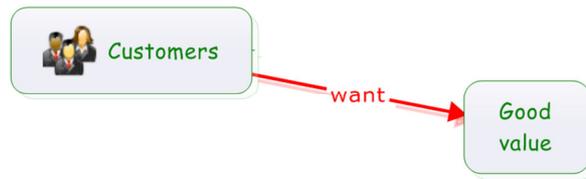
Figure 6: A proposition in a Concept Map: "Customers want good value"

Hierarchy has much less influence in Concept Maps. By convention, top-level ideas are drawn at the top of the map, but in practice there is not a strict ranking of concepts further down. It is more likely that related concepts will end up near to each other in a Concept Map, rather than trying to fit into hierarchies where they may belong in several contexts. There are advantages in making a Concept Map more compact by restructuring and untangling crossed connections. Sticking to a rigid hierarchy with cross-connections can result in maps that are bigger than they need to be, which makes them less usable.

Returning to our Mind Map where we began to draw out the factors relating customer preferences to profitability, we can now draw this as a set of propositions in a Concept Map instead:
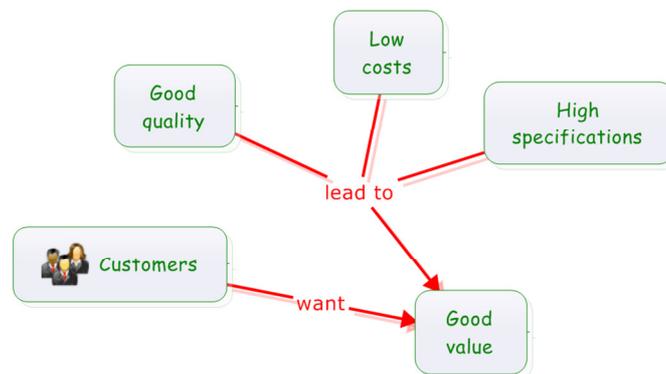
Figure 7: Four propositions in a Concept Map

This fragment of a Concept Map makes four distinct statements, but *without those statements being closed units.*

- Customers want good value
- Good quality leads to good value
- Low costs lead to good value
- High specifications lead to good value

This is visually more concise than writing each of these statements as a branch in a Mind Map, and less hierarchical than mapping these items in a single tree where each node has only one parent. The possibility of making other connections to either the concepts or to the text linking them is always open in a Concept Map, even though it makes definitive statements. Concept Maps are "read" by reading each proposition. You usually read the same concept or linking text several times, as each can appear in more than one proposition, strengthening the definitions of concepts.

Concept Maps visualise a *system* of interrelated and interacting ideas. The depth and sophistication of this model reflects the author's knowledge, which is why Concept Maps were developed as evaluation tool in educational settings. But as a consequence, it also means that they are adept at visually communicating concise knowledge in non-academic environments.

Mind Maps and Concept Maps have complementary strengths

Because of the different origins and purpose of each, Mind Maps and Concept Maps have complementary strengths.

- Mind Maps can grow much larger than Concept Maps. Networks get exponentially more awkward to use as they scale up, whereas trees scale up well, because they *encapsulate* information. Mind Maps can handle large volumes of information effortlessly.

- Mind Maps are much better at visually and mentally dividing things up into different contexts and areas of focus. A Concept Map is more usually considered as a whole, which is another reason that Concept Maps tend to remain smaller. Folding hierarchies to hide detail is easy, but the same thing is more difficult with networks or block diagrams.

- Mind Maps are quicker to create than Concept Maps. Drawing networks in software usually means spending a chunk of your time on cosmetic or topological improvements - trying to reduce the number of crossovers by untangling the network, and making it "look nice". This is not needed in Mind Mapping software, as it is much easier for software to automatically space out non-overlapping trees.

- Mind Maps are better at visualising patterns. Our in-built instinct to complete patterns or notice discontinuities is well exploited by Mind Mapping. Patterns are harder to see in Concept Maps, although sometimes symmetry can emerge from a fog of ideas that helps to validate the underlying structure.

- Concept Maps are designed to be clearly read one proposition at a time, whereas many Mind Maps can only be skimmed to give a flavour of the subject, or even just visually appreciated as a work of art.

- Much of the knowledge and insight behind a Mind Map often remains in the author's head(s) and rarely makes a total transfer to the screen or paper. Mind Maps work well as a reminder for those "in the know". The majority of Mind Maps have short lifetimes and can be difficult to return to after a period of time away. Concept Maps are self-contained and self-explanatory, so are better suited to sharing real knowledge with non-authors, without a limited shelf life.

- The connections between concepts in a Concept Map are always explicit. The connections between ideas in a Mind Map are rarely explicit, unless One Word per Branch has been applied to break down propositions. Connections in a Mind Map are frequently implicit, and must be deduced (or sometimes guessed at) from the surrounding context and the purpose of the map, if that is known.

- Many Mind Mapping software tools allow you to draw cross-connections in a tree, but in practice these can obscure rather than inform if the ratio of cross-connections to hierarchical connections gets as high as 1 in 10. This is because the hierarchy dominates the topology, and cannot easily be restructured to minimise crossovers. This limitation does not apply to a network diagram, although there are much lower limits on the practical size of networks.

- Because they are networks, Concept Maps visualise *systems*, something that is hard to do in tree diagrams. Not many processes or interdependent systems are strictly hierarchical, so visualising them in trees is less than satisfactory, although many users try.

Choosing between Concept Maps and Mind Maps

Mind Maps are a good choice for:

- Creating a personal crib sheet for revising and memorising
- Taking notes for re-writing later
- Being creative
- Capturing everything you know about a subject - usually, much more than you first thought
- Capturing open-ended subjects that are likely to grow to hundreds of branches with increasingly detailed content
- Finding and exploiting repeated patterns
- Making lists and breaking things down into fairly independent groups or contexts
- Summarising - reducing something to a few key points
- Designing and drafting materials that will be converted to a linear format, such as a word processor document

Mind Maps are a less good choice for:

- Describing systems that depend on interaction
- Describing processes and sequences
- Visualising subjects which have multiple valid & useful ways to organise them (i.e. items properly belong on more than one list at a time)
- Being explicit about relationships between items
- Sharing knowledge with people who did not help to build the map

Network diagrams (including Concept Maps) are a good choice for:

- Visualising and explaining systems that are best understood as a whole
- Showing how a situation is a balance of influencing factors
- Visualising processes and sequences
- Showing relationships between concepts that are not naturally hierarchical
- Describing closed or small subjects (dozens of nodes rather than hundreds of nodes)

Network diagrams and Concept Maps are a less good choice for:

- Capturing ideas quickly, on the fly
- Drafting materials that need to be converted to a linear format
- Visualising larger subjects that will need more than a few dozen nodes

Mind Maps are easier to start than Concept Maps, but are harder to bring up to a satisfactory level if the underlying subject is not well suited to a hierarchy. Concept Maps take more effort to create, but the results can be more valuable and have a longer lifetime. You might find that it works well to start by Mind Mapping the elements of a network, and then migrate it to a network diagram when you have all the concepts, relationships and influences to hand.

Drawing Concept Maps and other network diagrams

There are many dozens of Mind Mapping software products on the market today, and a smaller number of dedicated Concept Mapping tools.

The fragments of Mind Maps and Concept Maps in this article were all drawn with Mindjet® 11 for Windows. The Concept Map elements were drawn with **Network Builder™**, an extension for Mindjet® 11 for Windows, MindManager® 2012 and MindManager® 9 that creates network diagrams, Concept Maps, flow charts and more inside Mindjet / MindManager maps. This means that you can have a diagram that is a Mind Map, a Concept Map, or a mixture of both on the same canvas - or even multiple network diagrams in the canvas, and a choice of visualisation options within the same tool.

Armed with your knowledge of Concept Maps, you can now read the diagram below, which tells you more about Network Builder.
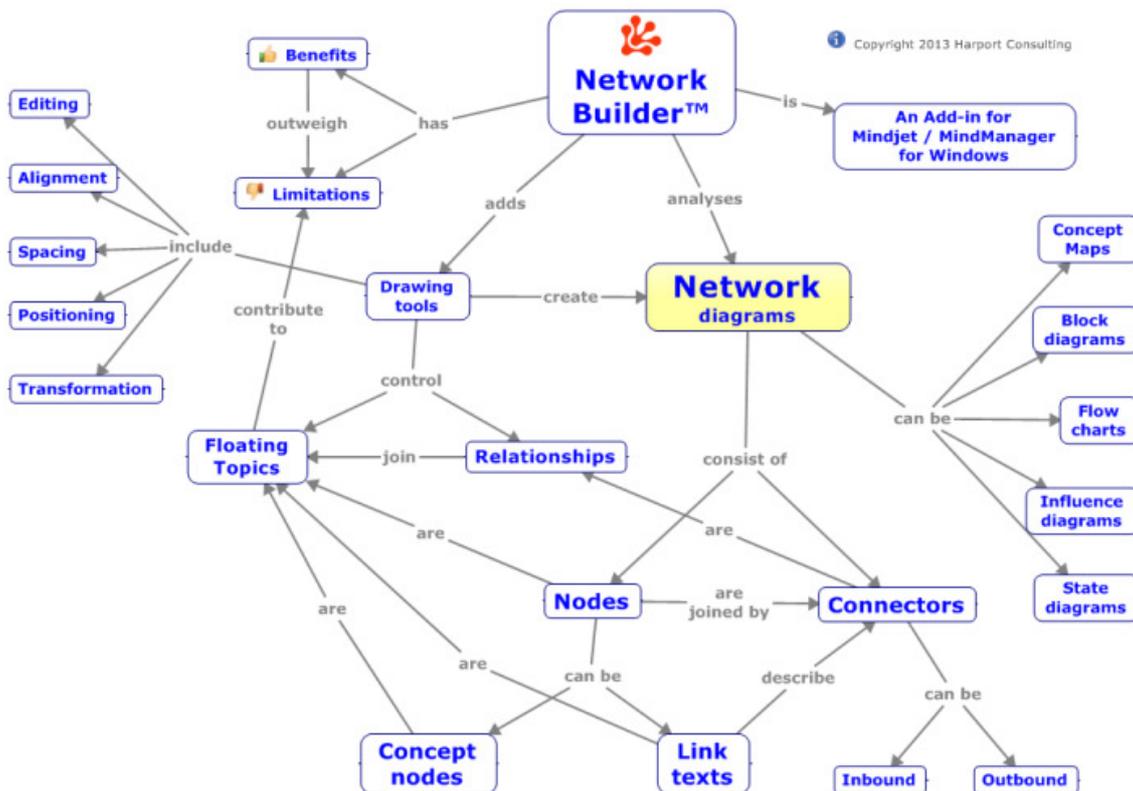
For more information and to see further examples of Concept Maps and other network diagrams, please visit:

http://www.olympic-limited.co.uk/product/network-builder/