HOW TO THINK LIKE A KNOWLEDGE WORKER
A guide to the mindset needed
to perform competent
knowledge work.

William P. Sheridan

Thinking involves the separation of relevant information from irrelevant information. Knowledge consists of concepts that are available to process information and guide action. So, thinking requires knowledge. The Human Knowledge MindMap presented herein will give you that knowledge – the thinking is up to you!

Frontpiece: The Firebird - Russian Iconographic Art

"Firebird symbolizes the marriage of human wisdom and divine power."
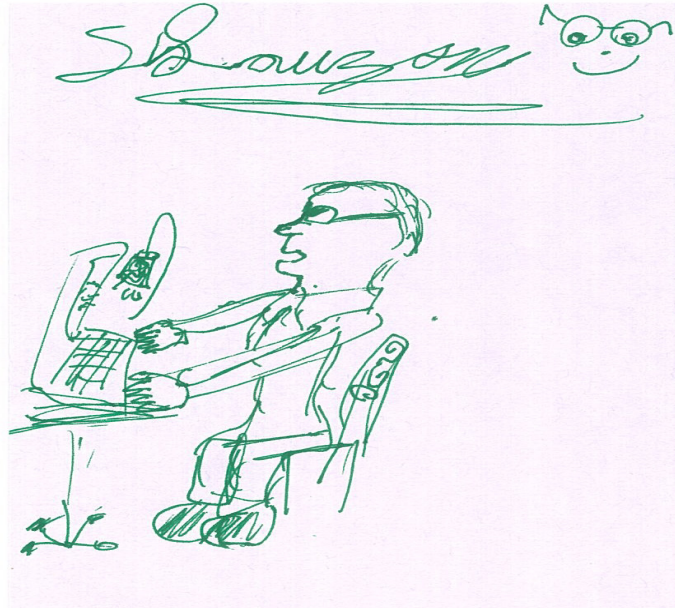   -Mike Leslie, THE MAGICAL PERSONALITY

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competent knowledge work**

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the author at work

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First edition 2008

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ISBN: 978-0-9810814-0-3

Preface

The Human Knowledge MindMap, the core construct of this book, was developed over a 35-year period. It was begun while I was an undergraduate in the interdisciplinary program Technology/Society/Environment (TSE) at Carleton University in the early 1970s. It has been ruminating in the back of my mind ever since I read Clarence Irving Lewis' book MIND AND THE WORLD ORDER.

By that time (the early 1970s), the transition to a Knowledge Society was well underway, although the naming of that phenomenon had to await the coming of the personal computer and the Internet. Based on what we now know, it is obvious (to me at least) that the systematic application of knowledge to standardize social processes began during the First World War, to facilitate component compatibility and supply logistics. The major impact of this early knowledge engineering was in product and process design.

With the coming of the personal computer and the Internet, work organization and workflow began to be modified on the job, and simultaneously personalized products led to successive alterations in lifestyles. We went through phases of evolutionary development, from technology management, to data management, to information management, and most recently knowledge management. In each of these phases however, most of the expertise behind both consulting and publications referred to organizational applications. For their individual use, people either tried to apply what they learned on the job to their home computers, or they learned by reading manuals and by trial-and-error. In most cases however the on-the-job training was only partially transferred – the way most people manage their own technology, data and information is quite amateurish and sloppy. As for knowledge management, whether on-the-job or on a personal basis, many people still ask "What's that?!"

So what is it? Knowledge consists of concepts available to process information and guide action. Knowledge Management refers to "smart use of know-how." In a knowledge economy more and more tasks involve "think work." Thinking involves the separation of relevant information from irrelevant information. Therefore, "think work" is a component of "knowledge work," specifically the information processing part – the other part is the "informed action" part.

What the Human Knowledge MindMap offers to the Knowledge Economy is similar to what W. Edwards Deming offered to the Industrial Economy. Just as Deming developed a method for quality assurance for industrial output, the Human Knowledge MindMap is a method developed to provide quality assurance for knowledgeable output. When the United States shunned Deming's approach, he was invited to Japan where he taught the kind of quality control that enabled Japanese manufacturers to successfully challenge the American domination of the global automobile and electronics markets. The knowledge-based start-up companies everywhere in the world are looking to provide the same kind of challenges in the future, and having a workforce trained in knowledge work skills will be part of their strategy!

William Sheridan

How To Think Like A Knowledge Worker

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Don't miss this
INTRODUCTION

This book is about HOW to think, not WHAT to think. Let me clarify that. This book does not deal directly with the issues or concerns you will encounter and deal with during your education, on the job, or in your life. But no matter what you are doing, you ability to deal effectively with your issues or concerns will depend on how you approach them. Let me give an example. If at any point you have an issue or concern about what you or anyone else has learned and/or knows, what that is about is what is called *epistemology,* "theories of learning and knowing." The implication of your issue or concern is the question "How does anyone learn or know anything?"

There are three generic forms of epistemology: (1) empiricism (observe the facts); (2) rationalism (think things through); and (3) constructivism (formulate new ideas). We all do all three to some extent – but most people emphasize one of the three, and de-emphasize the other two. Those habits of emphasis and de-emphasis only lead to partial and inadequate learning and knowing. After reading this book however, such partiality is no longer necessary. Herein the three epistemologies are explained and illustrated. By the use of the three epistemologies you gain cross-training in the concepts needed to deal with the complexities of the world you experience. Henceforth every epistemological issue or concern will involve the recognition of, and need to blend all three forms of learning and knowing. With this wider perspective, you are at an *epistemological advantage*. You can understand learning and knowing issues and concerns in a comprehensive sense. Epistemologically you will have become an effective thinker.

In a similar way this book will provide you with an outlook on your other beliefs and values, as well as a deeper understanding of the processes of asking questions, and drawing conclusions. For instance, most people's concept of "Reality" (ontology) is also focused on only one of the alternatives (either materialism, or idealism, or behaviourism). Once you cross-train yourself to use all three versions of ontology, you are then also at an *ontological advantage,* with a comprehensive perspective on reality.

It's the same for all the other concepts that are displayed on the Human Knowledge MindMap. But for this to work, you have to keep the concepts in mind (or the diagram in front of you) whenever you do knowledge work. If you were a high-level knowledge worker, you would be doing a lot of this intuitively already, but probably not explicitly. However, to be really competent in knowledge work you must not only be able to use the techniques, but be a *reflective practitioner*.

Everything I have said above can be reduced to one theme: Ideas without context are like people without responsibility – you just can't trust them. Ideas have a history, implications, and consequences, all of which should be borne in mind when you encounter them or use them. Otherwise you are simply sleep-walking through the knowledge society, going through the motions without ever being self-conscious about what you are doing. As a result your narrower perspective will cognitively disable you from working at the leading edge of creativity and productivity.

Benjamin Franklin's Response to a Request for Advice

To Joseph Priestly   London, September 19, 1772

In the affair of so much importance to you, wherein you ask my advice, I cannot for want to sufficient premises, advise you **what** to determine, but if you please I will tell you **how**. When those difficult cases occur, they are difficult chiefly because while we have them under consideration, all the reasons *pro* and *con* are not present to the mind at the same time; but sometimes one set present themselves, and at other times another, the first being out of sight. Hence the various purposes or inclinations that alternately prevail, and the uncertainty that perplexes us.

To get over this, my way is to divide half a sheet of paper on a line into columns; writing over the one *Pro*, and over the other *Con*. Then during three or four days consideration, I put down under the different heads short hints of the different motives, that at different time occur to me, *for* or *against* the measure. When I have thus got them all together in one view, endeavour to estimate their respective weights; and where I find two, one on each side, that seem equal, I strike them both out. If I find a reason *pro* equal to some two reasons *con*, I strike out the three. If I judge some two reasons con equal to some three reasons pro, I strike out the five; and thus proceeding I find at length where the balance lies; and if, after a day or two of further consideration nothing new that is of importance occurs on either side, I come to a determination accordingly. And, though the weight of reasons cannot be taken with the precision of algebraic quantities, yet, when each is thus considered, separately and comparatively, and the whole lies before me, I think I can judge better, and am less liable to make a rash step; and in fact I have found great advantage from this kind of equation, in what may be called *moral* or *prudential* algebra.

Wishing sincerely that you may determine for the best, I am ever, my dear friend, yours most affectionately,

Ben Franklin

HOW TO USE THE MINDMAP

<u>What is it?</u>

Knowledge consists of concepts available to process information and guide action. The core concepts of human knowledge are depicted in a series of lists organized as a MindMap. As Tony Buzan (THE MINDMAP BOOK, BBC Books, London, 1993), the inventor of the MindMap concept explains, this display technique gives a graphical integration of knowledge that words alone cannot provide.

<u>How to use it?</u>

Read the book through once - it is short, modularized, and will provide a sense of the content of the message, and of how it is presented. Using reference sources on any topics under consideration will also likely prove helpful; then apply the concepts and consider the implications henceforth.

<u>Who should use it</u>?

Anyone whose job requires knowledgeable processing of information (students, intellectuals, support staff, managers, service staff, professionals, operational staff, experts, etc.) will find the MindMap useful. It enables a person to sort experience into conceptual categories, the basis of thinking. Every situation can be 'deconstructed' into the concepts on which it is based or which it incorporates. You can use the MindMap construct to explore situations, or find issues elsewhere and assess them with MindMap concepts.

<u>What are the implications?</u>

The core premises for the design of the MindMap are Conceptual Pragmatism and Cognitive Economy i.e., our ideas should have maximum use-value and minimum complexity. The concepts in the MindMap allow the user to triangulate the issues that are involved in whichever situation is encountered. If your question is "How do I know?" then it will involve some combination of elements of empiricism, rationalism, and constructivism. Such cognitive amalgamations do what makes "knowing" possible; other aspects of experience can be deconstructed and reconstructed just as readily using the MindMap.

Once concepts are identified and categorized, what then? In the process, one often finds that issues appear incommensurable because the ideas on which they are based seem incompatible. In such cases, there are three ways of negotiating commensurability: (a) reduction (to a common standard, i.e., money, energy, votes, etc.); (b) separation (into distinct dimensions/judgments, i.e., beliefs, values, preferences, etc.); and (c) innovation (synthesize an encompassing alternative, i.e., bisociation[1], lateral thinking[2], thunks[3], etc.). Innovation has the highest commensurability potential.

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ACT OF CREATION	LATERAL THINKING	CONCEPTUAL TOOLMAKING
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1. Conduct an Inventory of Your Own Cognitive Processes

In Systems Analysis, the place to begin a project is to inventory the existing arrangement(s) that you are trying to improve or replace. The same principle applies to adopting or improving your own approach to personal knowledge management.

(a) as you read through the outline of each concept in the MindMap, note when and how you currently use that concept, AND how you might revise or extend its use in the future – if it's empiricism (see section on Epistemology), do you get and assess the relevant facts about a task before moving on "to do something"? Could you do better in this respect in the future? If it's behaviourism (see section on Ontology), do you clarify "how people do things" in the relevant context before assuming you know what is and is not acceptable? Could you do better in this respect in the future?

(b) in the description of each concept in the MindMap it will be possible to formulate similar questions about how you presently might (or might not) use it, and what you could do to either begin to use it, or to more effectively use it in the future. The goal is to begin monitoring yourself on what concepts you engage when you begin to think, AND to prompt yourself to either start to use the relevant concepts or to use them more effectively.

2. Conduct a Similar Inventory of Incoming Messages

Other sources of information are NOT, in all likelihood, monitoring the use of concepts as described above. So, incoming messages will likely have large conceptual gaps in them, which is something you should also notice and monitor.

(c) messages can be interpreted as "information packets" that function to persuade you of something – some facts, or principles, or propositions, or proposals or whatever. The questions to ask yourself are: What is the topic of persuasion? How is the persuasive case being made (what evidence is being presented)? What evidence is NOT being presented that is, nevertheless, relevant?

(d) the aim here to is to track the persuasive intent of the incoming messages, so as to discern any shortcomings and/or hidden agendas. If the messages contain misinformation (insufficient evidence) or disinformation (incorrect assertions or assumptions), and they may very well, then the next question is, Does it matter? That is to say, are there egregious errors that should be and can be confronted? "Speaking out" may or may not be feasible, but it is good practice to be on the alert for deficient messaging so that you will be able to recognize it and take appropriate action when that is necessary.

3. Audit Your Inventory to Clarify Your Thinking

Reflect on your cognitive inventories to see if your thinking is (i) comprehensive; (ii) coherent; and (iii) consistent – use the MindMap for comparison. Decide which parts of your thinking you could work on, and make some effort to align your conceptual framework so that you develop a more effective capability for processing information and guiding action.

A Generic Strategy For De-coding Issues and Messages

All of human culture is written in code – this is the conclusion of Structural Anthropologists based on their numerous case studies of all types of cultures throughout the 20th century. The "code of culture" consists of deeper semantics and pragmatics than are apparent based on a simple interpretation of the explicit meaning of the signs and symbols that are communicated. The purpose of the Human Knowledge MindMap is to crack that code. The Human Knowledge MindMap can be divided into two columns (recall Ben Franklin's technique), with the concepts on the left (Perspectivity, Methodology, Axiology and Semiology) labelled Divergent Strategies, and the concepts on the right (Quintessential Questions and Inferential Operators) labelled Convergent Strategies.

DIVERGENT STRATEGIES	CONVERGENT STRATEGIES
The overall strategy with the use of this list is to look for, and recognize opportunities to expand upon the use of these concepts when assessing incoming information.	The overall strategy with the use of this list is to look for, and recognize opportunities to narrow down the use of these concepts when assessing incoming information.
The reason you are trying to expand upon the use of these concepts when assessing information, is that conventional thinking in these areas is only partial, i.e., it does not take into account all of the aspects needed to assess the full range of experience.	The reason you are trying to narrow down the use of these concepts when assessing information, is that it is both unnecessary and counter-productive to try to ask every question or make every inference about a situation, i.e., inquiries and inferences must be prioritized.
An example may be helpful: If you are trying to assess an aesthetic (artistic) experience, it is important to keep in mind that there are three premises for artistic appreciation, not just one, i.e., **romanticism** (the artist's self-expression), **populism** (the audience's response), and **formalism** (the technique of the art form). All of these considerations are required to provide an adequate assessment.	An example may be helpful: If you are trying to discover how a process or mechanism works, it will NOT be relevant to ask **who** the operators are, or **where** they were born, or **what** they do in their leisure time, or **why** they were selected to do the job in the first place. These questions should be excluded, because the focus of inquiry is the configuration of the procedure or mechanism itself.
How does one decide **which concepts are intrinsic** to any particular issue or message? Intuition will usually generate a preliminary categorization – if the topic is learning or knowing, it's about epistemology; if the topic is right or wrong, it's about ethics, etc. If there is too much ambiguity, use a dictionary, thesaurus or reference book for guidance, or confer with someone.	How does one decide **which questions or inferences are intrinsic** to any particular issue? Intuition will usually provide a preliminary sense of "what I want to know", "what I need to ask", "where all this is going", and "what I can reasonably conclude". Follow up by balancing costs (time and effort) and benefits (reducing uncertainty and clarifying implications).
How does one decide which concepts to apply to which issues or messages? Begin with intuition - then refer to this list. **Every concept on this list represents some aspect of every topic** – you have to choose which aspects to prioritize – there are always perspectival, valuational, categorical, and appreciative aspects to every issue – which aspects will you focus on, and why? **Within a category, deal with ALL aspects!**	How does one decide which questions or which inferences to apply to which issues or messages? Begin with intuition – then refer to this list. Focus on what you **need to know**, rather than on what you want to know, when asking questions. Focus on **the purpose of the outcome** when deciding which inferences to make. In both cases cognitive resources are limited, so pursue the strategy of satisficing (**set reasonable limits**).

<u>What is the larger purpose?</u>

What can a user of the Human Knowledge MindMap expect to be able to accomplish that would otherwise not be possible?   That will be the capability to THINK EFFECTIVELY. Most peoples' thinking, most of the time, is not clear enough, focused enough, or systematic enough to perform "knowledge work" competently. The purpose of the Human Knowledge MindMap is to give users the wherewithal to do exactly that. Whether during education, or on a job, effective thinking consists of a set of components as depicted below.

EFFECTIVE THINKING: parallel tracks and alternate tacks	
Topical Processes	*Integral Processes*
1. clarifying premises (why premises?)	i. checking assumptions (whose assumptions?)
2. inferring explanations (inferring how?)	ii. asking questions (which questions?)
3. following implications (following where?)	iii. coordinating conclusions (what conclusions?)

The Topical Processes are applicable to the subject matter under consideration. The Integral Processes are intrinsic to the thinking activity itself. What effective thinking requires is tacking back and forth between these parallel tracks so that both sets of considerations are covered in the larger endeavour. The elements to do this are available in this document.

This Human Knowledge MindMap document has been written to cover appropriate sets of assumptions, questions, premises, and inferences, together with the implication and coordination techniques that are needed in thinking. The pages taking the user through this material are organized in a particular sequence, although the reader may read the material in any order. For the practice of EFFECTIVE THINKING the requirement is to go through the topical and integral processes comprehensively. Here too, there is no necessity order in which to do this. One may encounter, contrive, or be assigned a concept, problem, or situation to which any one of these processes may be applied to begin with, but regardless of the starting point, all of the other processes have a contribution to make to the eventual outcome. The arrows in the table above suggest one sequence through the thinking processes, but the order can be varied to fit alternate styles of thinking, different individuals, and changing circumstances. The contrast to the sequential approach might aptly be called "The Pinball Methodology" - bounce the concepts and constructs around until you create an effective ensemble - history confirms that it works!

References

(Conceptual Pragmatism)   (Cognitive Economy)   (Pinball Methodology)

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MIND & THE WORLD ORDER COGNITIVE ECONOMY   THE PINBALL EFFECT
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| Original Construction | Deconstruction |

| Reformulation | X2 | Reconstruction |
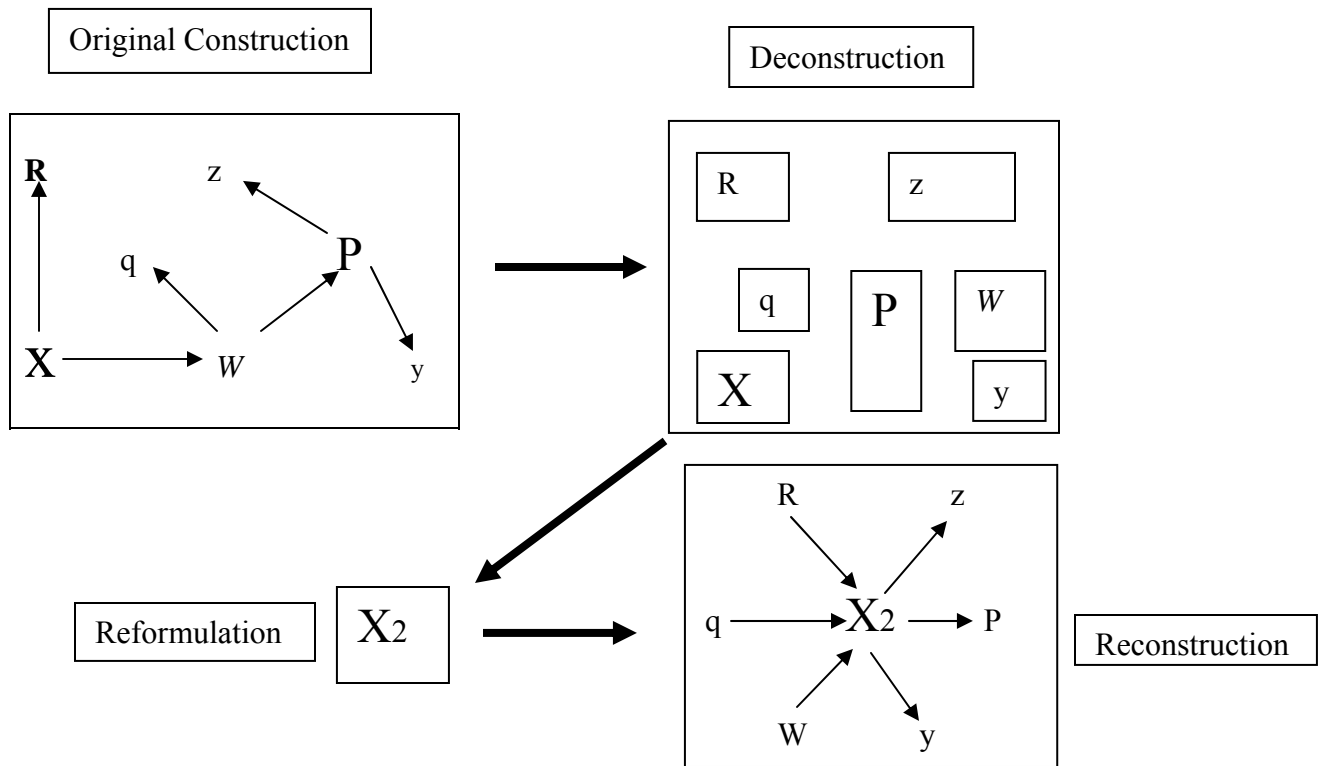
MindMap Methodology: Concept R&D

As encountered in messages from a variety of sources (conversation, text, etc.), a construct may consist of several concepts, related to each other in a variety of ways, depending on the context. Various views may be vague, or inconsistent, or both. Deconstruction consists in separating and clarifying each of the component concepts as to their individual etymology and their pragmatic use. One (or more) of these concepts may then be reformulated to enhance its inclusiveness, exclusiveness, range, or whatever. Whereupon this newly reformulated concept may then be used as a basis to reassemble the entire construct, but in a way that brings new order, generality, explication or whatever to the entire ensemble of ideas.

This idealized version presents the process as a somewhat formal, public sequence - however it can just as easily occur informally and intuitively in the mind of a practitioner. In either case the process is an art rather than a science. The definitions in the deconstruction phase may be as wide or narrow as the practitioner prefers, the choice as to which one(s) are to be reformulated is also up to the practitioner, as is the configuration of the reassembled construction. Two different individuals or groups, using the same original construction, may then settle on alternate definitions, reformulations, and reconstructions, yet be entirely correct within the logic each has employed. Good craftsmanship requires only consistency and transparency.

Application of Concept R&D

Read the entire Human Knowledge MindMap through once.

Pick a situation, problem, challenge, decision or choice of interest or concern to you (on whatever basis you regard as appropriate). Then proceed with the following steps:

1. Identify which aspects are of most interest or concern to you.
2. Prioritize (rank) your interests or concerns.
3. Using the Human Knowledge MindMap as a visual guide, apply the relevant concepts to the most important (prioritized) aspects of your interest or concern (limit it to the top three aspects on your list to begin with).
4. If you don't recall whether or nor a particular concept is relevant, refresh your memory by re-reading the one-page outline.
5. From this point apply the methodology as outlined above (this may, in addition to other things, require reading more materials to acquire the necessary depth of understanding in the issues you are trying to deal with).

Initially this may be a slow and somewhat cumbersome process. Learning to think by applying the right tools to the right circumstances often is an initially slow process! With practice however the process will become intuitive, and you can begin to use the MindMap for periodic refreshment, and to plan for some more in-depth study of concepts, if this interests you. A good way to proceed with this more expanded goal, is to read the reference books mentioned in each of the concept pages, and then begin using your new insights to find additional materials, and/or to apply your accumulating schemata to what you read or otherwise find. Do not regard any of the references suggested as being "the gospel" on a topic - each is simply recommended as "food for thought".

Concept R&D is a dynamic process, but the key to its successful use is to recognize that the responsibility for the dynamic aspect of the process lies **with the user.** The MindMap can inform a user about the conceptual basis of knowledge, and about the way in which it can be most appropriately utilized. BUT, **you gotta really wanna!** If your interests in, or concerns with issues are not sufficient to motivate the cognitive effort to master and apply the Concept R&D methodology, then this MindMap is not for you – you will be wasting your time with it. If you decide this effort is worth your time and attention, this MindMap should be helpful. If you think that you can do any of this better than what you read herein, prove it - do it!

Universal Disclaimer: Firstly, the author of this material is not responsible for motivating users to want to think – that is their responsibility. Secondly, the author is not responsible for any action whatsoever that users may take based on what they regard as the implications of this material. Users must always take responsibility themselves, not only for deciding whether or not to think, but also for choosing what action to take (or not to take). The one claim which the author does make irrespective of any situation or user, is that being a knowledgeable decision-maker or choice-taker is ALWAYS better than being an ignorant one!

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Gary Klein
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MIT Press, Cambridge, 2006

THE MINDMAP RATIONALE

When receiving information (watching, reading; listening, touching, or any other kind of observation), DO NOT JUST ABSORB PASSIVELY. Some New Age Analysts have been known to advise to "clear the mind" while attending to incoming sense-data so as not to impose one's own categories or standards. This is a profoundly foolish and counter-productive piece of advice. The way to effectively absorb information, *to make it your own* is through active listenin*g* - by fitting it into what is already known. What the active listener needs to remember is to keep the attributed characteristics and categories TENTATIVE rather than PERMANENT. Every incoming piece or stream of information has a context and implications. Whether stated or not, such information reflects or entails certain beliefs (what is this, and how do we know?) and certain values (what should we do, and why?). Buried in the incoming information are clues to help answer these questions, but those answers will only be revealed if the information recipient deconstructs the message and categorizes its components. The function of every message is persuasion, whether implicit (a statement) or explicit (an argument), whether intended (social source) or unintended (natural source).

There are nine types of beliefs at the core of our sense of reality, three types of methodology whereby we categorize our experience, nine types of values we hold, and three types of modes to our sensibilities. Statements or situations are usually blends rather than being composed exclusively of a single type, but within such a blend one type tends to dominate. Little or none of this may be explicit however – it is the task of the *reflective practitioner* to begin to deconstruct the conversation **in real time** and identify the premises **as they are articulated**. In other words, being an active listener takes some real, and continuous effort, and considerable practice – you have to pay attention, AND try and make sense of the incoming messages. How is this done? Start by paying attention to those components of the message that occur most frequently or are emphasized most emphatically.

Why bother? Because the incoming information, no matter what the source or content, has the effect of controlling your behaviour, even if you ignore it. But no matter what you do as the result of that incoming sense-data, you can make better decisions and choices if you are capable of *informed action*. Like *informed consent*, informed action involves a state of mind that has aligned the content and context of incoming messages so that you can understand and control some of the aspects of your experience [even adjusting your attitude to the prospect of the inevitable is a form of empowerment – and often there is considerably more that you can do].

Use of the MindMap will foster an attitude of Contrarian Thinking: *there is no necessity to take conventional wisdom at face value*. This is a way of positioning yourself and what you know so that incoming messages are not naively accepted as *the truth*, or *the facts*, or *just a description*, or *with nothing more implied or intended*. Something more is ALWAYS implied and intended. There is no "unequivocal truth" or "straight facts" or "simple description". Every person and idea has a history, implications, and consequences. To the extent that you don't think about any of this, you don't understand what is going on, and you don't know what you are doing. The Human Knowledge MindMap helps you counter-act gullibility and complacency.

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