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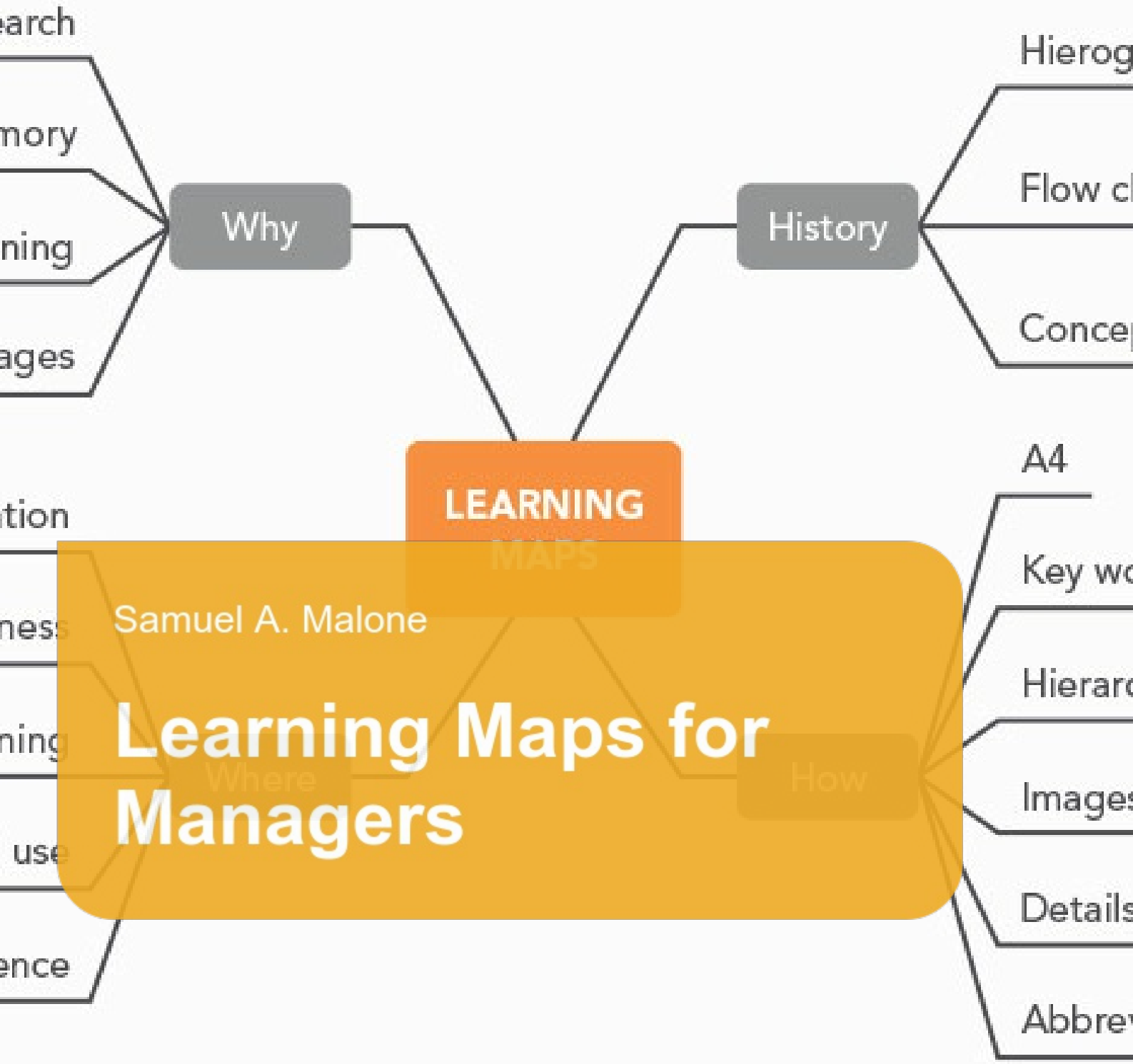

Samuel A. Malone

Learning Maps for Managers

SAMUEL A. MALONE

LEARNING MAPS FOR MANAGERS

Learning Maps for Managers
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CONTENTS

INTRODUCTION

Learning maps are tree-like, radiant, nonlinear ways of organising information by showing the connection and inter-relatedness between the central topic, and supporting information. They are major visual mnemonics of ideas and information. Visual methods of displaying information have existed for thousands of years. Some languages have even evolved from hieroglyphics and pictograms. Examples of learning maps relevant to managers and learning map enthusiasts are shown throughout the text. They have been done using the software package ConceptDraw MindMap. In addition, the text has been illustrated by diagrams to aid recall. Appropriate quotations have been peppered throughout the text.

You will find it easy to draw learning maps if you follow the rules set out in this book. They can be constructed either manually (with paper and pen), or digitally (on a desktop computer, notebook or tablet), individually, in pairs or collaboratively in smaller or large groups. Many people resist constructing learning maps initially but if you stick to the task you will become proficient in their use.

Learning maps are now used in many areas of life such as education, business, finance, medicine, science and life planning. Evidence supporting the use of learning maps can be drawn from research on the brain, learning, memory, information processing, training and education. They are also supported by personal testimony and anecdotes, and articles supporting their use have been peer reviewed in reputable academic journals. They are particularly supported by members of the teaching and training professions. The author was awarded a M.Ed. with distinction from the University of Sheffield with on the basis of his dissertation on mind maps.

Learning maps can be used for a variety of purposes including brainstorming and creativity, note taking and note making, consolidating information from research, project planning, planning your thesis, problem solving, decision making, making presentations, time management, report writing, writing articles for magazines, taking minutes of meetings. studying and memorising information. In particular, the ability to problem solve and make well informed decisions is a key skill for managers and students alike. In your personal life you can use learning maps to summarise books, plan a speech, design a personal career plan, plan a holiday, design the landscape for a garden, preparing a to-do-list, or even help plan a wedding. Learning maps are a great facilitator of lifelong learning skills.

Over the past 50 years they have been adopted by millions of people throughout the world including educationalists and many leading corporations use them. You can draw learning maps by hand, but over the past 20 years sophisticated software packages have been developed to facilitate the drawing of learning maps individually and in groups. Some of these packages are available free on the internet while others are available on payment of a small fee.

Samuel A Malone April 2019

ACKNOWLEDGEMENTS

The artwork in this text was produced by the author with the aid of Microsoft's 'SmartArt' creatively combined with the clipart facility in the word package. Some of the artwork was accessed through Google. Known copyright material accessed through Google has been acknowledged. I will gladly acknowledge any other copyright material brought to my attention in future editions. The learning maps are my own creation assisted by the software package ConceptDraw MindMaps. The term mind map is the copyright of Tony Buzan.

ABOUT THE AUTHOR

Samuel A Malone is a self-employed training consultant, lecturer, moderator, examiner and author. He has published numerous journal articles in the fields of learning, study skills, personal development, motivation and management. He is the author of 21 books published in Ireland, the UK and worldwide on learning, personal development, study skills and business management. Some of his books have been translated into foreign languages including Russian, Spanish, Danish and Norwegian, and gone into second editions. His most recent book (2014) is titled *Awaken the Genius Within – A Guide to Lifelong Learning Skills* (Glasnevin Publishing, Dublin). He has a M.Ed. with distinction (in training and development) from the University of Sheffield and is a qualified Chartered Management Accountant (ACMA), Chartered Global Management Accountant (CGMA) and a Chartered Secretary (ACIS) and a member of the Irish Institute of Industrial Engineers. He is a Fellow of the Irish Institute of Training and Development (FIITD).

Previous books published by the author include *Why Some People Succeed and Others Fail* (Glasnevin Publishing, Dublin), *Learning about Learning* (CIPD, London), *A Practical Guide to Learning in the Workplace* (The Liffey Press, Dublin), *Better Exam Results* (Elsevier/CIMA, London) and Mind Skills for Managers (Gower, Aldershot, UK) and *How to Set Up and Manage a Corporate Learning Centre* (Gower, Aldershot, UK). The last two books become best sellers for Gower in their training and business categories. Better Exam Results proved to be a best seller for Elsevier/CIMA and is still in print 30 years after its earliest incarnation. Most of his books are available online from Amazon.co.uk.

The author's latest books have been published online by bookboon.com in 2018 namely:

- The Role of the Brain in Learning
- How Adults Learn
- Learning Models and Styles
- Experiential Learning
- Learning with Technology
- The Ultimate Success Factor
- Series of Books on People Skills for Managers
- Series of Books on Creativity Skills for Managers
- Series of Books on Training Models for learning facilitators
- Series of Books on Marketing for the Non-Marketing Manager

1 LEARNING MAPS

- What are learning maps?
- How did learning maps evolve?
- How do I make learning maps?
- How are learning maps used?
- Why use learning maps?

1.1 WHAT ARE LEARNING MAPS?

The Oxford Dictionary defines a mind map (similar to a learning map) as a diagram in which information is represented visually, usually when a central idea is placed in the middle and associated ideas arranged around it. Learning maps is an alternative name for mind maps and emphasises their role in many aspects of learning and memory. The term mind map is the copyright of Tony Buzan. Learning maps are tree-like, radiant, nonlinear ways of organising information by showing the connection between a central idea, and supporting relevant related information. They provide a simplified overview of complex information, allowing learners to better understand relationships, and find new connections. They can be produced individually or collaboratively by groups and teams. They can be made by hand or by a computer software program. Learning maps combine a textual and visual way of recording information to engage the dual processing capabilities of the brain – the left and right hemispheres.

There are now millions of people using learning maps throughout the world, for learning, brainstorming, note taking, writing, project planning, problem solving and decision making. For instance, the mind mapping tool *FreeMind* is downloaded over 150,000 times a month, and a software mind mapping package called *MindManager* is used by over 1.5 million people. There are many professional software mind map programs available including ConceptDraw MindMap which the author used in drawing the learning maps in this book. Learning maps have stood the test of time, and have now been used in various formats for more than fifty years. They have evolved from, and borrowed ideas from, visual representations such as flow charts, organisation charts, semantic maps, knowledge maps concept maps, diagrams and visual metaphors.

Visual metaphors, when one element of experience is described in terms of another, can be used to convey complex concepts and to increase comprehension, uniqueness and memorability. For example, an iceberg is often used to show the strong role of the hidden unconscious mind governing our actions compared to the visible conscious mind. The conscious mind

is seen as the tip of the iceberg, supported by a vast subconscious mind submerged below the water, which plays a major role in influencing our behaviour and shaping our destiny.

Learning maps have gone through various incarnations, such as semantic maps, knowledge maps, concept maps, patterns, spider diagrams, mind maps, memory maps, brain maps, thinking maps and idea maps. Some of these techniques such as concept maps start with the central idea at the top of the page and work down, whereas learning maps and mind maps start in the centre and work out. One of the main differences between concept maps and learning maps is the liberal use of images, icons and colour in learning maps. Concept maps are mainly used in science and education whereas learning maps are mainly used in business but are becoming increasingly popular in education and other areas as well.

I prefer the term learning maps which emphasises their unique quality to enhance learning and memory effectiveness in a variety of contexts including business, management, study and education. One way to grasp the essence of a learning map is to compare it with a map of a city. The city centre represents the main idea, the main road leading from the city centre represent the main branches or key ideas, and the secondary roads represent the sub branches or supporting thoughts. Special images, icons, symbols or shapes can represent landmarks of interest, or particularly significant ideas. The following learning map is an overview of the book.

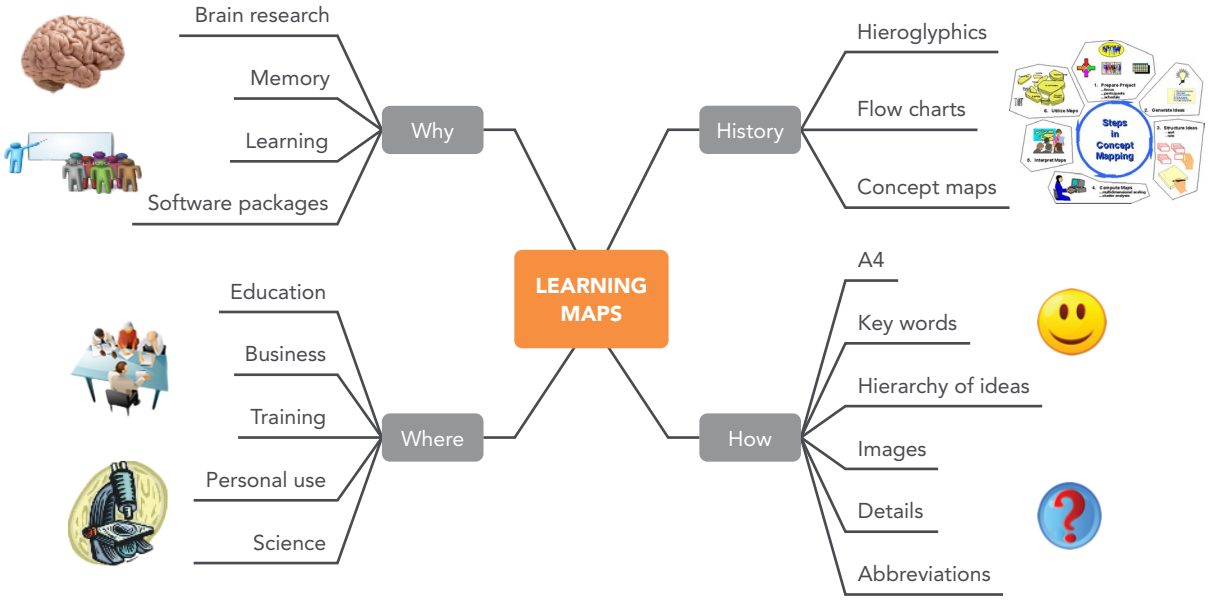


Fig. 1.1. Learning map – overview of book

> *"Mind maps can be used for almost anything – from planning the day, to taking notes, to organising a presentation or simply exploring one's own thoughts."*
>
> – Janet Mason

1.2 HISTORY

Mankind has used pictures, drawings, images, icons and symbols to record information, and leave their mark on the world for thousands of years. Evidence for this has been found throughout the world in the form of prehistoric cave paintings, in places such as France, Australia and South America. Images have evolved into written languages such as Egyptian hieroglyphics and Chinese characters. The ancient Egyptians created an entire language in 3000 BC, using words and images. After many years of studying the Rosetta Stone and other examples of ancient Egyptian writing, Jean Francois Champion deciphered hieroglyphics in 1822. The oldest known geographic map was produced by a Chinese cartographer in about 1100 AD. The Chinese characters and language have evolved over time from hieroglyphics and pictograms. In more recent times the great brains of history such as Leonardi da Vinci, Michelangelo, Darwin and Einstein used pictures, sketches, drawings, images and symbols to clarify their thinking before they produced their great inventions, masterpieces and theories.

Maps of various types are used in many areas of industry with the capacity to bring complex topics to life making them understandable and accessible to a wider audience. Schematic wiring diagrams help engineers and electricians understand how electricity networks are organised and operate. System flow charts help systems analysts design computer-based systems. Flow process charts are used by industrial engineers to streamline and improve movements and methods in the workplace. One of the most famous flowcharts was created in 1933 by Harry Beck. His flowchart of the London Underground is still in use today and has influenced the depiction of transport systems worldwide.

Critical path analysis with the aid of computers is used to monitor and control large construction projects such as roads and buildings. Fishbone diagrams help managers identify and solve complex business problems. Cycles, such as the product life cycle and working capital cycle, show how ideas are related in a circular manner. Decision trees are widely used in financial and management accounting to improve decision-making, and show the options available when making decisions. Organisation charts show the management hierarchy within a company.

Today the majority of our communication is still done through the written word but symbols and images are beginning to play a more significant role in our everyday lives. For example, there are numerous examples of symbols on road signs meaning different things depending on circumstance and context. Modern advertising on billboards and television means that our senses are continually bombarded by colourful and stunning visual images. The advent of computers and smart phones has given a new impetus to the role of visuals in cartography (the art, technique, or practice of compiling or drawing maps or charts) and in communication generally.

GPS (global positioning systems) are now used routinely in cars to help us plan our journeys, and Google maps are now part of our lives. Unfortunately, our ability to map knowledge is not as sophisticated. However, the integration of computer technology and telecommunications has improved our ability to map knowledge, and we can now routinely draw learning maps illustrated with clip art images. As our work has become more complex, we need charts, diagrams, graphs and learning maps to record it and make it more comprehensible and memorable to ourselves and others.

> *"A properly prepared flowchart is like a road map. It can be used to plan important steps in your thinking. It can be used to help you remember how you arrived at a certain point in your thoughts. Sometimes a flowchart will help you find a better way to solve a problem."*
>
> – Mc Quigg and Harness.

1.3 HOW TO DRAW LEARNING MAPS (MIND MAPS)

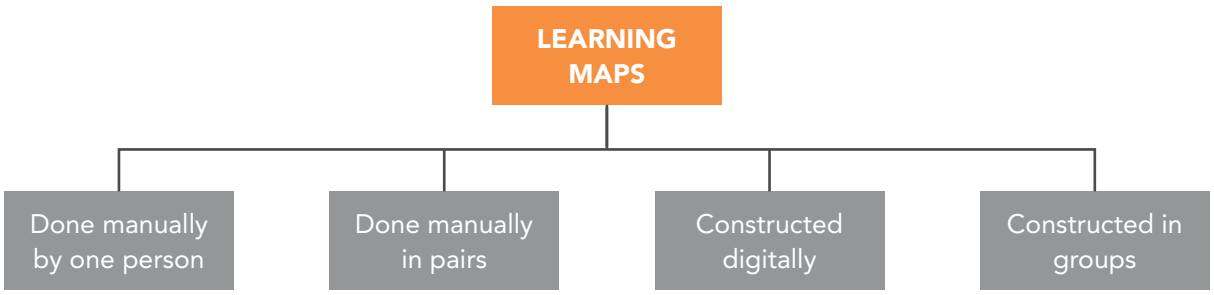


Fig. 1.2 Various ways in which learning maps are drawn

There are no set rules for drawing learning maps but only general guidelines. Each user is free to develop their own personal style and system of shapes, colours, lines or symbols. Information is converted into a combination of written, diagrammatic, symbolic and graphical representation, allowing related ideas, concepts or themes to be linked together. It is comparatively easy to draw learning maps, but they do require considerable care, patience and practise over time to become proficient in their use.

They can be drawn by hand or using a computer software package. They can be drawn by one person, in pairs or constructed collaboratively in groups. It goes against our natural instincts to construct things from the bottom up or the top down. In the West our education has taught us to write in a linear way; starting in the top left-hand corner of the page and working out and down. Instead learning maps start in the centre and work out in a clockwise radiant fashion. This goes against everything we were taught to do as school children and so takes some time to get used to.

An example of a learning map is shown above. For a visual metaphor of a learning map imagine an octopus with lots of tentacles or a tree with its many branches. Like a clock, learning maps are drawn and read from 1pm going clockwise giving them clarity and order. Learning maps mimic the network organisation of major systems in the world, such as electricity, telecommunications, water, roads, railways and airlines. They are as unique to a learner as finger prints and so are idiosyncratic to each individual. Different people will produce different learning maps for similar ideas and this is one of the reasons why learning maps produced by one individual may be indecipherable to another without the owner's guidance.

Guidelines for drawing learning maps

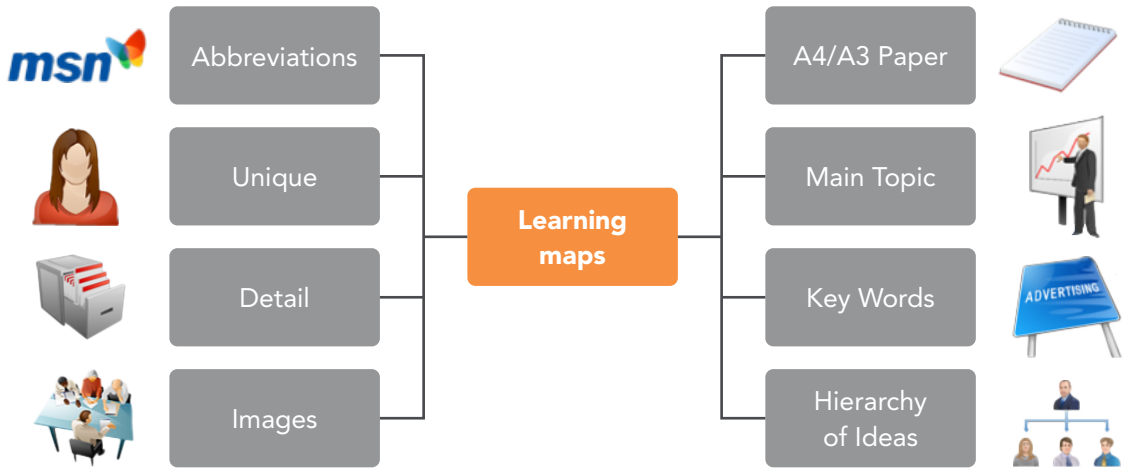


Fig. 1.3 How to draw learning maps

The following is all you need to know to hand draw a good quality learning map or mind map:

- *Blank sheets of paper.* Take an A4/A3 sheet of good quality unlined blank paper and place it in a landscape position so that you have plenty of room for your work. Blank paper provides a limitless and free-thinking space for your work. A3 sheets are suitable for a consolidation of chapter learning maps into one for the complete book when summarising the contents of a book. A4 sheets are suitable for learning maps for each chapter.
- *Key words.* Put your key word in the centre and branch out in a radiant way. If there is a symbol or picture you can think of related to the key word, sketch that in. This radiant style is in contrast to linear notes that start at the top left-hand corner of the page and work down. It is also in contrast to concept maps which start at the top of the page and progress down. Use single words, or as few words as possible on branches, as these are more likely to creatively trigger

off further relevant ideas connected to the main idea. Minimum use of text makes it easy for the reader to scan for a word or get the gist very quickly. In addition, this prevents 'map shock' or confusion (information overload) caused by clutter or putting too much text on the map.

- *Hierarchy of ideas.* Use a hierarchical structure to show the relative importance of ideas. Ideas go from the general to the specific as you move from the centre out. Use bigger letters for words nearer the centre than for words further out. In addition, use the thickness of lines or colour to emphasise structure and importance; those near the centre will be thicker than those branching out. The lines should be curved for effect and should be the same length as the word. Curved lines give rhythm to the map and make it more interesting and vibrant to look at. In addition, they will help you to keep all your words upright and easy to read.
- *Images.* The central point in the learning map should be an image because the brain is drawn more compellingly to images rather than words. Use images instead of text, or in addition to text, to make the information more memorable, and to appeal to both sides of the brain. The images must be a visual metaphor for the idea that it is meant to represent and reinforce or convey, so that when you see the image the idea comes readily to mind. However, some people prefer

to stick to words only rather than use images as they find it extremely difficult to convert and draw words into images.

- *Supporting detail.* Branches are drawn, beginning at the top right of the page and following a clockwise direction. Attach key words on branches to the centre. These in turn should be supported by supporting words on sub branches. All branches should lead back to the central keyword. Words chosen should be concrete nouns, strong verbs or adjectives because these are easier to remember. In normal writing key words like concrete nouns rather than adverbs, adjectives and pronouns make up only 5 to 10 per cent of the text but convey most of the meaning. For emphasis, print words, larger at the centre, and smaller as you radiate out. Some people make the words at the centre two-dimensional for further emphasis. The large letters and thicker lines emphasise the hierarchy and significance of ideas, by making them more distinctive, visible and emphatic and thus more memorable.
- *Make it unique.* Use colour, images, cartoons, symbols, icons, abbreviations, and acronyms so that your learning map looks as unique, impactful and artistic as possible. Colour further enhances learning maps making them more interesting, fun, unique and outstanding thus improving retention and recall. Colour should be used to differentiate or emphasise ideas, rather than used arbitrarily, which can create confusion rather than clarity. It is better if you use a different colour for each major category or major branch used in the hierarchy of ideas as this makes them more memorable.
- *Abbreviations.* Use personalised codes and well-known abbreviations as a type of shorthand, just as you do for texting on your mobile phone. For example, 'mgt' for management, 'ctee' for committee, 'u' for you, 4 for four and? for question mark, and so on. This saves space and speeds up processing, encoding and registration of information. Personalised codes using colours, arrows and asterisks add a fourth dimension to learning maps. In addition, well-known mathematical symbols such as > (greater than), < (less than), = (equal to), + (plus), % (percentage) and so on can be used to save space on your map.

> *"Everything is connected to everything else."*
>
> – Da Vinci

Advantages of learning maps

Learning maps are easy to create and have many advantages over traditional linear note-taking. They allow you to explore an idea, concept, problem or complex issue in a creative,

radiant and non-linear way that mirrors the way the human brain works. They illustrate the 'bigger picture' by including how ideas and concepts relate and connect to each other, rather than presenting isolated facts in a linear way down a page. They condense material into a concise, coherent, cohesive, cogent, memorable form that can be used to review and revise and can be adapted for a wide variety of purposes.

In colleges and universities throughout the world, the most common delivery of transferring knowledge is the traditional lecture method. Generations of students have suffered 'death by PowerPoint' and still do so up to this day. This is the term used to describe the use of slides cluttered with text, often with irrelevant embellishments, boring students to death and often resulting in little meaningful learning. This is a linear type of presentation rather than a connective radiant style showing the rich inter-relations between concepts facilitated by learning maps. The connective style promotes a deep rather than a surface approach to learning.

In summary, learning maps help learners learn, researchers create new knowledge, administrators to better structure and manage organisations, writers to write more concisely and coherently, and teachers and trainers to evaluate learning.

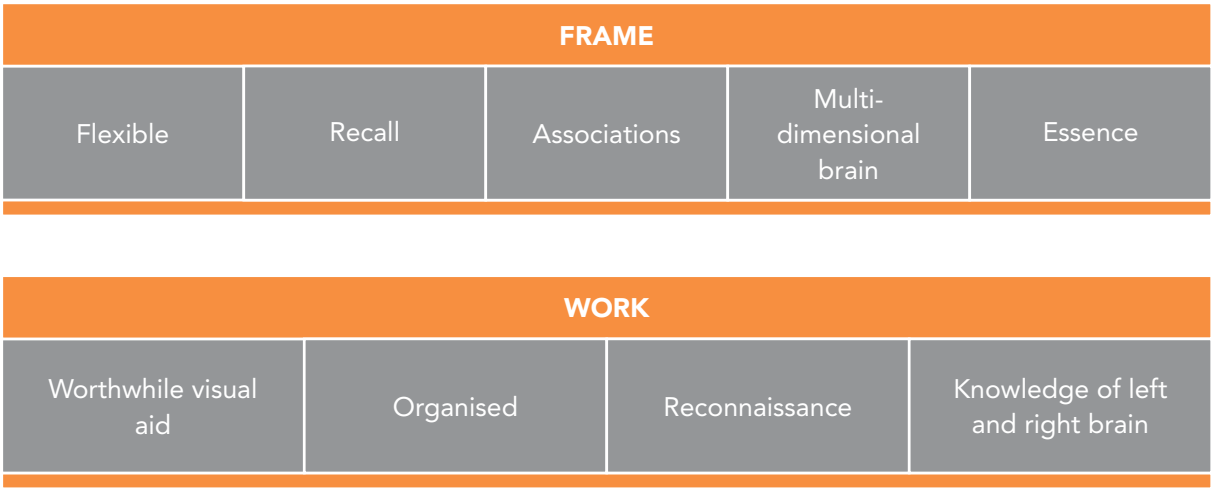


Fig. 1.4 Advantages of learning maps

Flexible. The linear method of note-taking presents many organisational problems to the learner, including deciding in what sequence to list facts. People have logistical problems inserting additions, corrections and making deletions as needed. However, the biggest disadvantage of the linear method, is that it presents a homogeneous monotonous field, that is difficult to absorb and organise in a meaningful way.

Learning maps can be developed with new and additional pieces of information by adding them to the appropriate branch. With linear notes this creates organisational problems.

Additions to learning maps may be through research, serious and pastime reading, watching television, listening to radio, observation, discussion, experience, and critical and reflective thoughts. These additions may be cross-referenced to their original sources. So, be sure to leave space to add more content if necessary, to the learning map at a later stage. The resultant learning map is a comprehensive, concentrated, integrated, visual and easily digestible overview and key summary of a topic.

Recall, review and revise. Rereading of non-fiction books and reports is kept to a minimum. Only key words, associations and images are concentrated on. This gives you more time to review and revise the topics that concern you. Learning maps save time and as a manager time management is critical to success. Psychologists have shown that recall and review are essential to consolidate information in long-term memory and to optimise learning effectiveness. A learning map with its key words and images, particularly if the key words are converted into acronyms, is much easier to learn than twenty pages of linear script.

Associations. Knowledge is in fact a pattern of connected ideas, inter-related and linked information. It is the association of new information to existing stores of knowledge and prior experience that makes new knowledge meaningful and useful. Learning maps gives learners an opportunity to recall to mind what they already know about a topic and this makes the information more personalised and memorable. It helps learners to assimilate what they already know (prior knowledge) with what they are about to learn. Relationships among ideas are more learnable in a two-dimensional display as on learning maps than in text. Learning maps by their unique structure will help you recall trigger words, and their many associations, while linking the words to each other and to the central concept.

Multi-dimensional brain. Learning maps are analogous to the brain's own system of making connections and interconnections through its myriad of synapses and brain cells. Learning maps, through an interconnective model of words and images, help managers integrate both sides of their brain and contribute to whole-brain learning. Organisation, association, integration, linking, clustering, images, colour, emphasis, key words, acronyms, visualisation and other phenomena that naturally facilitate human memory and learning, are used to make learning maps a more holistic, and effective learning system and mnemonic.

Essence. The overall concept or essence highlighted at the centre of the learning map, with the hierarchy of ideas leading from it, provide a very clear overview of the topic to the manager. Single words help the manager focus on key issues without the distractions of grammar, punctuation, spelling and sentence construction. The learning map will help the manager understand concepts and principles rather than cluttering up the mind with detail – a type of '*paralysis by analysis*.' Regardless of the reading load or complexity of the articles, learning maps allows users to grasp and depict the essence of an article in a single

page. By analysing a series of learning maps, the user is able to integrate and consolidate work across articles into one coherent set of ideas, which are easily managed and understood. The result is a deep form of learning rather than surface learning. Deep learning is more lasting and permanent.

Worthwhile visual aid. A picture is worth more than a thousand words. A learning map is a visual aid with impact, originality and creativity. When you hear or read 'Santa Claus' a fat rotund gentleman with a white beard and red nose dressed in red will spring to mind. This is because your brain is wired to process visual information rapidly and you can use images as mental building blocks to help you process, understand and retain information. The effectiveness of our memory and understanding is increased the more of the senses we bring into play, and the visual senses are particularly important. Visual thinking techniques like learning maps help people envisage ideas and solution more effectively. Most educators create and present advance organisers such as charts, diagrams, flow charts, power point presentations or other visual tools to help learners organise and comprehend complex issues. Learning maps are just another type of advance organiser.

Organised. Learning maps are a structured, systematic and shorthand way of getting down information and facts just as road maps differentiate major roads (key concepts), minor roads (important ideas) and bye-ways (important detail) by the thickness of lines, codes, dimensions, colours and so on. Learning maps provide the structure, organisation, context and motivation to learn. They link new information to existing stores of knowledge in a structured foundational framework facilitating comprehension, learning and memory. Melrose (2013) found that mind maps are advance organisers which provide scaffolding that give learners temporary support as they move toward constructing relevant knowledge independently.

Reconnaissance. Learning maps will help you carry out a reconnaissance or overview by mapping out unfamiliar terrain, particularly when used to preview reports, chapters and complete non-fiction books. They imprint key information on the brain, making it part of the learner's own experience and knowledge. Similarly, good drivers plan out unfamiliar routes by advance study of road maps. A learning map can act as scaffolding for students who are learning new material. By revealing the relationships and patterns within and between items of information, a learning map allows them to build on what they already know. This is why I produce learning maps as handouts for the participants on the course that I lecture on.

Knowledge of left and right brain. The left side of the brain deals with language, numbers, logic and analysis, while the right-side deals with creativity, images, rhythm and colour. There is increasing evidence that the ability to put thoughts into images as well as words

enhances thinking skill and actually improves intelligence. Albert Einstein saw images in his head before he translated them into mathematical formulae. Both sides of the brain are complementary and can take over the functions of the opposite side.

> *"Interesting benefits to companies were findings that Mind Maps helped improve staff morale and motivation, improve creativity in writing and proved an effective tool for communication."*
>
> – R. Ellis

Disadvantages of learning maps

- Learning maps are idiosyncratic, or unique to an individual and therefore can sometimes be difficult for people other than the creator to read and follow. Therefore, there is no standard format for a learning map so that comparative studies are difficult to do.
- The hierarchical relationships may be inconsistent and too complex. The link between ideas may be unclear especially in other people's maps.
- They can be time consuming and cumbersome to draw especially if done manually. Manually creating learning maps requires thorough reading and comprehension which takes much time and effort especially regarding the design.
- They do not suit all people. Some people who are not visual orientated may shy away from the concept. After a lifetime of linear notes many people are resistant to the concept of a radiant approach.
- The reaction to learning maps is not always positive. Although most students find the technique useful some research revealed that it did not always increase short term recall or critical thinking (Melrose 2013) as claimed by some advocates.
- The research supporting the use of learning maps is inconclusive. Its links to the brain, learning theory and memory are debatable.

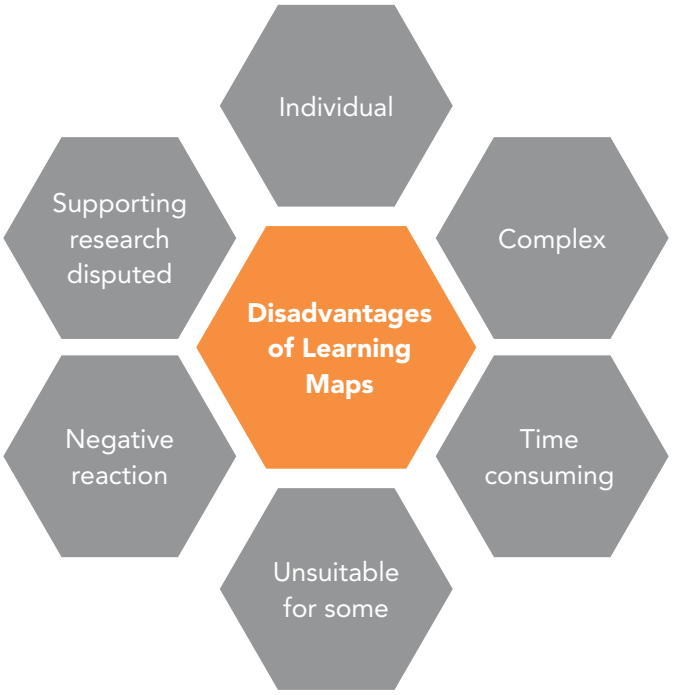


Fig. 1.5 Disadvantages of learning maps

1.4 EDUCATION USES

Learning maps are now used in many areas of life, such as education, business, science, optometric, and personal development. O'Reilly (2015) claims that specifically within the area of EFL (teaching English as a Foreign Language) mind mapping has been successful as a teaching tool for the development of writing skills. Like all academic students' foreign students of English must master grammar, punctuation, structure and conventional and judgemental elements. The nature of mind maps with their radiant organisation and associations of ideas helps in the drafting and planning of the academic writing process. The writing process includes outlining and organising, researching and taking notes, and analysing and synthesising.

Anokhin (1973) found that using mind maps for lesson planning can help teachers or trainers identify a logical plan or teaching route and increases recall of the subject matter. This can boost confidence and facilitate the smooth running of programs. McClain (1987) proposed the use of mind maps in optometric education. In particular, she recommended that students be given a skeletal map (with blank terms) at the beginning of the lecture. Students would be required to fill the blanks as they listened to the lecture. She indicated that mind maps would allow teachers to stay on task, allow students to add their personal ideas to the topic, and increase comprehension.

Learning maps are an active learning method just like case studies, role play, problem-based learning and are recognised strategies to foster critical thinking in learners especially for those studying for professional qualifications and university degrees. People who use them attest to their effectiveness as planning, notetaking, summarising, revision and learning tools. They encourage active hands-on-learning by engaging the senses of the learner such as visual and touch. They are an aid or means to an end rather than an end in themselves. They will help you to learn more efficiently and effectively, but they are no substitute for hard work. Learning requires long hours, concentration, positive thinking, motivation and persistence. Without these attributes you are unlikely to succeed in any endeavour.

Learning maps improve concentration because they promote the interaction and engagement between learner and text. They force the learner to decipher the precise relationship between concepts, link ideas to other ideas, and determine the hierarchy of the ideas. They encourage learners to turn tacit knowledge into explicit knowledge which often they don't realise that they possess. However, learning maps will only make the job a little bit easier, but will not do the learning for you. You must do this yourself. Let's now look at some of the applications in education and training and development for learning maps.

Further applications in education, training and development

Learning maps have a long history in formal education, and training and development. They are a powerful tool for teaching, learning and memory and can be used for, making presentations, curriculum design, training needs analysis, and training evaluation. They can be used to involve and engage relevant parties in curriculum development, such as fellow educators, trainers, learners, professional bodies and employers. Learning maps show how all the theories and knowledge in a syllabus fit together. They can be used to plan handouts, take notes and make notes and present learning sessions for individual courses or for entire curricula. During a presentation learning maps help you to keep focused on the main points making it less likely that you start to stray away from the key issues and overlook important points.

They can be used to identify the relevant knowledge a learner possesses before or after training. A comparison between before and after the training intervention should determine the learning gap and the amount of learning that took place in the interim. In a corporate setting learning maps can be used to capture expert knowledge, so that it can be preserved and shared with others. They have even been used to record and analyse the variety and complexity of tasks involved in a trainers' and teachers' job, so that a comprehensive job analysis and job description can be compiled. Gannerud et al (2005) used mind maps to analyse the range and scope of teachers' work.

Learning maps can be used for note taking as when taking notes at a lecture and note making as when summarising the main points of a non-fiction chapter or book. They can also be used for taking notes from articles, reports, presentations and textbooks. Students can also use them for recording, organising and sharing complex research. They help students integrate and see the connection between their prior knowledge and new information. They also help students realise that they may not know how two ideas are related, and this leads them to develop new questions to investigate and explore. Macro maps can be used to summarise a complete book while micro maps can be used to summarise chapters supporting the macro map. Creating one huge map with everything on it can quickly become unmanageable so that the need for supporting maps becomes apparent.

Learning maps have been found to be useful when planning essays, particularly in examination conditions where strict time constraints operate. When doing essays in exams students need to keep their answers relevant, clear, logical, organised and sharply focused on the question. It has been found that planning an essay, in the form of a learning map, can help students answer essay type questions more effectively. It also aids the recovery of information from a student's memory banks of prior knowledge in an exam context. This means that the time spent doing a learning map, before getting down to the essay, is worthwhile as it will be reflected in a better thought through and organised essay. Micro learning maps can be used as a plan before you commit thoughts to paper to answer examination questions ensuring that all aspects of the questions have been addressed.

Stankovic et al (2011) found that students are more motivated to learn when using mind maps. Mind maps allow visualisation of the content and better integration of theoretical and empirical knowledge. The following learning map is an example of one made for making presentations using the 4Ps mnemonic of planning, preparation, presentation and postmortem.

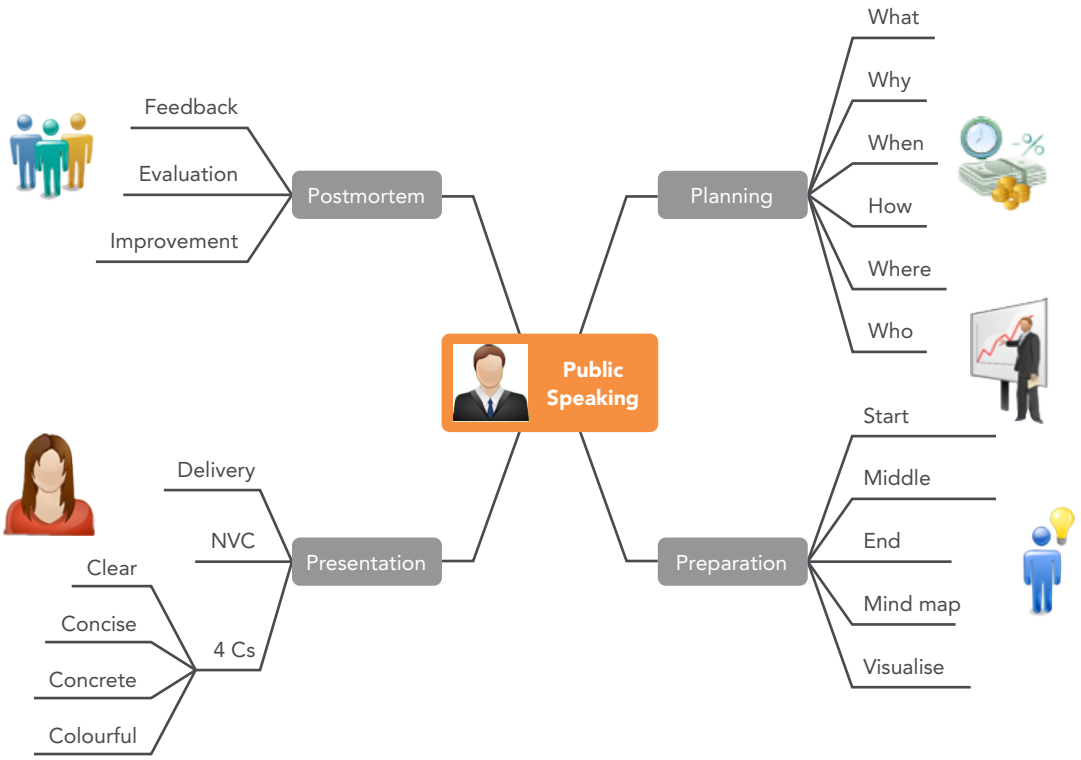


Fig. 1.6 Learning Maps for Making Presentations

"The mind is like a parachute – it works only when it is open."

– Old saying

1.5 BUSINESS USES

Learning maps have a wide application in business. They are used by companies such as Boeing, Disney, Microsoft and NASA to help them plan their business activities. They have been used by banks to capture knowledge, and make it available to other employees. Charles Jennings, global head of learning of Thomas Reuters, uses them to keep track of the different aspects of their training throughout their organisation. These aspects include course content development, course workbooks, trainer training, training delivery, and assessment of outcomes.

Jennings maintains that learning maps play a central role in every aspect of their learning and development work; from training needs analysis to brainstorming around course development and delivery, through data capture and performance charting. The maps can be exported to programs such as Microsoft, PowerPoint or Project, enabling the manager to monitor and control the individual projects of employees.

Byrnes, (2010) claims that in project management mind maps can be used for brainstorming, organising, requirements gathering, decision-making, and planning amongst many other applications. The feedback from project managers is unanimous: it makes their job easier, more effective, and fun! Mind mapping saves time, eliminates duplication of effort, accesses the creative genius of individuals and teams, makes assigning priorities and timelines fluid and easy, and makes presentations stand apart from the rest. There is even software called Matchware specifically designed for project managers. With a simple click of the mouse, the mind map can be converted into a Gantt chart or a timeline which eliminates the need to recreate or transfer information from one program to another. Within the mind map package, dependencies, priorities, critical paths, constraints, completion values, duration, lead/lag times, resources and milestones can be managed.

In human resource management interviewers use them when preparing for selection interviews, and to record the proceedings of the interview. At the end of the interviews they have a good overview record of the proceedings for selection comparison purposes, rather than relying on memory. On the other hand, candidates for the job can prepare for their interviews using a learning map to plan their research on the company, clarify their thoughts, anticipate likely interview questions, and plan their approach and answers to likely questions during the interview. Negotiators can use learning maps to give them the

competitive edge when negotiating. They use them to plan their negotiations, identify key players and goals, compare the pros and cons of different strategies, and clarify options while focusing on the big picture.

Learning maps are used widely in leadership training to impart the skills of communication, teamwork and interpersonal relations to prospective leaders. These and other skills such as problem solving, decision making, time management and strategic planning are essential for successful leaders. In project management learning maps are excellent for communicating the objective of a project, the different tasks involved, and the role and function of team members.

Learning maps can be used in strategic planning to think through such useful techniques as SMART goals (specific, measurable, attainable, relevant and timely), SWOT (strengths, weaknesses, opportunities and threats) and PEST (political, economic, social and technological) analysis. For example, a SWOT learning map can be drawn up to identify competitive threats, and exploit the company's strengths and most promising opportunities to deal with them. In marketing they can be used to flush out the 7P model (product, price, promotion, place, people, process and physical evidence) and to illustrate Porter's Five Forces Model.

Marketers' have used them to create marketing plans, do market research, brainstorm product improvement, and new product developments. They are a great way to illustrate marketing models including the Product Life Cycle, The Growth Share Matrix and the Marketing Mix (4Ps). Sales people have used them to create their sales plans and make their annual sales presentations. They can be used to build up outlines of important customer profiles which can help in analysis of market segments. They have even been used to demonstrate how marketing can be used to promote the arts. Tax consultants have used them for client financial planning. In summary, learning maps can be used to clarify complex ideas in business management, strategic planning, management accounting, economics, law and marketing. The potential uses of learning maps is only limited by your imagination.

Use the learning map for creating ideas and planning out your report. This will improve the design, clarity, conciseness, coherence, organisation, logic and sequencing of the content of the report. In a business context, learning maps can banish writer's block from letters, reports and memos. For report writing, use the learning map for planning and creating ideas. In structuring reports key points can be used as headings while the supporting points can be used as subheadings. Use learning maps for review and recall purposes when reading complex reports and for getting a quick overview of the key issues. This saves considerable time. Similarly, learning maps can be used to plan books, articles, essays, assignments and dissertations.

They are particularly useful when planning your time on a yearly, monthly, weekly and daily basis. There is no better way to increase your personal productivity than by having strict control over your time and how you spend it. Learning maps are a great way to visually prepare for the coming week, and plan priorities for each day. Print it out and stick it on the wall next to your computer monitor, where it is easy to see. The following learning map gives a quick overview of the key elements of time management.

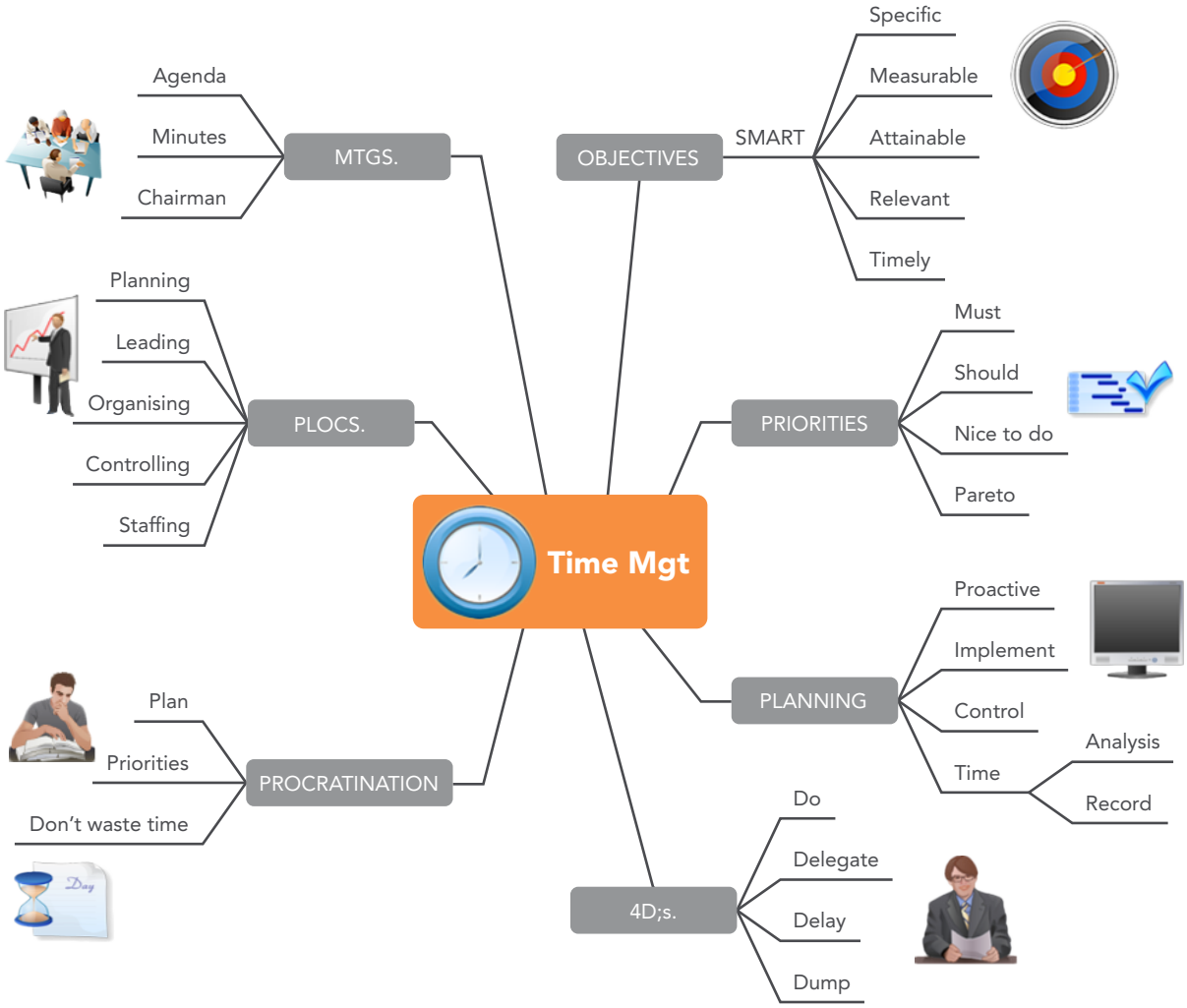


Fig. 1.7 Planning your time

Taking notes and making presentations

Learning maps can be used to plan meetings and draw up an agenda. During the meeting they can be used to record the main findings, conclusions and decisions made, and draw up the minutes after the meeting. People responsible for agreed outcomes and actions are recorded, so that there is no doubt as to who is going to do what and when. At the next meeting the completed actions and outcomes can be accounted for. This means that things decided at the meeting are monitored, followed up and done.

They have been used by law lecturers to make business law more accessible and understandable to students, by making the relationships between key concepts transparent and visual. Just like for lectures and training sessions, learning maps are great ways to plan, prepare and deliver presentations. They help many overcome the fear of public speaking and writers' block when preparing their speech. Learning maps will keep you on track and in time. They can be used to plan and structure communications, such as email, letters, memos and reports.

These maps have been used by librarians for teaching and other presentations, researching and writing, brainstorming, and project planning and management. They are particularly useful when brainstorming in groups and teams. They can be used instead of, or in addition to, PowerPoint and other presentations to provide a big picture overview, connect the big picture to the small details, show relationships across subtopics, and make the whole presentation easier to remember. Ideas can be captured as they come up, added to the appropriate branch, without worrying about where they fit in the scheme of things. Once all the ideas are captured, they can be grouped, analysed, debated and prioritised.

> *"Few processes are more complex than negotiations, but there is no better way to model a negotiation than with mapping. All this complexity becomes accessible."*
>
> – Clive Lewis

1.6 SCIENCE USES

Learning maps have proved their usefulness in areas such as economics, law, accountancy, social science, engineering, health, psychology, medical science, nursing and midwifery education and even polar exploration. Learning maps helped accounting students integrate and clarify complex materials better than just relying solely on the textbook. I taught accounting, costing, management accounting, marketing, management and strategic planning to CIMA and other students over many years at night classes and during exam revision courses and they found them very useful as a learning aid for previewing and reviewing material.

Social science students learned more effectively when using learning maps. The reason for this seems to lie in the manner in which learning maps integrate students' prior knowledge and previous experience with new information. In one case the complexities of race relations were explored through the use of learning maps. It was found that the maps enhanced students' critical thinking, synthesising and analytical skills by visually connecting social, historical, and economic factors to ideas about race relations.

It is believed by some researchers that learning maps may be better suited to qualitative research because they provide more flexibility than concept mapping. Some reflected that learning maps were a useful way to record experience, with practice they were easy to make, and helped them see things in a new light. Some suggested that this was because learning maps helped them remember events from years ago, and helped them organise their thoughts about their experience systematically. Others suggested as a visual aid, learning maps helped them put the experience in context and provided a clear view of what happened. Many were not novices in the use of learning maps, as over the years they used them to focus on key experiences, concepts and connections.

Learning maps support learners to think in conceptual and theoretical terms. Learning maps are used routinely by students in medicine, nursing, science and mathematics. Medical students learning physiology gained deeper meaningful knowledge, and exhibited more critical thinking when they used learning maps. Critical thinking has been defined as the ability to link data, knowledge, and insights together from various disciplines to provide information for decision-making. Critical thinking skills involve the processing of information through analysis, synthesis, interpretation, explanation, evaluation, generalisation, abstraction, application, comparison and contrast. Critical thinking skills, like common sense are not very common but must be developed and worked on.

Noonan (2013) found that lifelong learning is a key aspect of a midwife's and nurses' professional practice and mapping may be a resource that can be used to assist students and future practitioners. Nurses learn to organise key information essential for practice. Learning maps in nursing can be used for career planning, care planning, qualitative research, note-taking, planning for exams, assignments, reflection and revision. Michelini (2006) found that marrying mind mapping with care planning encouraged the use of critical, whole-brained, holistic thinking when applying the nursing process and using nursing diagnoses. For career planning you can show your strengths and weaknesses in the form of a learning map for reflection. They can be used to structure assignments and to develop an introduction, context and conclusion.

Williams et al (1997) a cognitive therapist used mind maps to clearly formulate case histories of patients. They can be used to provide a clear, structured and easily updated statement of the essential features of the case. There are definite advantages of writing down a clear case summary. By using different modes of memory storage (factual, visual and colour) mind maps increase the ways in which information is remembered whereas linear text uses only writing. It can help the cognitive therapist clarify their thinking by forcing them to identify only the key patient information. The mind map provides the facility to write down the key elements of the history, allowing the therapist to think about what they have found, synthesize and summarise information in a rapid, memorable and effective manner. Key

facts are condensed onto a single sheet so that very large amounts of information may be reviewed very quickly. This approach is very helpful clinically and is efficient in terms of time and resources.

Kotcherlakota et al (2013) claims that in graduate nursing education learning maps promote metacognition or awareness and meaningful management of thought processes and thinking skills. Thinking or cognitive strategies overcome the inherent difficult challenges of organising knowledge. For example, using learning maps for taking notes, using images, summarising main ideas, are strategies encouraging the organisation of ideas in graphical or visual form and contribute to deep thinking and learning.

Jim McNeil, polar explorer has been using a software package called MindManager since 2004 to help him draw up logistic plans for his expeditions. He uses this to plan the routes the team will take, the fuel they will use, and to anticipate safety issues. He used a notepad and pen before, but as his missions became more complex and the conditions more severe, the need to quickly model and modify simulations with the rest of the team became more urgent. He has used the tool to visualise, brainstorm and plan for different scenarios that may arise on their expeditions through the Arctic. The following shows the major areas for the application of Learning Maps.

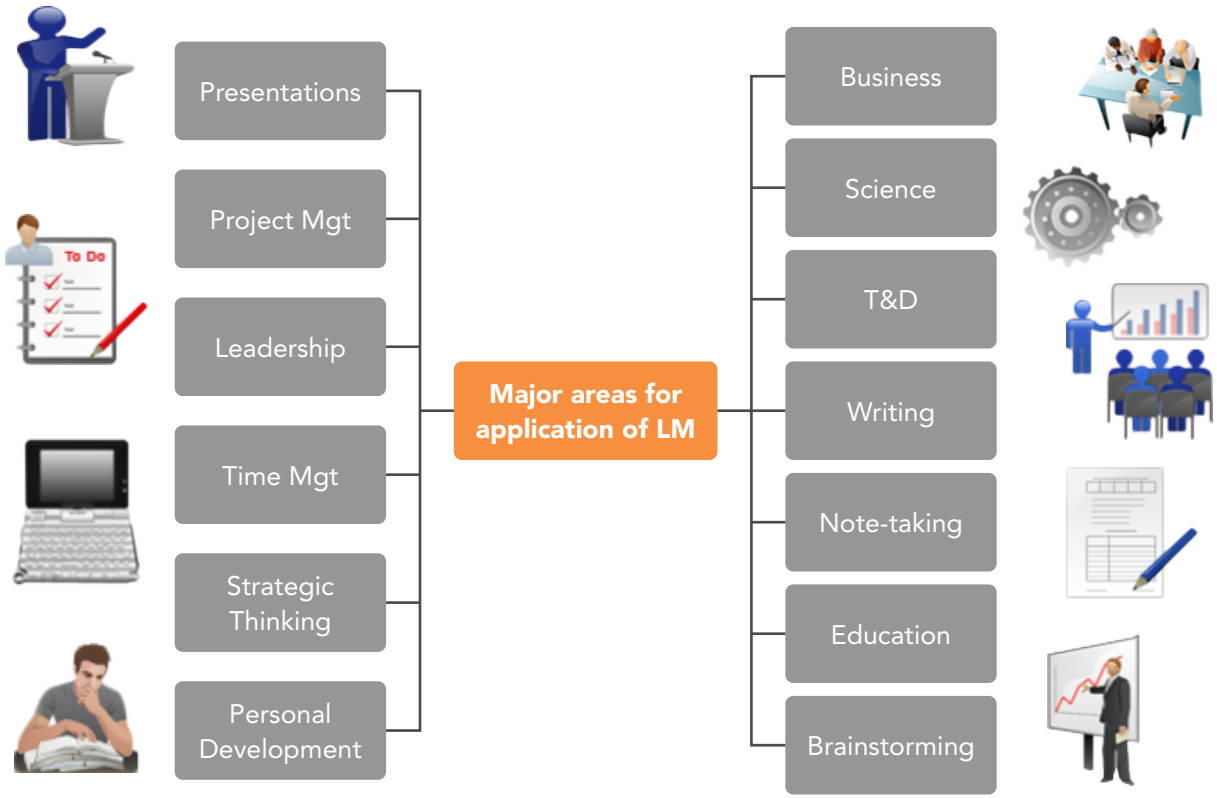


Fig. 1.8 Major areas for application of Learning Maps

"I use mind mapping software an awful lot for making safety plans and planning decisions. These expeditions are logistically very complicated and visualisation software has been a revelation in planning for it. As a team we have used the tool to visualise and brainstorm different scenarios that we might face in the Artic; even the unexpected and highly unlikely."

– Jim McNeil

1.7 MY OWN EXPERIENCE USING LEARNING MAPS

In my career as a training manager, financial controller, training consultant, organisation and methods analyst, administrator, lecturer and writer of business books I have used learning maps extensively. I also used them at a personal level when studying for professional qualifications and university degrees.

Lecturing

As a part-time lecturer of over thirty years I used learning maps to prepare and present my lectures in such areas as business management, marketing, costing, management accounting, strategic planning, finance, supervisory management, and human resource management. On the other hand, I encouraged students to use them for note taking and most of them found them useful: there is some resistance to change at the start as it is often a question of getting used to the unfamiliar radiant format rather than the traditional conventional linear format.

I'm not the only one who saw this application for learning maps. Murley (2007) cites that at the Oregon Health and Science University, two dentistry professors use mind maps to help students learn and remember complex information. Professor Ron Sakaguchi gives his students a map of each lecture's objectives and content, which he also summarises into a single map before examinations. However, it is not always plain sailing, experience has shown me with some training, many students adapt readily to learning maps. However, I must admit that some students do not like them and prefer to stick to their traditional linear and logical methods of notetaking.

Sometimes I would build up a learning map on the flipchart or whiteboard, and students found this better than the usual talk and chalk approach, as it encourages active learning in the form of exploration, discussion and participation. The instructor becomes a 'guide

on the side' rather than a 'sage on the stage.' In other words, a facilitator of learning rather than a director. When discussion leading, I used them to record points of view and debate their validity. I also gave out skeleton learning maps for students to complete and customise as the lecture went on. This gave them 'hooks' to hang their new learning on. They found this very useful as it gave them the opportunity to customise the learning map to their own needs.

This was in response to student requests, as I always emphasised that from a learning point of view it was better if they prepared their own learning maps. Nevertheless, they found the skeleton frameworks useful as a starting point. In fact, the more personalised the learning map the more effective they are for learning. Most of the learning is in the making and preparation of the map and subsequent reflection. Nevertheless, Melrose (2013) found that research has indicated that students who used teacher-constructed mind maps as study aid scored higher on quizzes that those who did not.

Training

During my career as a training manager in the Electricity Supply Board (ESB) in Dublin I ran learning maps workshops for all grades of staff, including clerical, administrative, accounting, information technology, marketing, human relations, legal, supervisory, technical and engineering. I used them in financial literacy and business management programmes. The feedback from these workshops was very positive, and the variety of applications of the technique was diverse. I also ran study skills workshops, including a session on learning maps, aimed at staff doing university degrees, diplomas and professional qualifications part-time. Most participants of these workshops went on to use learning maps extensively in their formal studies, work lives and even in their personal lives. Some of them even passed on the skill of making learning maps to their children.

Similarly, I used learning maps to research, prepare and present my lectures. Learning maps help learners to visualise and integrate information and this helps them to remember key points. I also encouraged course participants to use them. I found them to be an excellent tool in collaborative learning particularly when analysing business case studies, and in facilitating brainstorming and creativity. They are a great technique for capturing group composite thinking, while at the same time developing individual and team skills and group morale and confidence. Group members learn to present debate and defend their ideas, listen to other peoples' point of view, and learn from the diversity of thinking, experience and knowledge within the group.

When I took early retirement from the ESB, I set myself up as a freelance training consultant, part-time college lecturer and writer of business books. In this role I have used learning maps to design, prepare, and deliver training and educational programmes in a diverse range of private and public sector organisations. I have used them to design course syllabi and course schedules. When making presentations, learning maps help me to maintain eye contact with the audience – a most important aspect of making effective presentations. They also allow me the flexibility to stay within time, as I can easily customise the presentation to fit within time constraints while still covering the main ideas. Using learning maps as a presentation tool will help your presentation to be free-flowing, engaging and natural, rather than histrionic and formal.

As an organisation and methods analyst of clerical, administrative and operations work I used learning maps to record, analyse and capture the range and variety of tasks that these people did in their everyday jobs. The learning maps were then converted into flow process charts and systems flow charts to improve the methods and eliminate any unnecessary operations and movements. This increased the productivity of staff while at the same time making their jobs more efficient, motivational and satisfying.

Writing

From experience I have found learning maps to be a great antidote to writer's block. Their open-ended structure helps me to be creative in brainstorming ideas, and exploring issues and coming up with the appropriate words when writing. Organising and critically analysing and synthesising new and complex information from diverse sources can be overwhelming without the aid of learning maps. When you use them to record your existing level of knowledge, they mirror what you know at a particular point in time. They help to identify gaps in my knowledge and alert me to areas where I need to do further research.

The research and writing process may take place over many months and even years, during which time I can be distracted by other work. However, once I have made the learning maps it is a permanent record so that I can return to again and again and the writing flows seamlessly from them. Learning maps help me to stay focused and I can return to them with additional thoughts and research and resume my concentration even after interludes of many weeks or months.

Visual outlining tools such as, learning maps, mind maps, diagrams, concept maps and flow charts are very useful to writers in helping them organise their ideas while providing a stimulating framework for their writing. Learning maps help me organise my notes in a systematic way when researching a particular project. As the author of over 20 conventional

books and 30 e-books on personal development, management, marketing, learning and study skills, I have used learning maps to research and integrate my material from various sources.

Learning maps help me to organise my knowledge, ideas and thoughts in a structured and logical and free-flowing way. They have helped me produce well written and structured books, in less time and with fewer drafts, significantly increasing my output and productivity. So far, any book that I have written has been published. They have also helped me get articles published in numerous professional journals over many years.

> *"Note-taking may be a valuable aid to learning chiefly because students have to think about what they write. Particularly if information needs to be abbreviated, a student must ask himself what is important."*
>
> – Michael Howe & Jean Godfrey

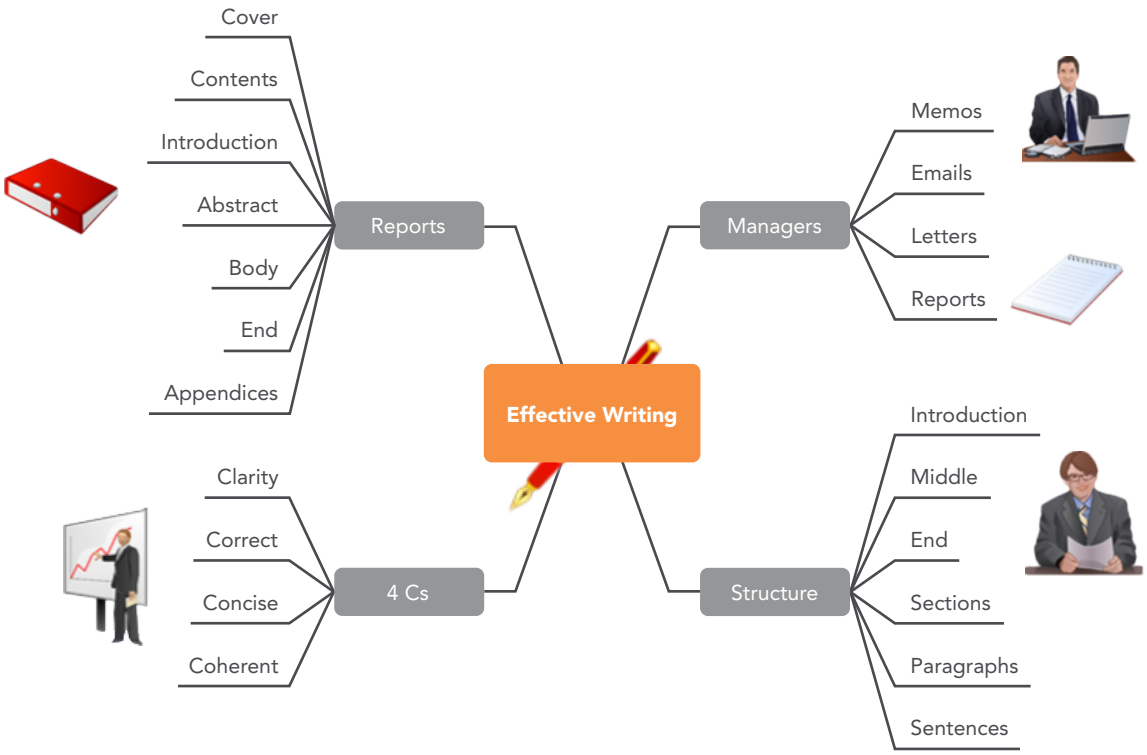


Fig. 1.9 Learning map of effective writing

1.8 PERSONAL DEVELOPMENT USES

At a personal level learning maps can be used when brainstorming, problem solving or decision making or writing up your curriculum vitae. For brainstorming they can be used to generate ideas either individually or collaboratively in groups. Ideas can be captured as

they are suggested, without worrying about where they fit in a hierarchy. When all the ideas have been captured, they can be grouped and prioritised. The visual presentation makes it easy to see links and associations between ideas. With mind mapping software, organising a brainstorming learning map is a simple drag-and-drop operation. Paykoc et al (2004) described the successful use of mind maps by faculty members in brainstorming curricular change. The map was projected to the group and the progress of the discussion was reflected and monitored on the mind map.

They are also useful when writing a curriculum vitae or building a portfolio for job applications. You can use key topic headings within a learning map to organise evidence and examples of your skills and experience in an easy and flexible way. It then becomes easy to add changes and updates to the appropriate branches on your CV as time goes on.

For problem solving they can be used to clarify interpersonal relationship issues, generate alternatives, and suggest appropriate solutions. The biggest long-term financial decision you will make in your life is when you decide to buy a house. It becomes even more complicated when you have an existing house to dispose of. Buying a house, while selling an existing one, can be a traumatic time, and needs careful consideration and planning because of the variety of professionals you need to deal with, such as mortgage providers,

bankers, auctioneers, surveyors and solicitors. For everyday short-term financial planning and budgeting, learning maps can be used to set out your daily, weekly, monthly and yearly sources of income and expenditure in a cash forecast so that you know exactly where your hard-earned money is coming from and how you are spending it.

Learning maps can be used as a tool for lifelong and self-directed learning when keeping up-to-date in your particular field. Lifelong learning skills include the generation and communication of ideas, the ability to do research, independent and analytical thinking, analysis and synthesis of information, work collaboratively with others in teams, and the effective use of information and communications technology.

In the modern world where knowledge is expanding at an exponential rate and innovation and creativity is highly valued, it is very important to keep up to speed in your particular area of expertise. Learning maps can also be used to clarify your life vision, plans and goals so that you know where you are going, how you're going to get there and have a road map and purpose to follow in life. At a more mundane level, people have used learning maps to plan their holidays, outings, speeches and birthday parties.

I have also found them very useful when studying for professional and university degrees such as the Chartered Institute of Management Accountants (CIMA) and the M.Ed. (training and development) from the University of Sheffield. I used learning maps to summarise the content of management accounting and management texts. I was a prize winner in the CIMA exams and I attribute my success to the use of learning maps.

I used learning maps when planning my assignments and thesis for the M.Ed. degree which I passed with distinction. Learning maps helped me structure assignments and my thesis in a systematic, holistic and logical fashion and condense large amounts of information on a single page. In relation to the thesis, they helped me draft and plan the dissertation abstract, introduction, structure, signposting, findings, conclusions and recommendations in a clear, coherent, cogent and critical fashion facilitating greater balance in my writing overall. This was confirmed by a study by Toi (2009) who found that students who were trained in the use of mind mapping in planning before writing their English compositions improved their writing.

Just like many others in the research literature, I found them a useful way of condensing, integrating, digesting and overviewing information from many sources, including research, experience, observation and reflection. Over time as new information is discovered it can be easily assimilated into the learning map on the relevant branch thereby helping learners produce more robust research.

They helped me reflect on my level of knowledge and understanding, thereby providing me with feedback, so that I could monitor and identify my learning needs, reinforce my strengths and address my weaknesses. However, as I said before, learning maps are only a tool which will help you on your way. They are no substitute for concentrated study and hard work, but they will increase your efficiency and productivity. The following learning map is a quick useful overview of problem solving.

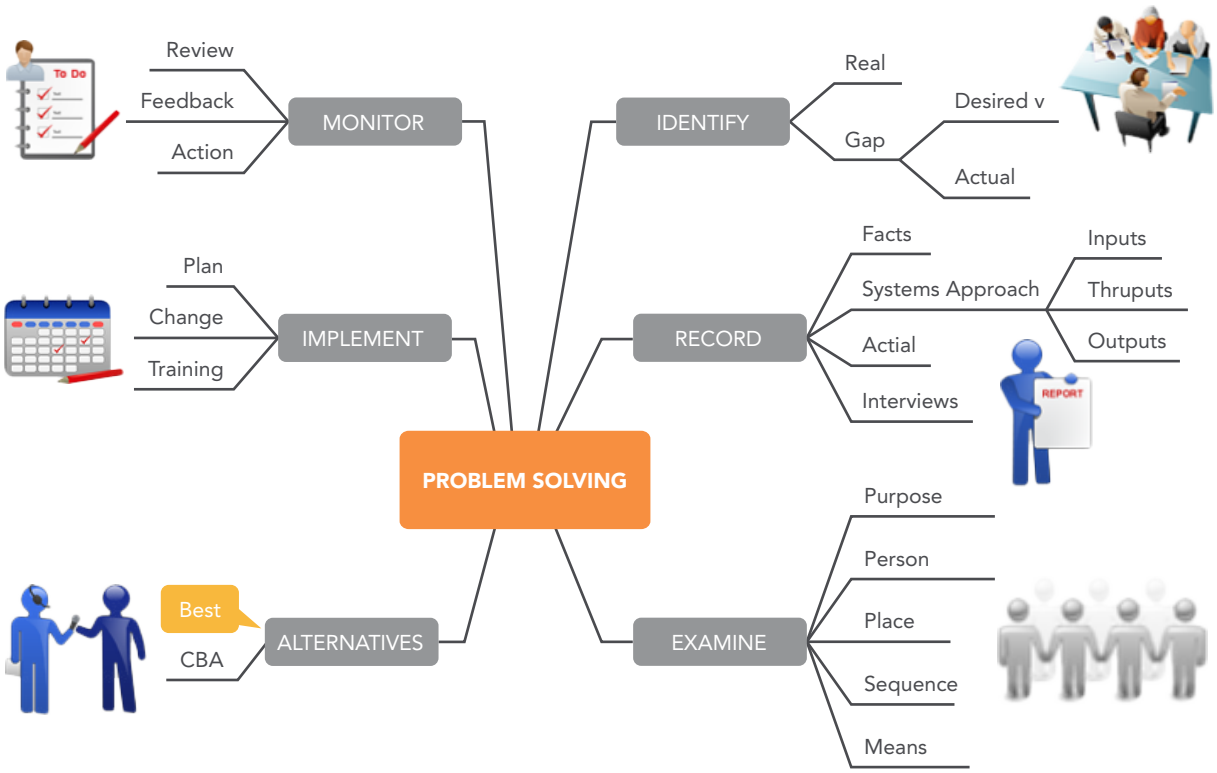


Fig. 1.10 Learning map for problem solving

> *"The real strength of the Mind Map approach comes when you combine your notes from various sources into one map giving you an overview of your accumulated knowledge in any topic."*
>
> – Dan Butler

1.9 WHY USE LEARNING MAPS

The short answer to this is because they are of practical use in many walks of life, and have proved themselves to help people learn and memorise more effectively and productively for more than fifty years. A multitude of peer-reviewed articles have been published in reputable academic journals on their application and use in the social sciences, engineering, medicine,

business and education. They are indirectly supported by research on the brain, memory and learning theory, in addition to personal testimony and anecdotes.

Briefly, they promote active, meaningful, and reflective learning. They facilitate learners in representing or manipulating a complex set of relationships in a diagram facilitating analysis, synthesis, memorising and comprehension. Lifelong learning is a key aspect of most professions and learning maps provide a method of organising information essential for practice and keeping up to date. Despite being initially labelled by some as quack psychology, they have now quite a substantial following, and body of research, supporting their use. In addition, users find them very useful in their personal and career lives. Let's now look at some of the scientific evidence supporting the use of learning maps.

Brain research

Our brains do not work in a linear fashion. We have numerous thoughts, images and impressions that occur simultaneously. Conventional outline notes can't keep pace with the complexity of our thoughts and the expansion of information but learning maps can. The centre of the learning map and its radiant organisation reflects how the brain is structured, wired and interconnected. Use images and colour in learning maps because the old Confucian saying 'a picture speaks more than a thousand words' applies to both memory and creativity. Colour is known to stimulate and energise the brain, and our ability to remember images is better than our memory for words. In psychology this phenomenon is known as the *picture superiority effect.*

The linked nature of learning maps reflects the associative and connective nature of the brain with its network of neurons, dendrites and synapses. Some psychologists maintain the human memory is a vast, intricately interconnected network. According to such models it is not letters, syllables, or words that are recorded in the brain, but a mental model of the world or concepts. The concepts are thus related in various ways to other concepts, forming an associative network.

The act of encoding or recording something on the brain is simply forming new links and associations in the network. Learning maps mimic the organisation of the brain by showing the links and relationships between key concepts giving users an overview and a greater insight and understanding of the topic. Learning maps are designed to replace conventional note taking by reflecting the way the brain actually connects information.

Two sides of the brain

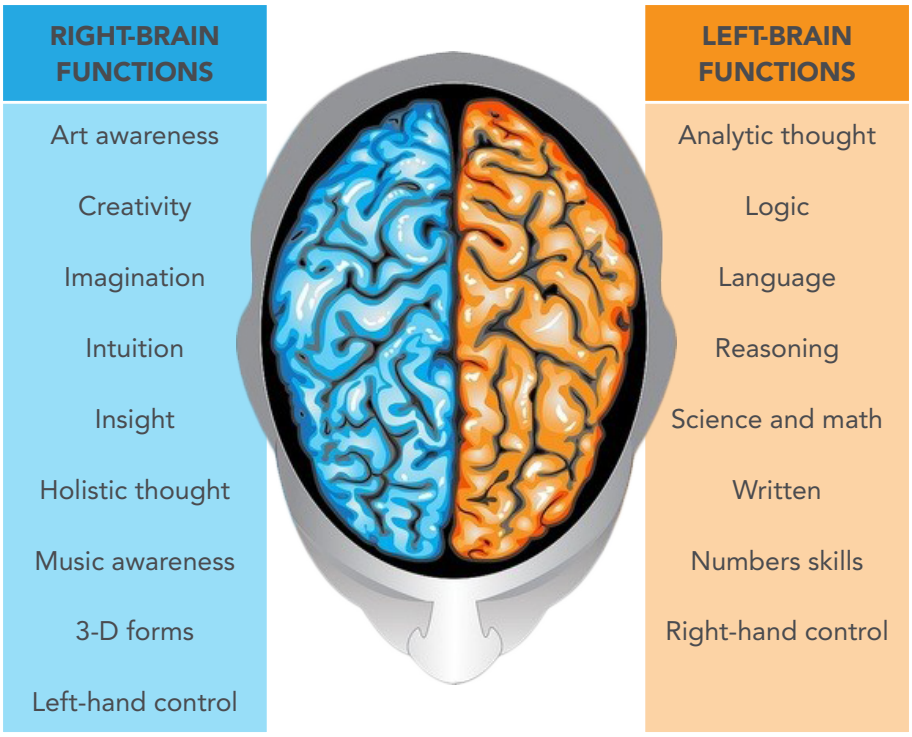


Fig. 1.11 Right and left-brain functions

Due to the work of Nobel prize-winning researcher, Professor Roger Sperry, we now know that the human brain consists of two hemispheres, connected by a large structure of 300 million neurons called the corpus callosum. Briefly the left hemisphere of the brain deals with words, while the right hemisphere handles images. Although the brain is bi-functional and multi-dimensional, the most creative and productive intellectual functioning occurs when the two hemispheres are talking to each other. Thus, integration and creativity can be encouraged through the use of learning maps.

It is noticeable in the great scientific advances throughout history, that people like Leonardo da Vinci, Albert Einstein, Charles Darwin and Thomas Edison combined imagination, intuition, drawings and key words instead of sentences with careful reasoned analysis to boost their creativity. Visual outlines are particularly helpful for people who are right-hemisphere-dominant thinkers, because they help them visualise the spatial relationship between ideas. Learning maps use icons, images, pictures and colour to help organise and prioritise information.

The left hemisphere controls the right side of the body, and a stroke to this side of the brain may impair speech ability. On the other hand, the right hemisphere controls the left side of the body and a stroke to this side of the brain may impair spatial awareness. Hence the conclusion that the left hemisphere is more verbal and logical, while the right

hemisphere is more spatial and creative. However, it has been discovered that hemispheric specialisation is not as clear cut as it is sometimes made out to be. It has been found that reports of deficits of imagery, for example, were just as likely to follow left hemisphere damage as right hemisphere damage.

Furthermore, more recent research on left brain/right hemispheres shows more integration and plasticity than was previously thought. Some psychologists compare our memory to a tree. The more branches on the tree, the greater the possibility for new branches to grow. The open-ended nature of learning maps, reflects the bi-functionality of the brain and mimics the brain's plasticity and synaptic networks, and encourages links and associations and the identification of relationships.

> *"Our education system, as well as science in general, tends to neglect the non-verbal form of intellect. What it comes down to is that modern society discriminates against the right hemisphere."*
>
> – Professor Roger Sperry

Memory

Miller's magical number 7 plus or minus 2 rule in memory, suggests that main branches on the learning map should not number more than 9. Some experts even suggest that our memory store is limited to only four pieces of information at a time. Learning maps chunk information on branches into meaningful groups by a process of segmentation. In most practical situations there are seldom more than seven or eight main branches, so that the material on a learning map can be organised into a number of easily remembered chunks to facilitate recall.

Each main branch can in turn be divided into seven or eight sub branches, to keep them within the short-term memory capacity of nine items. Learning maps thus capitalise on Miller's memory law, by careful organisation and grouping of words within segments to maximise learning and recall. In addition, images, diagrams and colour, are more easily stored in memory than text.

People remember things better if they are unique and outstanding. In psychology this is known as the *Von Restorff effect*. Hence learning maps are constructed to print key words in colour and to make them two dimensional for greater emphasis. The connecting lines are also made thicker near the centre and less so as they radiate out; so that lines and words have a hierarchy of thickness signifying the importance of ideas. In education, learning

maps have been found to be better in promoting knowledge retention, than attending class lectures, reading, or participating in class discussion.

Studies in psychology show that it is far easier for people to remember information if it is personalised. Personalised codes on learning maps using colours, arrows, symbols, icons and abbreviations add a fourth dimension to learning maps. They enhance the learner's ability to analyse, define, structure, organise and reason. Most words are still recognisable if vowels are dropped providing a unique form of shorthand giving more space on learning maps as needed.

Your short-term memory is remarkably fickle. Recently presented material, if unrecorded and unrehearsed is usually soon forgotten. Ideas externalised in a learning map can be studied, explored, extended, enhanced and experimented with. The structure of learning maps, with review, facilitates storage in long-term memory. In educational psychology the three *'R's' of memory* are registration, retention and recall. Every form of learning involves information encoding, storage and retrieval.

Acronyms and mnemonics

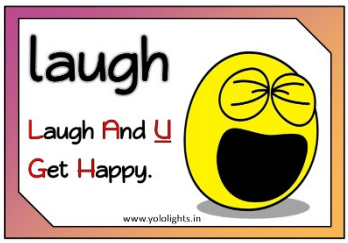


Fig. 1.12 Mnemonics

A learning map processes information by making it meaningful through its spatial radiant organisation, and its links and associations. It is in fact a major visual mnemonic device. A mnemonic is a learning technique that helps us organise, retain and remember information, by making recall and review easy. It is also an external record that can be studied and reviewed as needed. After a number of reviews, the information on your learning map will be registered in your long-term memory. Psychologists have long established that up to 80% of textual material is forgotten within 24 hours, unless reviewed and rehearsed. The learning map is an ideal instrument of speedy review. Learning map summaries of complete texts can be reviewed within 5 minutes. A systematic review plan spaced over a period of time will ensure registration in long-term memory.

We make information more memorable in learning maps by inventing acronyms for key points and memorising these. Mnemonics such as acronyms have a long track record as memory aids. They go back thousands of years to Greek and Roman times when philosophers and scholars recognised their usefulness for remembering key points when making presentations. In those days there was more reliance on an oral tradition rather than a written one. The method of loci is one of the oldest mnemonic devices that memory experts use. Learning maps are a method of loci, with their unique shapes, using the branches as main locations, and the sub branches as more specific locations. The locations can be used to associate a series of ideas to be learnt and to put them into context.

Today school children use mnemonics without prompting, and they are the secret weapon behind stage mnemonists who amaze their audience with their memory feats. These memory experts recall vast quantities of information by forming idiosyncratic verbal and visual associations for the information they want to remember. They realise that words converted into images are more easily memorised than those that are not. Similarly, it has been found that students who express their learning visually had a 40 per cent higher retention rate than verbal learners. In fact, as we know learning maps are a major visual mnemonic device.

> *"In a recent survey, 80 per cent of respondents said that they suffer from information overload. Mind Mapping can streamline a lot of thinking activity. It's a great way of recording and storing information, not only by making the information visually memorable, but also by generating associate thoughts. In essence, it's a thinking technique that parallels the way the mind thinks."*
>
> – Clive Lewis

Learning theory

Many of the theories of learning may support learning maps. Gestalt and Freudian theories are classic examples of holistic approaches in psychology. Gestalt psychology puts forth the view that context, organisation, and meaning, are important factors for perception, learning and memory. Freudian theories emphasise the importance of the subconscious in learning because of its vastness, and impact on our behaviour. The basic concept of a holist position is that a complex phenomenon cannot be understood by an analysis of the constituent parts alone. To understand we must perceive the 'big picture' rather than dwell on individual elements or details of an idea, concept or picture. Learning maps are based on the principle of holism, giving the total overall picture made up of many inter-related parts.

Many new educational programmes around the world now focus on how to improve the mind's operation through 'learning how to learn skills.' In a rapidly changing world, with new techniques coming on stream frequently, it will be more important for people to know how to learn and continue learning throughout their lives. Most people now change careers and jobs several times in a lifetime, and often have to acquire new experience and learn new knowledge and skills to equip them for their new roles.

It is thus essential to learn new skills efficiently and effectively. Learning maps are one of the visual learning techniques that will enable people to achieve this goal. Peter Drucker, the late great management guru and father of modern management, realised this when he said that the business executive of the future must be someone who is able to 'learn how to learn.' In medicine, science and technology, particularly information technology, a graduate's knowledge is out of date within a few years. So, if you want to keep up to date you must engage in purposeful lifelong learning.

Deep versus surface learning

It is now known that the probability of learning something effectively is a function of the depth of processing. Words processed only in terms of their superficial visual appearance are poorly retained and understood. Words categorised in terms of their sound and visual associations being somewhat better recalled. The best learning tends to be associated with richer word encoding. This means identifying key words in terms of the whole picture while making connections between theories, concepts and prior knowledge. Learners should concentrate on key issues, concepts and principles rather than getting bogged down in detail. Learning maps encourage rich word encoding and deep rather than surface learning because of their use of highlighting, images, mnemonics and imagery.

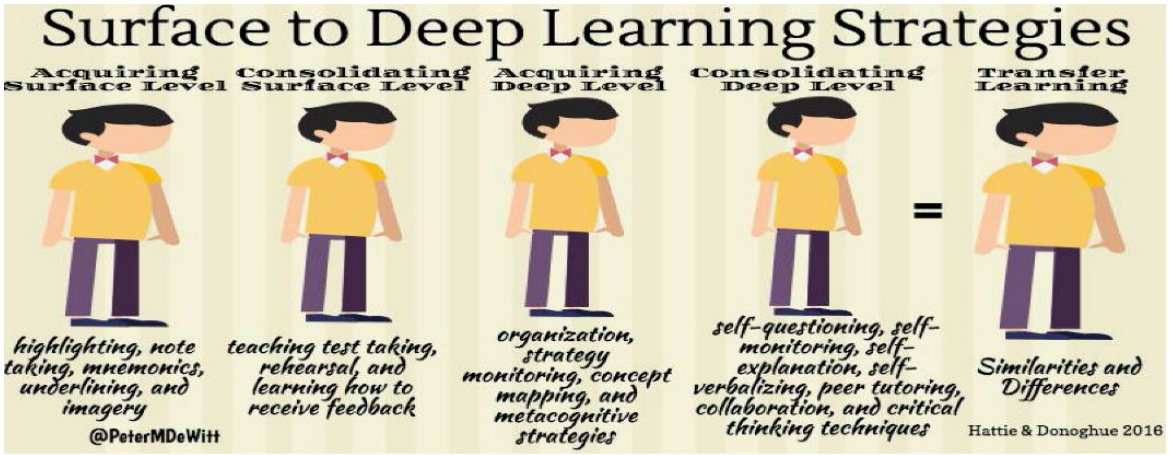


Fig. 1.13 Surface versus deep learning

Many scientists have come to the conclusion that the key to more effective learning may lie in the limbic system within the brain. The limbic system controls the emotions, and engaging the emotions is the most effective way to create attention, interest, enjoyment and motivation which are key ingredients to successful learning. The imagery, novelty, fun, aesthetic and entertaining quality of learning maps may activate the limbic system by appealing to the emotions and thus help learning.

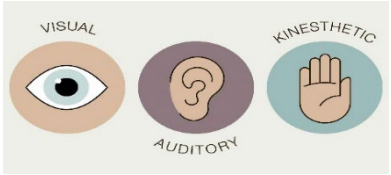
High level learning involves comprehension, making relationships, synthesis, evaluation, application and analysis. Learning maps bring together information from various and diverse sources on a single page enabling the mapper to critically analyse, synthesise, overview and make sense of the information recorded. This process encourages deep rather than surface learning.

Learning simply by listening passively to presentations or lectures is more likely to result in rote learning whereas learners who produce their own learning maps are more likely to engage in deep learning. This is so because learning maps help students to actively learn by linking new information to prior knowledge and experience, rather than relying on rote memorisation and cramming. In addition, people who become proficient at using learning maps for note taking and note making, claim they are a great way to take more organised notes in real time, because they're inherently structured and endlessly flexible to handle additions. Encouraging students to compare and contrast learning maps with fellow students is an additional activity that can promote and encourage collaborative meaningful learning.

Learning styles

The *Dual-Coding Theory in learning* claims that learners encode information in two distinct information processing systems, one representing verbal information, and the other representing visual information. Learning maps present a visual image as well as verbal information and therefore presumably taps into this dual-coding system.

The basic learning styles are visual, verbal and touch. Learning maps engage all three styles. Visual in the form of the text and images recorded. Verbal when the information on the learning map is rehearsed, revised and reviewed. Touch when the learning map is created with all its branches, sub branches and interconnections. Learning maps are in fact an active hands-on way of learning.



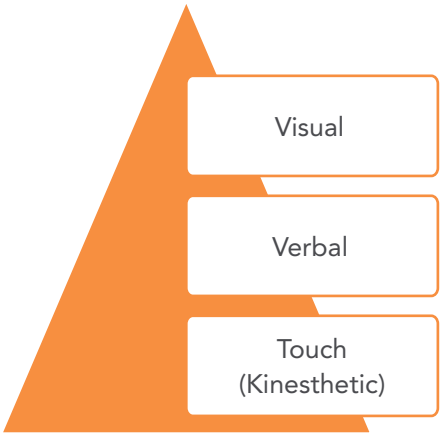


Fig. 1.14 Basic learning styles

In a lecturing context, auditory learners are well catered for by the traditional verbal presentation. However, visual learners need additional support, and tactile learners need

to do things to learn, so that if they construct learning maps it will meet these needs. In addition, in line with the theory of multiple intelligences, learning maps will help to engage your verbal, visual, spatial and creative intelligences. Learning maps are especially helpful for strong visual learners who absorb information better when it is presented via diagrams and similar visual aids than through written text alone, but all learners benefit from absorbing information in more than one way.

Kolb's learning style inventory has four dimensions: active experimentation (doing), abstract conceptualisation (thinking), reflective observation (watching), and concrete experience (feeling). It has been found that students with a 'doing' learning style learn more effectively from constructing and using learning maps.

People learn better in groups by sharing ideas and learning from each other. Collaborative learning maps facilitate this process, and also encourage idea generation and creativity.

> *"Meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures."*
>
> – Prof. Joseph D. Novak

1.10 SOFTWARE PACKAGES

Over the past 20 years software packages have been developed and refined to facilitate the drawing of learning maps individually or in groups. They have been used in various areas such as business, education, science, information technology and engineering. Such programs overcome the limitations of hand drawn maps, which are time consuming to create, inflexible, cumbersome, aesthetically unattractive, difficult to revise, and perplexing for others to follow. However, you are constrained by the design of the program while hand drawn maps are very flexible and can be designed to suit your own purpose and can be done at any time – all you need is a pencil and plain unlined paper.

Nevertheless, these software packages will quickly produce learning maps of a consistently high-quality appearance and standard. Some of the reasons why some people shied away from learning maps are because they claimed they were too difficult and time-consuming to create, and that they lacked the artistic abilities to draw the images and icons to support the ideas. With software packages these problems are overcome.

One of the great advantages of software packages is their flexibility. Learning maps can now be easily created on screen. Branches, sub branches and words can be manipulated, moved around and rearranged at the click of a mouse in seconds. It is easy to modify and customise

the map as your knowledge expands, and thinking evolves. Font sizes can be created bigger nearer the centre, and smaller as you move outwards to differentiate the importance of ideas. Branches can be created in different colours to create emphasis and interest. If you want to reorganised your learning map, items such as icons and branches can be dragged and dropped around the screen as you desire.

In addition, learning maps created on a computer may also contain links to files, hyperlinks to websites, pictures and notes making them a comprehensive learning resource. Quick changes can be made with the option to save numerous successive versions, import them into word documents, or power point presentations to be replicated, projected to audiences or emailed to others for their contributions or additions.

The modern networked computer environment facilitates individual or collaborative learning through the sharing of learning maps. People can collaborate remotely online with others in creating group learning maps. During their construction people engage in critical debate about the topic they are learning. Learning maps provide support for critical thinking as well as for subsequent reflection, review and knowledge revision. Some software packages have built-in internet conferencing features, allowing users to view one or more learning maps at the same time, and the leader of the conference can give the other users permission to make changes. Some of these software packages are so flexible that you can make learning maps almost as fast as you think, provided that you are proficient in the use of the package.

Libraries of icons and clip art images

The packages come with libraries of icons and clip art images, which mean that you no longer need to be artistic to create visually stunning maps. In addition, photos, images, icons, cartoons, graphs, videos and text can be imported from the internet. Hyperlinks with your learning map can connect to other files, web sites or supporting topics. Learning maps have been used to plan and design web pages on the internet.

Learning maps can be saved and imported into Power Point presentations, or published as web pages. They can be filed as pictures on your computer and then imported when needed into your Word document. You can send your learning map to others as an attachment to an email, and revise them later in line with their comments. Hundreds of books, blogs and websites have been created about learning maps, in their various incarnations, so that there is plenty of information about them on the internet.

The following is a diagrammatic summary of the applications of learning maps.

Fig. 1.15 Uses for Learning Maps

In summary, my own experience over a long career as a manager, administrator, lecturer and trainer in addition to a growing number of research findings provides the evidence that learning maps are a potentially useful technique that enhance learning and memory and can be applied in a diverse range of circumstances. Well-motivated students, lecturers, trainers, administrators, professionals and managers with significant learning map practice are the most likely people to benefit from their use.

> *"MindManager is a visual thinking tool designed to enhance a user's productivity by transforming the linear text of traditional brainstorming and planning sessions into colours, graphics, and icons that enhance creativity and innovation, establish key relationships between ideas, and ultimately speed up project implementation."*
>
> – Massue Mirelle

1.11 FIVE ACTIVITIES TO IMPROVE LEARNING MAPPING SKILLS

1. Follow the rules set out in the book under how to draw learning maps so that your learning maps are of a high quality and understandable to yourself and others.
2. Support the text by visual metaphors such as clipart to make your learning maps more attractive and memorable. Pictures and images can be used to trigger off words and ideas.
3. Practise using learning maps in all areas of your life including making presentations, time management, business, career, study and personal planning.
4. Use a software package so that your learning maps are cleaner, neater and more aesthetically appealing. However, you can also draw them by hand and build up practice and experience of using them.
5. Do a micro learning map for each chapter of the next non-fiction book that you read and a macro learning map for the complete book. These will help you to overview and review the book quickly if necessary. Use your spare time to practise doing learning maps and slowly introduce them into your daily and lifelong learning activities.

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