

Learning From the Perspectives of Mind Mapping

Padmanabha C. H [1]
Dr. H.M. Kasinath [2]

Abstract:

Mind map is an organisational thinking tool put forward by an Englishman called Tony Buzan . A mind map is similar to a semantic network or cognitive map, but there are no prescribed boundaries on the sort of links used. Most often the map involves images, terms, and shapes. The basics are arranged inductively according to the significance of the concepts and are organised into grouping branches or region. The homogeneous realistic formulation of the semantic organization of in sequence on the method of get-together knowledge may aid recall of existing memories. A creative device likewise combines two elements to project a third into the future, but the creative aim is to charge or affect the future in some way, whereas the mnemonic aim is simply to remember. Thus, by making mnemonic mind maps, simultaneously trains creative thinking faculties. These in turn improve reminiscence capability and an equally reinforce upward spiral is created. Even though the idea of mind map is quite old, its applications are noteworthy in the field of learning. The present research has the following research questions in mind: Is it necessary to validate Buzans' theory of mind map? What are the educational applications of a mind map? Does it follow the constructivist philosophy of learning? and How does it promote autonomy of learning? The present research study is useful for teacher educators, high school teachers, and even for primary teachers. If mind mapping concept can be implemented in education, it would help in promoting joyful learning.

Key words: Mind Map, brain based learning, constructivism, educational implications

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INTRODUCTION

A mind map is a figure used to characterise words, thoughts, and every day jobs or other things linked and arranged radically around a key word or an idea. It is used to imagine a structure and classify ideas. It is an image centred drawing that represents semantic or other associations between portions of information. By representing these relations in a radial, non- linear, graphical manner, it supports a brainstorming approach. A mind map is similar to a semantic arrangement or cognitive map, but there are no proper boundaries on the category of links used. Most often the map involves images, terms, and shape. The basics are arranged inductively according to the significance of the thought and are organised into grouping branches or areas. The consistent graphic formulation of the semantic structure of information on the methods of gathering knowledge may aid recall of existing memories.

Mind mapping is a path breaking practice for concept association and learning popularised by the British psychology author, Tony Buzan. In natural terms, it is a map of the mind, a drawing used to systematise information visually. It is a thinking instrument, which can help people to learn and think. People have been using picture centred radial graphic organisation techniques, referred to variably as mental or common mind maps, for centuries in areas such as engineering, psychology, and education.

Definition: In the words of Tony Buzan, It is dominant graphic techniques, which give a universal key to unlocking the potential of the brain. The mind map can be applied in every aspect of our life, where improved knowledge and clearer thinking will enhance human performance.

Mind mapping is a graphical technique for visualising hierarchical connections between several items of

information. Each item of information is written downwards and then linked by lines to the other pieces, thus creating a network of relationships. They are always organised around a single central idea.

A mind map is a drawing created by mind mapping.

Description of a mind map:

- The subject of thought is crystallized in a central image;
- The key topic of the subject give out from the central image as branches;
- The branches consist of a key image or key phrase printed on an associated line. Topics of Lesser significance are also represented as branches attached to higher level branches; and
- The branches form a connected nodal structure.

This kind of mind map can be enhanced and enriched with colour, pictures codes, and dimensions to add interest beauty and individuality.

In the preparation of mind map lessons, structural thought is very important. To form a structural thought, basic ordering of concepts (Box) is important as it helps an individual to fix that concept. The mind map starts with a central image, and further branches. The only difficult in a mind map is when to stop, i.e., when the basic ordering of concepts ends. Basic ordering of concepts help to shape, sculpt, and create mind maps enabling the mind to feel in a logically structured way. The basic ordering of concepts are in position so that less important and tertiary ideas can follow quickly and easily to help a harmonious thinking structure.

The mind mapping techniques are useful only if an image or shape is already fixed in the mind of learner. Learners who are studying new concept for the first time need to observe the shape or image of that concept. And latter mind mapping is

[1] Research Scholar, Dakshina Bharat Hindi Prachar Sabha, Assistant Professor College of Education, Srinivas University, Mangalore- 574001, Karnataka Email: haipadmanabha@gmail.com

[2] Dean, Faculty of Education, Dakshina Bharat Hindi Prachar Sabha, D.C. Compound, Dharwad, 580001 drhmksinath@gmail.com

useful for developing the knowledge relating to that concept.

Mind Map Laws or Techniques

1. Use importance

Always employ a central image; Central image is the main concept of learning, it is the central idea, based on that other sub concepts emerge. Use images all over the mind map; Images stimulate brain, and helps to remember. Use three or more colours per central image; Colours help to hold attention. Use measurement in images and around words; It helps to develop spacing in thought. Use synaesthesia; The blending of the physical sense. Use variations of size of printing line and image; variations in size avoids visual blocks, it is visual pleasing. Use measurement in images and around words; Use appropriate spacing;

2. Use association

Use arrows when you want to make connections within and across the branch pattern; Use codes.

3. Be clear

Use merely single key word for every line; Print all words; Print key words on lines; Make line span equal to word length; Make key branches attach to central image; Join outline to other lines; Make the middle lines thicker; make your boundaries "embrace" your branch out line; Make descriptions as lucid as possible; Keep paper placed horizontally in front of you; and Keep your print as upright as possible.

Emphasis helps to improve memory and creativity. It can also be used for association and vice versa. The central image automatically focuses the eye, and the brain it helps to trigger memory aid and attractive images draws attention and stimulates the brain. Colours stimulate memory and creativity, while organised spacing increases the clarity of the image and helps in the use of hierarchy and categorisation, leaving the mind map "open" to additions and is aesthetically pleasing.

One of the interesting features of a mind map is association as it helps to improve creativity. It is the combine device that our brains use sense of our bodily experience; it is the key to human being memory and understanding. Having established to central image and basic ordering of concepts, the power of association can take the brain into the depths of any subject as the arrows automatically guide the eye to connect one part of a mind map with another. They can be uni-directional, multi headed and varied in size, form, and dimension. They give spatial direction to the thoughts, while colour is one of the most influential tools for enhancing memory and creativity. Choosing specific colours for coding purpose or for specific areas of the mind map will give faster access to the information. It helps to improve the memory of the information and will increase the number and range of creative ideas. When using a mind map, the brain creates images from random shapes, thus making the shapes more memorable. In this way, creating shapes the mind map will enable to organize many bits of data in a more memorable form. This gathering of data is known as "Chunking", a well known mnemonic technique. Since the short-term memory is on average only competent of storing seven items of information, chunking helps to use this storage space more effectively. Upright printing gives the brain easier access to the thoughts expressed and this law applies as much to the angle of the lines as to the printing itself. If the lines are kept

as close to horizontal as possible, the mind map will be much easier to read. Try a maximum angle of 45°C.

The mnemonic mind map as a mirror of creativity

A mnemonic tool connections two items in order to facilitate the brain to recall a third image in the future. A creative machine likewise unite two elements to project a third into the future, but the creative aim is to change or affect the future in some way, whereas the mnemonic aim is simply to remember. Thus, by making mnemonic mind maps, simultaneously trains creative thinking faculties. These in turn improve memory capacity, and an equally reinforcing upward spiral is created.

The clue to the mind map's effectiveness lies in its dynamic shape and form. It mimics a brain cell under the microscope and is designed to encourage the brain to work in a way that is fast, efficient, and in the style that it does naturally.

a) Uses of Mind Mapping

The advantages of mind maps are:

1. Learners can get a deeper understanding in a fascinating way. They can preserve better and achieve more using mind maps.
2. Teachers can prepare bendable notes; the notes prepared as mind maps be able to be easily changed and new information can be added quickly. The volume of notes is thus condensed significantly.
3. Lessons or presentations organised as mind maps are impulsive to the point, inventive, creative and pleasurable.
4. Mind maps help in boosting the memory because the topic worked out as a mind map can be easily remembered and recalled. Mind maps use both the left "logical" as well as the right "creative" part of the brain, which results in the whole brain thinking.

Disadvantages of mind maps

There are disadvantages in using mind mapping techniques in an individual's work and personal life.

1. Change of habit and pattern of thinking; although change is very common in the world, sometimes it is most resisted. For a habit to be replaced minimum one month is needed before that new habit becomes a part of the life style of an individual.
2. There will be delay in acceptance of new information related technique in an individual's life. There may be opposition to the way in which data would be organised and presented.
3. Mind mapping also challenge an individual's pattern of thinking. This technique is found more effective only among intuitive individual.
4. Loss of meaning; unlike in note taking any one who is not presenting during the lecture would be able to comprehend what the topic is all about by just reading the notes. However, someone who is not part of the mind mapping session would get lost with the meaning of the maps as images, symbols and key words would hard to decode. Hence mind mapping would only be beneficial to those who are actually contributors and part of the mind mapping session.

Why Mind Mapping?

The brain learns during associations, as a result of mind mapping, the best way to learn and recognise anything. It involves best possible usage of both the left and the right parts of the brain, which is called “whole brain thinking”. Learning through mind maps has proved to be extraordinarily helpful. It can be used very productively for children in learning. Mind maps have been used for centuries for brain storming. Memory visualisation helps to solve learning challenges by educators, teachers, psychologists, and people in general argued that “customary” outlines rely on the reader to scan left to right and top to bottom, while what really happens is that the brain will scan the entire page in a non-linear fashion, also used popular assumptions about the cerebral hemispheres to promote the exclusive use of mind mapping over other forms of note making.

Tony Buzan believed that mind mapping had three essential features. They were:

1. Focus of the attention concentrates visibly on the central graph;
2. The branches of the topic spread out from the centre to all directions; and
3. The branches consist of important groups or key words.

Tony Buzan pointed out that mind mapping usually involved six steps:

Step 1: Draw the mind map in the centre of the paper. It can make people's mind to radiate to every instruction and make them to articulate their thoughts freely and naturally.

Step 2: Use a portrait on a diagram to convey key feelings. It allows the author to have full imagination because a picture is worth a 1000 words.

Step 3: Use colours in diagram since colours, similar to images, can stimulate the brain. Colours can add a sense of jump and strength to mind mapping and a great energy to creative thinking.

Step 4: Connect the central image with the brain branches, and then connect the main branches with the secondary branches, and so on.

Step 5: Let the branches of mind mapping be naturally bent rather than in a straight line because the human brain will get tired of straight lines.

Step 6: Use a keyword in each line to clearly express the relationship between the information and the topics.

As such it externalises, for the learner and the assessor, the breadth and depth of the learner understanding with a potential to disclose pre-conceptions, assumptions, misunderstandings, and biases. Cahill and Fonteyn (2008) reviewed the literature on mind mapping and attributed its theoretical basis to the learning theory mainly used by Ausubel (1963), who is credited with identifying the significance of relationships between concepts to a person's understanding and thinking. Meaningful (i.e., deep as opposed to superficial or rote) learning occurs when new learning is related to existing concepts of or information structures resulting in some change in understanding. This may be a revision of a previous concept and/or new insight to relationships with other concepts previously not appreciated.

Theoretical base of mind mapping

Mind mapping is based on following theories

A) Brain-based learning

The brain cell (neuron) contains a vast electrochemical complex and a powerful data-processing transmitting system. Each tentacle is like the branch of a tree, radiating from the cell centre or nucleus. The branches of the brain cell are called dendrites. One particularly large and long branch, called the axon, is the main exit for information transmitted by that cell. Each dendrite and axon may range from a millimetre to 1.5 metres in length and all along and around its length are little mushroom like protuberances called dendrite spines and synaptic buttons.

A dendrite spine/ synaptic button from one brain cell will link with a synaptic button from another brain cell, and when an electrical impulse travels through the brain cell, chemicals will be transferred across the minute, liquid filled space between the two. This space is called the synaptic gap.

A brain cell may receive incoming pulses from hundreds of thousands of connecting points every second. Acting like a telephone exchange, the cell will instantaneously compute microsecond by microsecond, the sum data of all incoming information and will redirect it along the appropriate path. As a given message or thought or re-lived memory is passed from brain cell to brain cell, electromagnetic pathway is established. Each of these neuronal pathways is known as a “memory trace”. These memory traces or mental maps are one of the most exciting areas of modern brain research.

The human brain consists of two hemispheres. It helps to divide the major intellectual functions between them. The right hemisphere is dominant in intellectual abilities like, rhythm, spatial awareness, gestalt (wholeness), imagination, and dimension. The left hemisphere is dominant in a different but equally powerful range of mental skills, words, logic, numbers, sequence, immaturity, analysis and lists. Although each hemisphere is dominant in certain activities, they are both basically skilled in all areas and mental skills. The range of skills available to all include those previously attributed to either the left or right hemisphere such as:

1. Language,
2. Numbers,
3. Logic: Sequence, Listing, Linearity, Analysis, Time association,
4. Rhythm,
5. Colour,
6. Imagery: Day dreaming visualization, and
7. Spatial awareness: Dimension Gestalt.

Linear vs. whole-brain thinking

Human brain is multidimensional and perfectly capable, it does so when looking at photographs, pictures or interpreting the images and environment that are around us. The brain, when listening to a series of spoken sentences, does not absorb information word by word, line by line, but takes in information as a whole, sorts it, interprets it, and feeds it back to the mind in a multitude ways.

Mind mapping is based on recent research about the human brain and what is known about how learning occurs. Caine and Caine (1991) suggested that brain-compatible teaching is based on twelve principles:

1. The brain is a similar processor. It simultaneously processes many different types of information, including thoughts, emotions, and cultural knowledge. Effective teaching employs a variety of learning strategies.

2. Learning engages the entire bodily processes. Teachers cannot address just the intellect.
3. The search for meaning is innate. Effective teaching recognises that meaning is personal and unique, and that students' understandings are based on their own unique experiences.
4. The search for meaning occurs through pattern. Effective teaching connects isolated ideas and information with global concepts and themes.
5. Emotions are critical to patterning. Learning is influenced by emotions, feelings, and attitudes.
6. The brain processes parts and wholes simultaneously. People have difficulty learning when either parts or wholes are overlooked.
7. Learning involves both focused attention and peripheral perception. Learning is influenced by the environment, culture, and climate.
8. Learning always involves conscious and unconscious processes. Students need time to process 'how' as well as 'what' they have learned.
9. There are at least two different types of memory: a spatial memory system, and a set of systems for rote learning. Teaching that profoundly emphasises rote learning does not promote spatial, experienced learning and can inhibit understanding.
10. It is possible to understand and remember best when facts and skills are rooted in natural, spatial memory. Experiential learning is most effective.
11. Learning is enhanced by challenge and inhibited by threat. The classroom climate should be challenging, but not threatening to students.
12. Each brain is unique. Teaching must be comprehensive to allow students to express preference

b) Constructivism

Mind mapping supports the constructivist theory of basis of knowledge acquisition through contact with objects and events using one's senses to link new information with things or patterns already stored in the brain. Creating a mind map requires the examination of prior knowledge, while also facilitating absorption and lodging of new knowledge. A mind map's radial structure of linked nodes clearly promotes relations. According to Gomez and King (2014), "Colours and images used in a mind map help brain to make associations and create connections between the concepts studied in the class and remember them for future purposes". Buzan (1993) advocated the mind mapping strategy as a way to enable students to make connections that improves one's ability to collect grasp, examine, construct, and control information and concepts. According to Al-Jarf (2011), creating a mind map assists students in obtaining related than isolated knowledge.

c) Multiple Intelligences

Gardner (1983) described three major learning styles (visual, auditory, and kinaesthetic), and also suggested the possibility of differentiating intelligence into multiple specific modalities (1997). Gardner's pluralistic view presented different intelligences as independent from one another. Mind mapping targets the visual-spatial intelligences as

described by Gardner (1997) and results in the creation of a visual aid to support the enhancement of other intelligences.

d) Gestalt Theory

German psychologists developed Gestalt theories of visual perception in the 1920s. They centred on the idea of a combined or global whole and explained the process of organisation as a tendency to perceive objects as part of a greater whole and as elements of more complex systems. Gestalt is a German word, which means configuration or more simply, an organised whole in contrast to a collection of parts. According to it, an individual perceives the thing as a whole and not as a mere collection of constituents or elements. To a Gestalt psychologists', the meaning or sensation or perception is always related to the total situation, and perception always involves a problem of organisation. A thing is perceived as a relationship within a field, which includes that thing, the viewer, and a complex background incorporating the viewer's purpose and previous experience. One of the main views of Gestalt is "insight into value".

Application of Mind Map in Education: Mind mapping can be used at diverse stages of the learning process. For example, it can be used before class for lesson preparation, planning of the lesson, research on the subject and organisation of the information collected, and during the class for note taking.

Collaboration: Students can work together using mind maps on group projects. They can do it by sharing mind maps on paper or online.

Comprehension: Mind maps can be useful in creating questions for the teacher about difficult issues.

Homework: Mind maps help to evaluate complex problems and find solutions.

Exam Preparation: Mind maps can be used as a tool to appraise the lessons.

Buzan (1995) claimed that the mode of note taking involved in making a mind map saves more than 90% of the total time required for the conventional linear method of making notes. Instead, the mind map version involves noting, reading, and reviewing only relevant key words.

Another way of thinking the mnemonic tool involves the use of the imaging and association in order to produce multi-dimensional memorable images. The use of the memory mind map activates the brain to become mnemonically alert and thus, increases the memory skill level.

The mind map is appropriate to imaginative thinking because it uses all the critical skills commonly associated with creativity especially imagination, association of ideas, and flexibility.

The group mind map becomes an influential tool during a group brain storming exercise. The mind map becomes a hard copy of the rising group consensus, and at the same time, reflects the evolution of ideas through the branches and sub-branches radiating from the central image or theme.

Thus, mind mapping is a visual technique for capturing concepts and ideas that explores the way a person actually thinks through synaptic connections and non-linear associations.

Conclusion and discussion

Mind map is an organisational thinking tool put forward by an Englishman called Tony Buzan in the 1970. He believed that the traditional linear notes which may cover up keywords was difficult to memorise and a waste of time. Also, it did not stimulate the brain effectively. He tried to open a graphics oriented approach to the human brain's potential and his idea led to Mind map is able to stimulate the cerebral cortex skill such as languages, images, numbers, logic, rhythm, colours and spatial awareness, and so on. It can be applied to all aspects of life improving learning and clear thinking so that people's performance can be getting improved. This technique helps students to study theoretical material more effectively, helps to memorise terminology easily, they can see main concepts of ideas clearer as well as interdependence and interrelations. Moreover, it can be successfully used in group assignments. Mind mapping provides ability to visually present a large volume of theoretical information, systematise knowledge that is useful when reading for examinations easier. It helps to improve academic achievement. Mind maps can be used across the curriculum from brainstorming, writing and note taking, and problem solving. It can be beneficial to all grade levels for a variety of objects. But it is more useful for gifted students as they can organise their ideas for a story using pictures and words. Students enjoy mind mapping because it gives them a creative way to express their ideas with colour and pictures, instead of just words in a straight line. The mind mapping is to support learning and teaching tools. It can pit linear dull information into the master mind mapping tool, not only can improve the efficiency of teachers preparing, but reduce workload in teaching any subject. It helps to develop divergent thinking. The teaching mode of using mind mapping for biology design courses not only helps students to establish a good cognitive structure, but also can effectively cultivate students' autonomous learning ability and thinking ability, to stimulate their interest in learning, the relationship between knowledge points to deeply understand the inner factors and the construction of knowledge system. Using mind mapping aided teaching in biology have inject new ideas, to provide new tools and strategies, is a kind of effective and positive way of teaching, not only can promote the teachers' teaching, it can promote the learning of students, is worthy of promotion.

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