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Using E-Maps to Organize and Navigate Web-based Content

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Summary

Many university faculty create their own websites or use a course management system to upload course materials for online instruction. Course content and files are mostly organized and presented in a linear structure and placed in a series of folders and subfolders. An alternative approach to navigate, organize, and sequence Web-based content is to use a computer generated mind map – an E-Map. With its unique storage and organizational capacity, E-Maps not only provide a user-friendly e-learning structure, but also can effectively manage knowledge in a much more efficient manner than using a linear approach to navigate and access Web-based content. The purpose of this article is to examine how E-Maps can be used as a graphical interface for presenting and organizing Web-based course content and files online. Explored in this article is a brief overview of mind maps , mind mapping software, how using E-Maps as a graphic organizer can facilitate learning, and some instructional application examples of using E-Maps for Web-based instruction.

Keywords

Mind maps; concept maps; graphic organizer; E-learning; Web-based course design.

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INTRODUCTION

It has been said throughout time that a picture can be worth a thousand words. Pictures are worth a thousand words because they can generate more cognitive associations that enhance critical thinking and memory than words can by themselves. E-Maps are computer-generated mind maps that can represent complex information in an organized, easy-to-understand visual format. E-Mapping is a powerful e-learning and organizational technique that can visually display main topics, subtopics, concepts, images and the interrelationships between them.

Many university faculty design and upload course materials to the Web using either their own website or a course management system such as Blackboard™, TopClass™, or eCollege™. However, whether using a website or course management system, most all content is presented in a linear or sequential structure using hyperlinks to access course files, websites and folders. Sequential ordering of content may be displayed in a chronological or alphabetical order, or can be arranged in subject matter progressing from general to specific. Using an E-Map can organize and sequence content in a non-linear structure on one webpage, by placing the main topic in an image-centered diagram with interrelated main and subtopics connections or branches in a radial format. E-Maps can be useful for presenting and summarizing information in a format that shows the overall structure of subject content.

ABOUT MIND MAPS

Mind Maps® were developed by Tony Buzan in the late 1960s as a way of encouraging students to take notes using only key words and images. The mind forms associations almost instantaneously, and the Mind Map approach helps students quickly relate a central word or concept to other pieces of information (Buzan 2002). A mind map makes information more memorable than just memorizing the information because a mind map, just like concept maps, places the information being learned in a context of existing knowledge. Furthermore, a mind map allows instructors to organize information into “*chunks*,” which enables students to remember more information for a longer period of time (Figure 1.1).

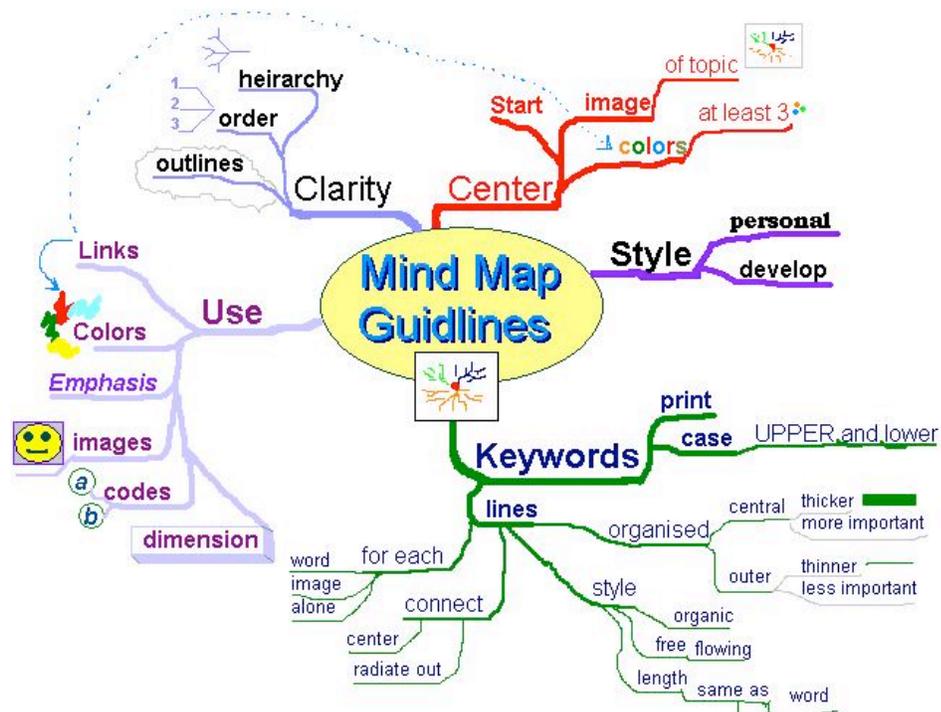


Figure 1.1 Mind Map example.
<http://heuristixx.wordpress.com/>

E-MAPS AND MEANINGFUL LEARNING

An E-Map is a graphic organizer that can create concise representations of *ideas, complex relationships, knowledge, and information* quickly and can be used on the Web. Mind and concept maps are a visual way of constructing knowledge and organizing information. They provide a powerful visual image which can depict complex relationships and information, and relate new information to prior knowledge. There are many learning theories and research studies to support the effectiveness of using graphic organizers such as E-Maps to facilitate learning.

Graphic organizers are particularly suited to:

- aiding learning by explicitly integrating new and old knowledge
- generating ideas such as brain storming
- assessing understanding or diagnosing misunderstanding
- increasing recall
- designing a complex structure (long texts, large websites, etc.)
- communicating and understanding complex relationships

Concept and mind maps are grounded in learning theory and research. They are based primarily on the learning theories of cognitive psychologists David Ausubel's (1968) *Assimilation theory* and James

Deese's (1965) *Associationist theory*. Ausubel was influenced by Piaget's cognitive development theory and was very active in his field in the 1950s to 1970s.

The primary concept in Ausubel's assimilation theory is *meaningful learning*. According to Ausubel, "the most important single factor influencing learning is what the learner already knows." Thus, *meaningful learning* results when a student relates new knowledge or information to what they already know (existing knowledge). Ausubel contrasted *meaningful learning* to rote learning, in which students incorporate new information into the knowledge structure *without* interaction.

Rote learning occurs when a student simply memorizes information with no attempt or motivation to relate that information to *prior learned knowledge*. The new information is easily forgotten and not easily applied to problem-solving situations because it was not linked to concepts that were already learned. This is why *meaningful learning* is enduring, whereas *rote learning* is easily forgotten and not easily applied to new learning or problem-solving situations.

Meaningful learning *anchors* new ideas or concepts with previously acquired knowledge in a non-arbitrary way (Novak & Gowin, 1984). The *associationist theory* states that memory consists of a network of concepts that is not hierarchical, although it is supportive of hierarchies. Relationships between concepts are formed naturally when two overlap on some dimension. As learning occurs, this network of concepts and relationships becomes more and more elaborate and complex. Regardless of the theory behind it, a concept map is intended to externalize an individual's cognitive structure (Freeman, 2004).

Other Research

There has been much research done on how using graphic organizers such as *concept* and *mind maps* can facilitate learning by using a pictorial way of constructing knowledge and organizing information. The following summations are noted theorist and studies that support graphic organizers in the teaching and learning process:

- Use of graphic organizers aids students in retention and recall of information (Inspiration Software, 2007).
- Semantic networking tools enhance comprehension and retention of the ideas being studied by helping learners construct structural knowledge. In addition to improving comprehension, structural knowledge improves retention of content being studied (Jonassen, 2000).
- Concept maps helped preservice teachers map their subject-matter knowledge as a precursor to lesson planning (Ferry, 1996).
- Students show some of their best thinking when they try to represent something graphically, and thinking is a necessary condition for learning (Jonassen, 1996).
- Dunston found that the effects of graphic organizers are greatest when students have in-depth instruction and training in their use and when students construct graphic organizers themselves (Dunston, 1992).
- Graphic organizers were found to help students transfer retention and recall skills to new situations (Griffin, Simmons, & Kammenui, 1991).

- Creating graphic organizers to illustrate the organization of ideas and information aids comprehension and learning (Flood & Lapp, 1988).
- When important information is isolated, we can see how concepts are connected, and this makes it more easily understood (Novak & Gowin, 1984).
- The mind arranges and stores information in an orderly fashion, so that when new information is added, the framework is already there on which to attach new knowledge (Rumelhart, 1980).
- A visual graphic containing key ideas and information is easier to remember than extended text, whether the text is visual or verbal. The use of both visual and verbal language to create graphic organizers results in active learning (Vygotsky, 1962).

E-MAPPING SOFTWARE

In 1993, Mindjet (<http://www.mindjet.com>) released *MindManager*®, which was one of the first professional *mind mapping* or *E-Mapping* software programs developed for business, education, and corporate training. A *MindManager* map can be exported as a clickable image map, exported as an image, PDF file, PowerPoint presentation, Word document, or webpage's. Today there are many E-mapping software companies that offer E-mapping software on both the PC and Mac platforms (Table 1.1).

Table 1.1 E-mapping software programs.

E-mapping Software	Platform Support	Web Address
MindManager® Pro 7 MindManager® Lite 7 MindManager® 7 Mac	PC MAC	http://www.mindjet.com
<i>INSPIRATION</i> ™	PC and MAC	http://www.inspiration.com/
<i>SMART Ideas</i> ™	PC and MAC	http://www.smarttech.com/
Mind Technologies <i>Visual Mind</i> ™	PC	http://www.visual-mind.com/
<i>IHMC CmapTools</i> ™	PC and MAC	http://cmap.ihmc.us/
<u>ConceptDraw</u> <i>MINDMAP</i> ™	PC and MAC	http://www.conceptdraw.com/
CoCo Systems Ltd. — <i>VisiMap</i> ™	PC	http://www.visimap.com/

One of the advantages of working with E-mapping software is its ease of use. You do not have to have any advanced computer skills to learn how to use the software. If you can create a PowerPoint presentation, you can learn how to use this software very easily.

CREATING AN E-MAP FOR AN INSTRUCTIONAL MODULE

There are seven basic components when constructing an E-Map (Figure 1.2). These components include:

1. A central or module topic of the map is automatically added to every new map.
2. Main topics branch off the module topic of your map. These should be the main content related to the topic.

3. Subtopics are used to provide details about their main topic.
4. A relationship exists between two (or more) topics.
5. Link to an existing file (including another map) Web page or folder.
6. Callout topics can be used for comments or to provide additional information for a specific topic.
7. Floating topics can be used for comments or to label the map.

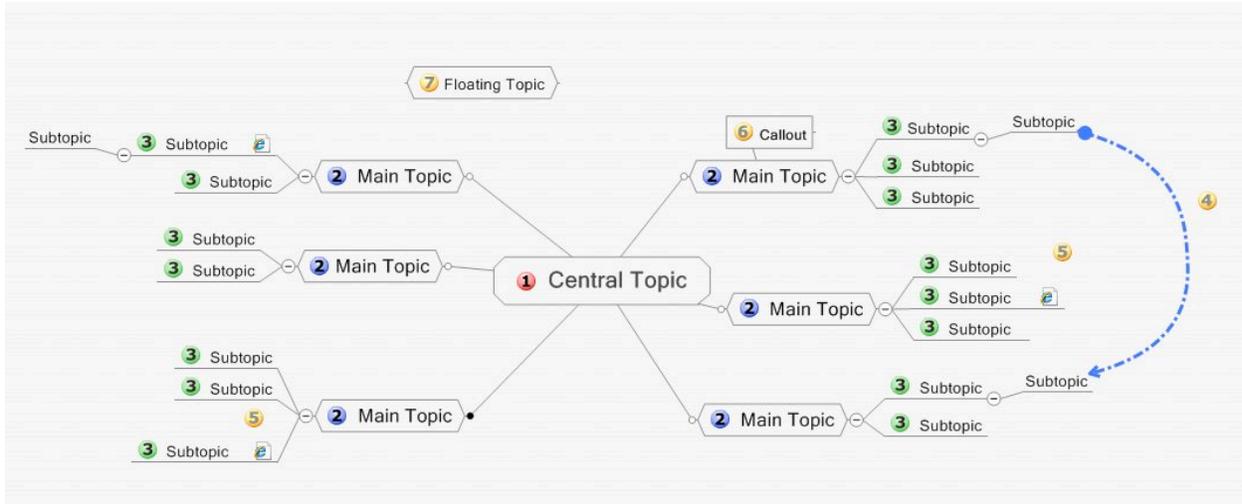


Figure 1.2 E-Map components, created with Mindjet MindManager Pro 7.

Color and Graphics

The use of color is a very important attribute to use in designing E-Maps. Color can be used to reinforce associations and for differentiating categories or topics, depict themes, and make relationships stand out. Graphic images and other visual aids such as arrows and icons are another important element in serving an organizing function by illustrating the relationships among similar and different topics (Figure 1.3).

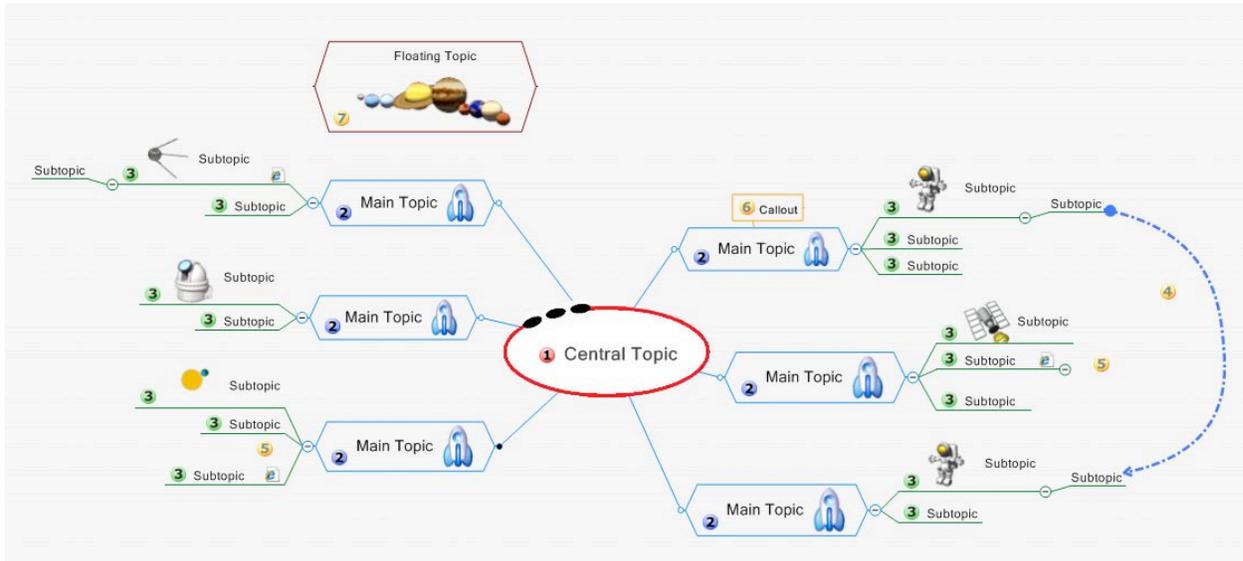


Figure 1.3 E-Map color and graphic elements, created with Mindjet MindManager Pro 7.

INSTRUCTIONAL APPLICATIONS OF E-MAPS

E-Maps can be created for a whole course, a course module or a special topic within a module. Using an E-map enables the instructor to design instruction showing the interrelationships of content and complex concepts by linking websites, word processing and PDF files, PowerPoint Point presentations, video clips, Flash movies and many other files. An E-Map can be used as a classroom presentation or serve as a study guide on a particular topic.

E-Maps for the Web

To use an E-Map as a graphical interface for webpage's and files, you first need to create a website for all of your webpage's by using a web authoring program such as Adobe Dreamweaver. By using a web authoring program you can keep all webpage's and files all in one location readily available for quick editing and can be uploaded to a server. Once an E-Map is completed, it can be exported as a clickable image map webpage (Figure 1.4).

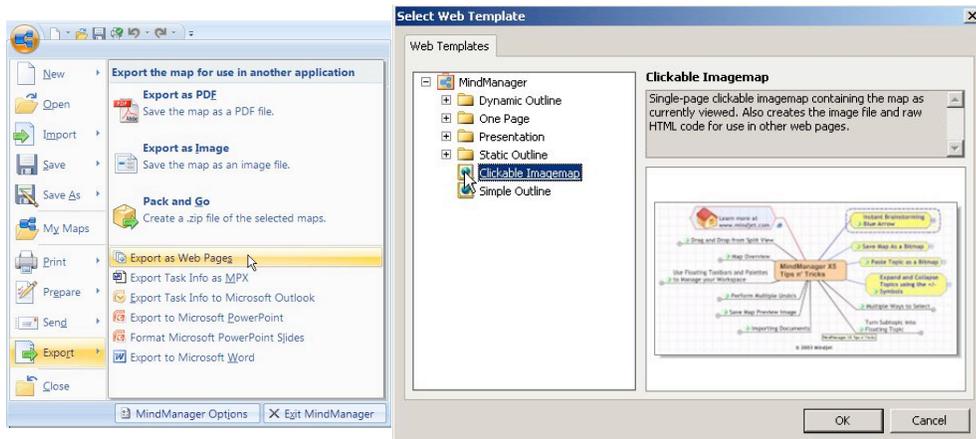


Figure 1.4 Export E-Map as Clickable Image map (MindManager).

The exported image map is saved in the websites root folder (Figure 1.5). The web pages and files can then be linked to the E-Map.

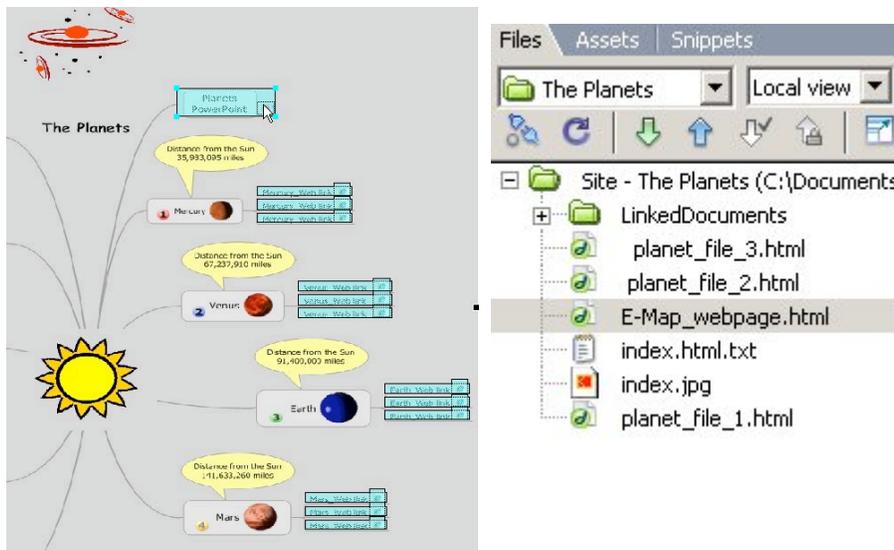


Figure 1.5 Exported E-Map saved in website root folder.

E-Map Planning and Examples

Before creating an E-Map formulate objectives for the module or topic. The objectives then can serve as a guide for creating E-Map topics and subtopics. In Figure 1.6 is an example of an E-Map created on the planets. Each planet branch extends out from the the Sun, includes a numerical position from the Sun, a picture of the planet, a call out indicating the distance from the Sun, a PowerPoint presentation on the planets, and planet hyperlinks to websites that correspond to each of the planets.

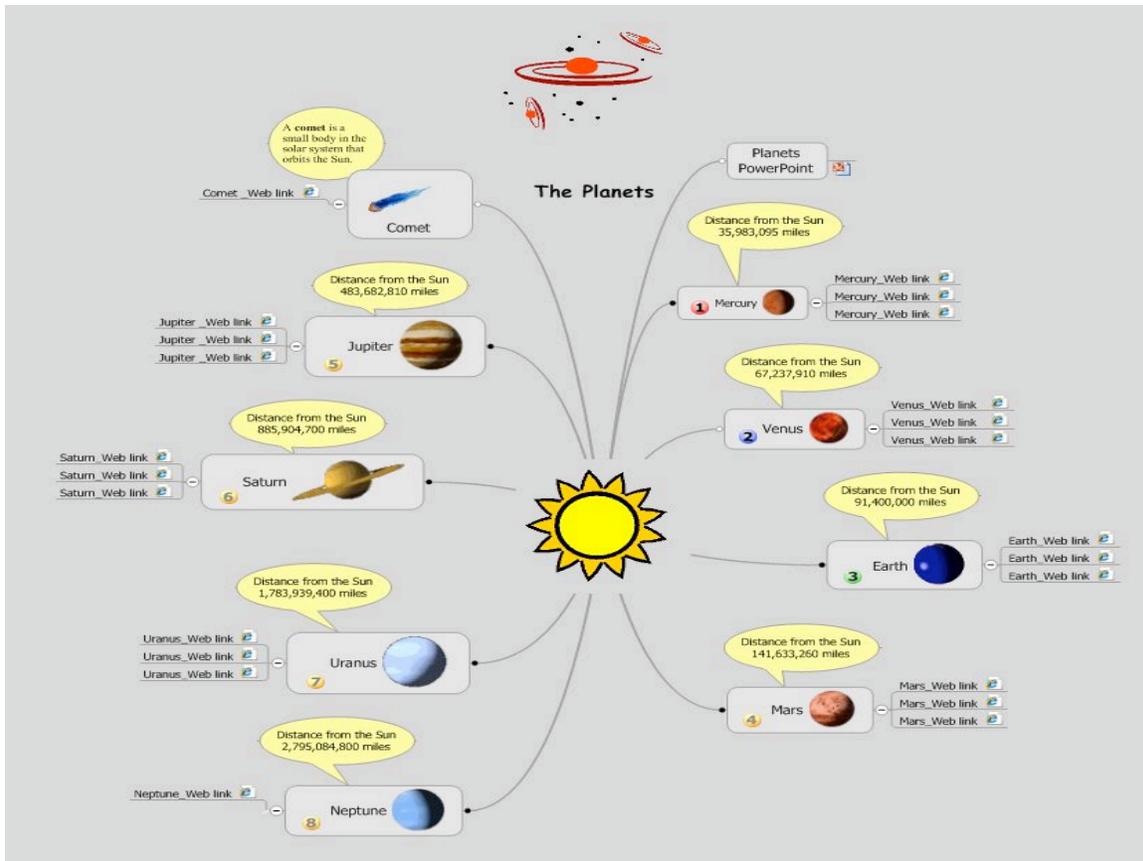


Figure 1.6 E-Map of the Planets created with MindManager Pro 7.

In Figure 1.7 is an E-Map created on the Moon. Each branch extends out from the Moon image, included are; nine branches with an instresting fact on the Moon, a branch that includes Web links of information on the Moon, a branch which attaches a picture of the Moon's phases, branches hyperlinked to a video clip on the Moon, PDF file articles, and a PowerPoint presentation.

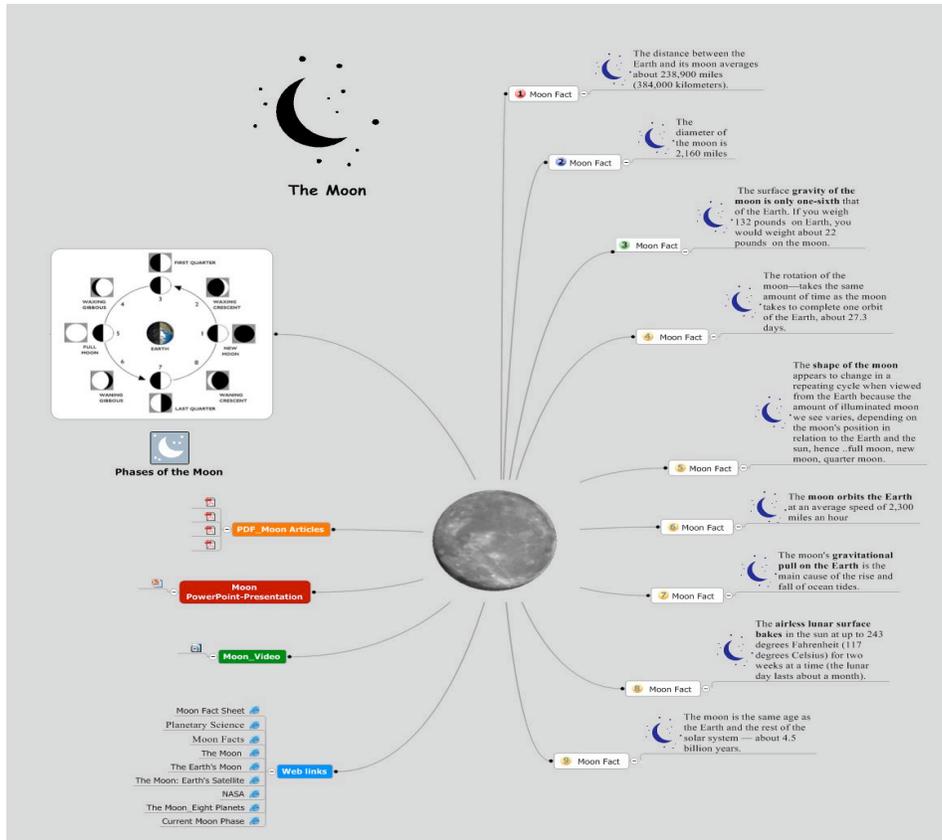


Figure 1.7 E-Map of the Moon created with MindManager Pro 7.

CONCLUSION

An E-Map is an outstanding e-learning tool for organizing and navigating Web-based content and files. There has been much research indicating the effectiveness of using graphic organizers, such as mind maps and facilitating meaningful learning. Buzan and Buzan (1993) argue that mind maps better harness the way the brain works. The radiant structure is consistent with the radiant nature of the brain; the colors, graphics, and nonlinear branches stimulates the entire brain.

Planning using a systems approach is important in guiding the E-Map design process. Using the E-Map technique gives instructors the freedom to express ideas and show interrelationships between concepts and content in a very visual and non-linear structure.

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