Profiling a mind map user: a descriptive appraisal

Joanne M. Tucker
Shippensburg University of Pennsylvania

Gary R. Armstrong
Shippensburg University of Pennsylvania

Victor J. Massad
Kutztown University of Pennsylvania

Abstract

Whether created manually or through the use of software, a non-linear information organization framework known as mind mapping offers an alternative method for capturing thoughts, ideas and information to linear thinking modes, such as outlining. Mind mapping is used in education, government and business as a creative method that is useful in training, brainstorming, organizing and problem solving. This paper examines mind mapping techniques, advantages and disadvantages of hand-drawn maps and using mind mapping software. Several mind-mapping software applications are compared on a number of product dimensions. Survey results provide a descriptive profile of mind map users in education, government and business sectors.

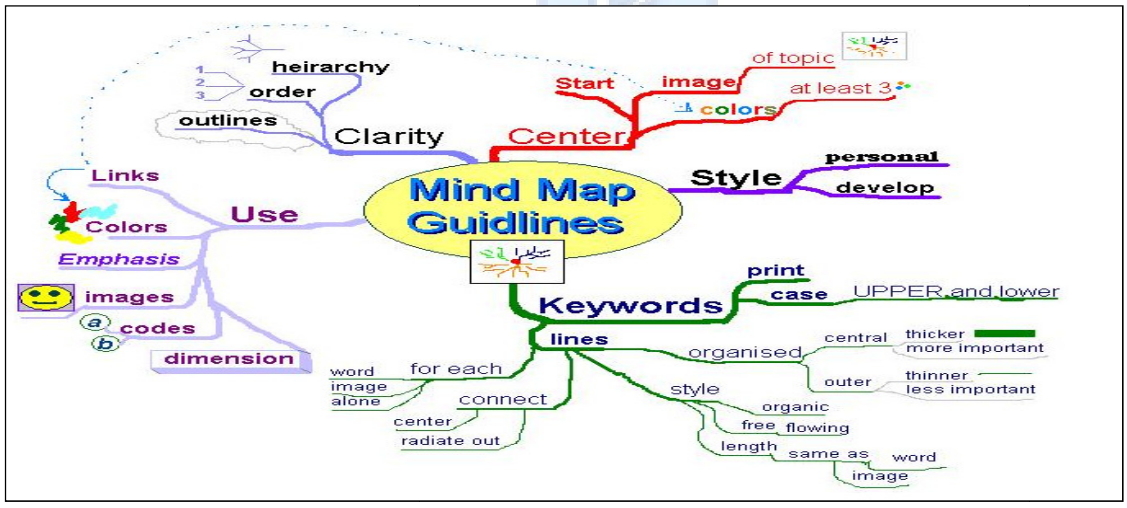
Keywords: mind mapping, mind mapping software, mind map user profile

Introduction to Mind Maps

The mind mapping technique, along with the term "mind map," originated with popular psychology author Tony Buzan (1970), who developed the technique as a way of helping people to learn more effectively. His work is partly based on the pioneering brain research of the 50's as well as left/right brain work by Roger Wolcott Sperry (1968) which was later refined by Robert Ornstein (1977). The body of this research indicates that the human brain responds best to key words, images, colors, and direct association. Buzan refined these ideas into a simple set of rules that can be followed to create a maze of information known as a mind map. Based on the increasing interest in this technique over recent years, many people have found mind maps to be an efficient way to take notes, plan a project or presentation, brainstorm, as well as other applications. Mind mapping usage and growth has been chronicled in the fields of business (Blum, 2007; Van Hool, 2004; Wilcox, 2003), engineering (Zampetakis,Tsironis and Moustakis 2007), and education (Abi-El-Mona, 2008; Adam and Mowers, 2007; Akinoglu and Yasar, 2007; Kirchner, 2009; Lamont, 2009; Näykki and Järvelä, 2008).

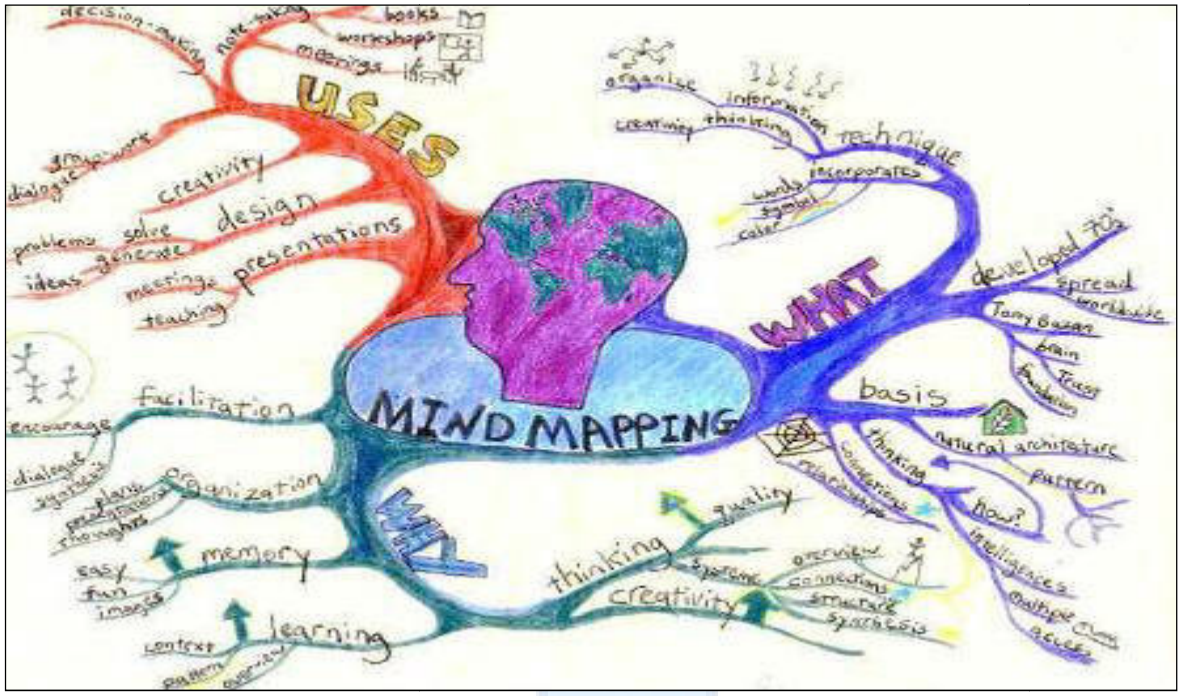
Mind mapping is a visual tool used to organize and relate themes or objectives. Buzan asserts that mind maps that incorporate pictures and different colors bring ideas to life. A good mind map shows the overall structure of the topic or problem and relates subtopics through color, lines and pictures. Wycoff (1991) summarizes Buzan's guidelines as: "A central focus or graphic representation of the problem is placed in the center of a page; ideas are allowed to flow freely without judgment; key words are used to represent ideas; one key word is printed per line; key words are connected to the central focus with lines; color is used to highlight and emphasize ideas; and images and symbols are used to highlight ideas and stimulate the mind to make connections." Figure 1, Mind Map Guidelines portrays the guidelines (www.mindmappingtool.com).

Figure 1: Mind Map Guidelines



The hand-drawn mind map in Figure 2 illustrates the overall organization of the topic, mind mapping, through the use of nodes, branches, words, color, lines and pictures (http://www.12manage.com/%5Cmethods_mind_mapping.html).

Figure 2: Hand-drawn Map



Unlike linear thinking techniques, mind mapping is a graphic technique that captures ideas and information. Proponents of mind maps assert that mind maps enable people to see the various aspects of the topic or problem; and seeing all constituents simultaneously positively affects concepts learning (Mintzes 1999, McComas 1999). Lane (2009) describes a mind map as a technique that stimulates creativity while allowing for clear distinctions between each thought. Buzan (1996) asserts that memory is naturally associative, and therefore, it is easier for brain to remember visually stimulating, multi-dimensional information as presented through a mind map than traditional linear outlines. Outlines lack the flexibility, creativity and ability to show associations between concepts.

Mind mapping enthusiasts affirm that mind mapping is an extremely valuable technique to use in educational, business and government environments. The increasing popularity of mind mapping is evidenced by the number of blogs, books and articles that focus on mind mapping. Using the Internet search engine Google and entering the search term “mind mapping”, yields over 112,000,000 web page hits. It is clear that many individuals have an interest in mind mapping.

Hand-drawn Maps and Mind Mapping Software

During the 1990’s, companies began developing software with the capability to create digital versions of mind maps. Use of mind mapping software does offer advantages and disadvantages over hand-drawn mind maps. Table 1 presents a taxonomy of advantages and disadvantages. One important factor affecting the significance of some of the advantages listed of mind mapping software over hand-drawn maps is the specific purpose of the map. Mind maps may be created for personal use such as taking notes or planning a presentation. If collaboration is not needed and the map is for solitary use, then mind mapping software features such as

sharing and collaboration are not relevant to the user. Alternatively, mind maps may be created by teams and updating a mind map becomes desirable. Clearly in this situation, the ability of software to allow real-time collaboration and editing of mind maps becomes an important asset.

Table 1: Hand-drawn Maps versus Computer-drawn Maps

	Advantages	Disadvantages
Hand-drawn Mind Maps	A. No Cost B. No restrictions on map design and layout C. May create map anytime with pencil and paper D. Each map is a unique creation of the user E. Collaboration possible if colleagues are together in same place	A. Cannot be digitally stored other than as a scanned document B. Map size is limited C. Preference of user for mind mapping software advantages
Mind Mapping Software	A. Ability to link to other information such as hyperlinks and notes B. Ability to modify and filter map easily C. Ability to integrate into other software D. Ability to create templates easily E. Ability to allow real-time collaboration F. No size limits	A. High cost of none free- source software B. Requires computer access C. Learning curve of using software D. Map design flexibility restricted by software options E. Preference of user to hand-draw map F. Map sharing restricted by format incompatibility

Mind Mapping Software Comparison

There are many mind mapping software packages that are classified by such attributes as free versus commercial or web-based versus desktop. Some of the more popular software packages include MindManager, MindGenius, FreeMind, Inspiration, MindMeister and MindView. They differ in terms of capabilities, cost and applications. Table 2 highlights some key differences as of January 2009.

Table 2: Differences in Software Packages

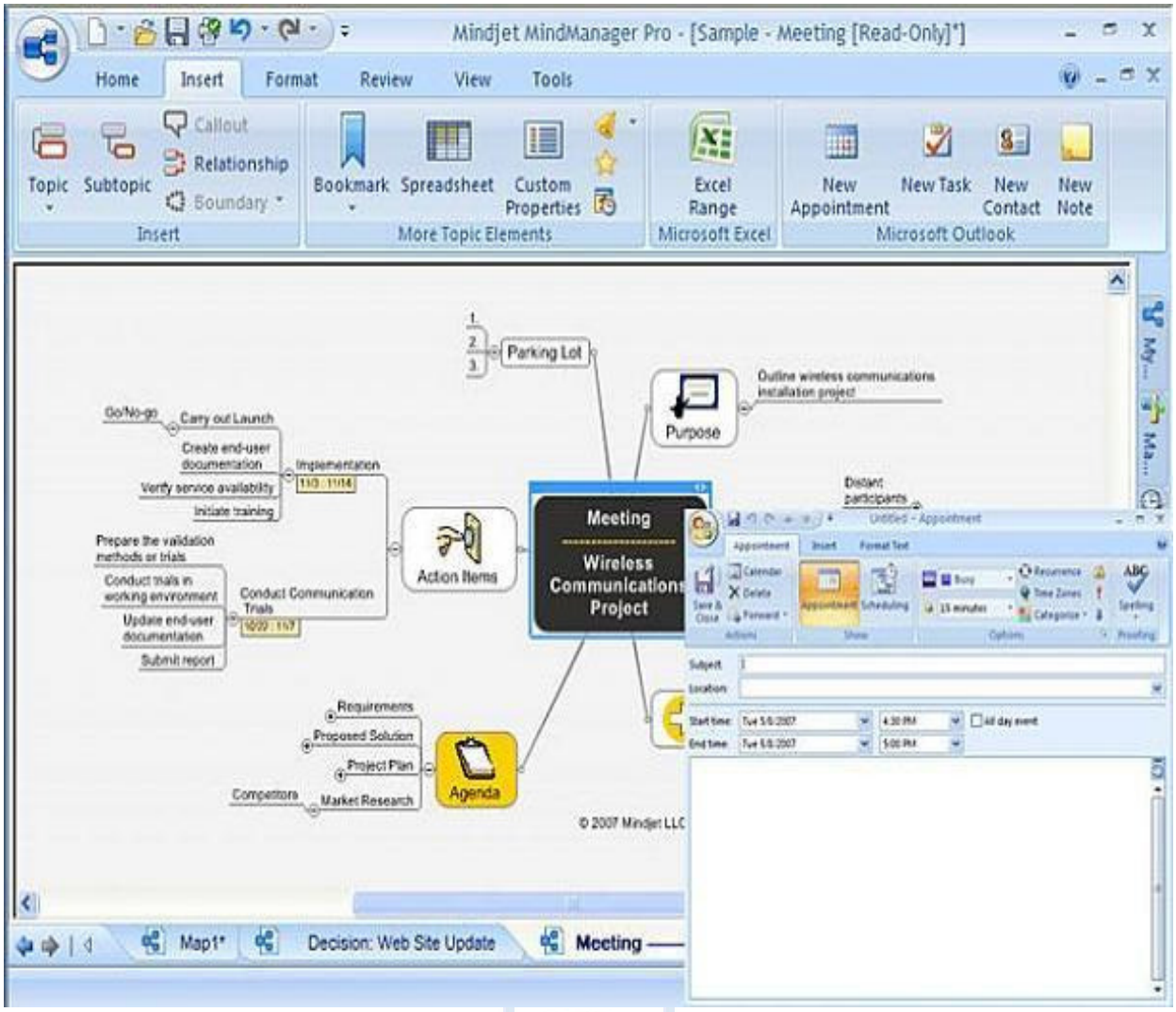
Software	Cost	Operating System	Comments
FreeMind9	Free	Linux/Mac/ Windows	Most popular free software
Inspiration8	$69	Mac/Windows	Integrated mind map with outline
MindView3	$389	Mac/Windows	Integrates with Microsoft Office
MindManager8	$399	Mac/Windows	Commercial market leader MindJet Connect allows collaboration
MindMeister	$72/yr. Bus $15/yr. Edu	Web-based	Good for collaboration Skype and Twitter integration
MindGeniusV2	$221 Bus $86 Edu	Windows	Integrates with Microsoft Office

MindManager is the current commercial market leader. It may be purchased alone or as part of Microsoft Office Professional Productivity Bundle which includes Office 2007 Pro, MindManager 2007 and Acrobat 8 Professional. One of Mindmanager's strengths is its integration capabilities with Microsoft Office. Online collaboration is possible with MindManager in conjunction with software, MindJet Connect. With Connect, multiple team members can access and update the same map and see instantaneous progress through an online environment. Besides integration and online collaboration, MindManager has advanced functions in creating and editing mind maps. Advanced features include the capability to hyperlink to the Internet, graphics, spreadsheets, docs, interactive PDFs, document protection and security. Figure 3 shows a screen shot of a mind map created by MindManager (http://software.techrepublic.com.com/abstract.aspx?docid=213395.)

MindGenius has many features particularly for exporting to other programs. MindGenius is closely integrated to Microsoft Office so that map outlines and images of maps can be imported and exported easily. One of strengths of MindGenius is that it provides a good structured with the ability to re-arrange the map into a variety of layouts. MindGenius is available in three versions, one for home, business and education.

FreeMind is the most popular of the public domain mind mapping software. Written in Java, FreeMind provides the basic elements for map construction. FreeMind offers users a variety of options for linking other content to maps. In this open-source program, users can create links to web pages, local folders, executables, and any file. However, online collaboration is not available. Other public domain mind mapping software includes Vue, Cayra, MindRaider and Thoughtex.

Figure 3: Screenshot of MindManager



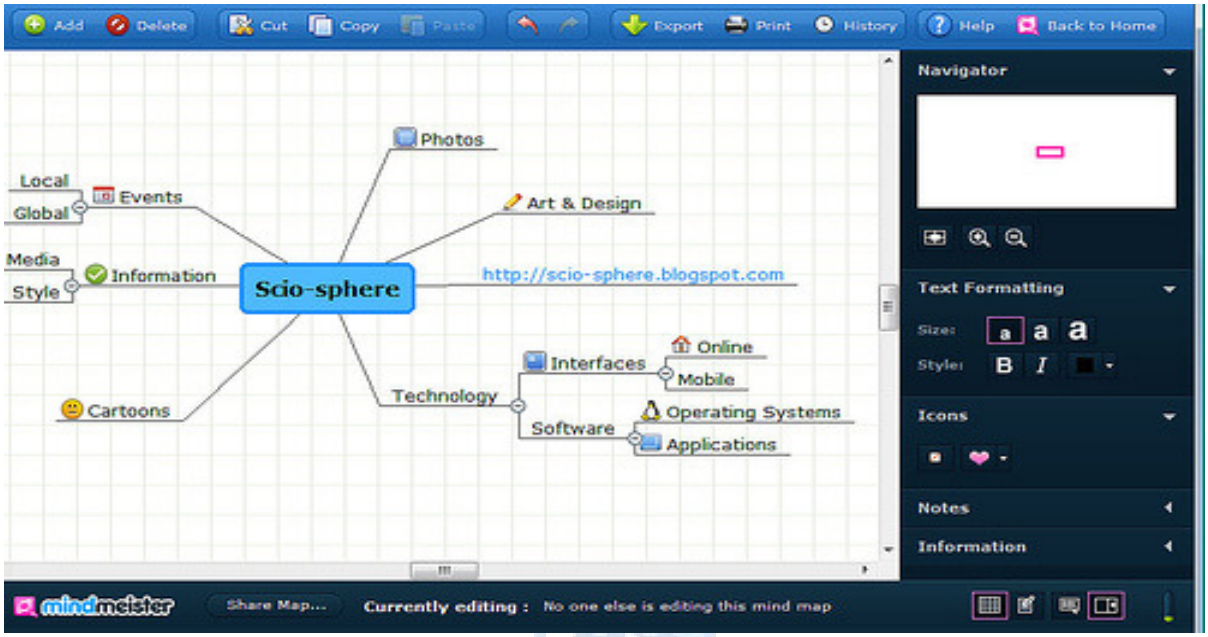
Inspiration is the most popular software designed primarily for education. It allows users to brainstorm, diagram, plan and organize in either the graphic organizer or traditional outline view. Users can work with either the organizer or outline view independently, and work done in one view transfers easily to the other. Inspiration supports hypertext linking, e-mail messages and other files. Pictures may be added to maps from a large image bank. Inspiration also offers dictionary and thesaurus and the ability to import movies and sounds. Inspiration does not have online collaboration capabilities.

MindMeister is the most popular web-based mind mapping software. MindMeister provides all the basic features for creating and editing a map; however it does not have the advanced graphics effects of desk-top software such as MindManager. Subscribers to MindMeister, typically use this software to collaborate in real-time with colleagues. Besides offering real-time collaboration, MindMeister can import from and export to desk-top mind mapping software programs MindManager and FreeMind, as well as the ability to export to an RTF outline or a GIF image. The software allows maps to be shared with others in either read-only or full collaboration mode. It also integrates with the software, Skype, so collaborators may

chat over the Internet while editing a map. MindMeister was recently chosen as the winner of the 2008 Red Herring Europe 100 Award, granted to the top 100 private technology companies based in the European, Middle Eastern and African regions. Other web-based software choices include bubbl.us, Mindomo Basic and Thinkature. Figure 4 shows a screenshot of a mind map created by MindMeister (http://farm1.static.flickr.com/200/484673949_d9cc3b0bbb.jpg)

MindView has many export and import capabilities in addition to integrating easily with Microsoft Office. It offers a variety of structured layout options and views. MindView is available in two versions, business and education, with a free viewer enabling colleagues without MindView software to view documents created by MindView.

Figure 4: Screenshot of MindMeister



Mind Mapping Survey

Research on mind mapping is still at an early, exploratory stage. Most of the existing studies as referenced earlier in the manuscript deployed a case study methodology to study mind map applications in business and education. Our research survey is also exploratory in nature. The primary objective is to profile mind mapping users in the education, government and industry sectors to understand their differences and similarities. Survey questions measure demographics, application areas and mind mapping usage rates and how respondents in each sector rank the advantages and disadvantages of using hand drawn and software maps.

A sample (8,440) of alumni from an eastern university received survey invitations. An email message sent to the each individual in the sample included a link to an online survey. A total of 1,477 completed responses were received which represents a response rate of 17.5 percent. Table 3 shows the demographics of those responding to survey questions. Responses from the education and "other" sector include three times as many females as males; whereas in business and government sectors the distribution of male and female responses are approximately the same.

Table 3: Demographic Characteristics of Survey Respondent

	Business	Education	Govt	Other	Total
Female	357	330	97	70	854
Male	394	108	95	26	623
Total	751	438	192	96	1477

Of those responding to the survey, 35 percent use mind maps, either hand-drawn maps and/or mind mapping software. Figures 5 through 7 focuses on usage rates for those using mind mapping techniques given respondent's gender and sector. Figure 5 shows 41 percent of respondents in business use either hand-drawn maps or mind mapping software; whereas 43 percent of respondents in education use either hand-drawn maps or mind mapping software. The education and "other" sector include many more female respondents, whereas females and males are fairly equally represented in the business and government sectors. This characteristic influences the usage rate for females as shown in Figure 6. Figure 7 provides statistics on the gender of those using mind maps within a given sector. Of those responding to the survey, 65 percent responded they do not use mind maps. Why not? The most cited reason is "not aware of the technique."

Figure 5: Mind Map Usage Rate Given Sector

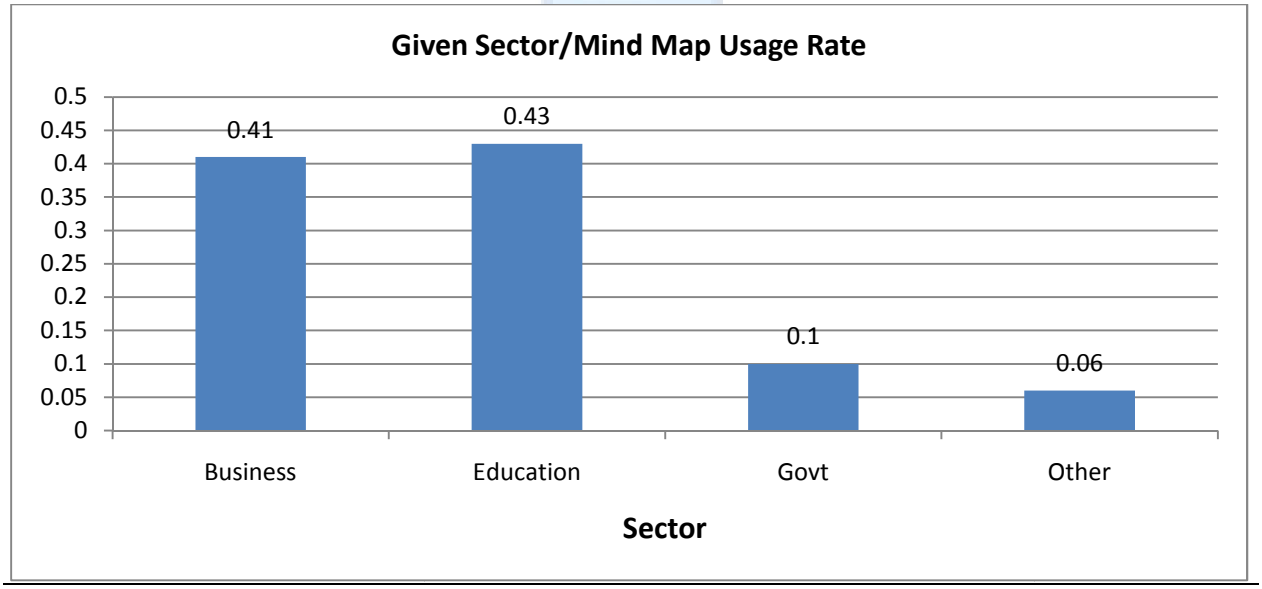


Figure 6: Mind Map Usage Rate Given Gender

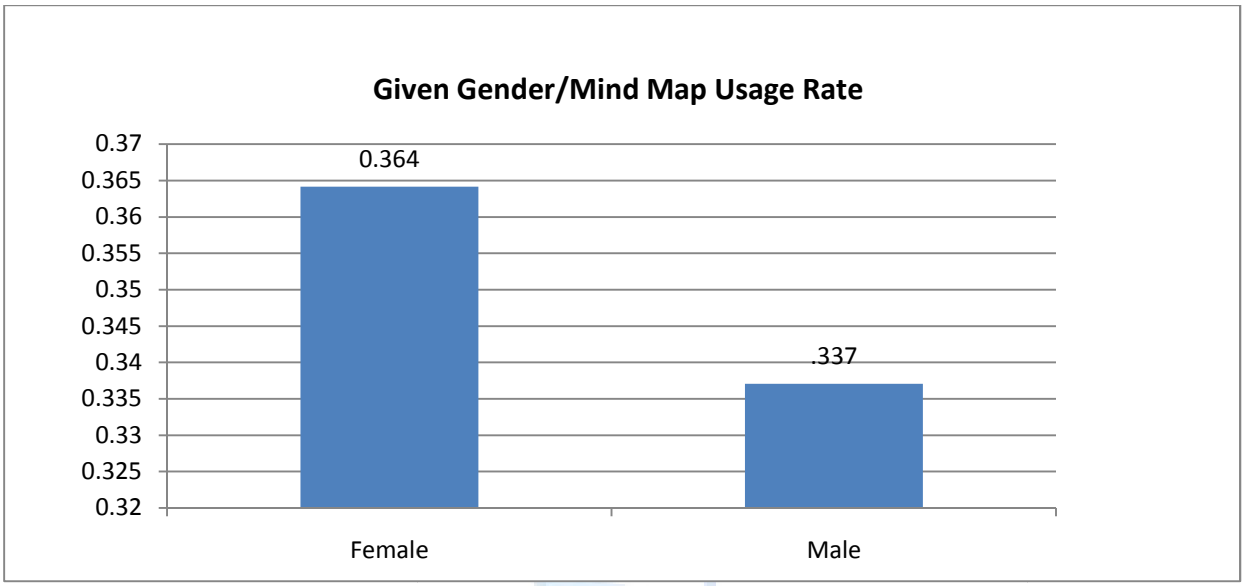
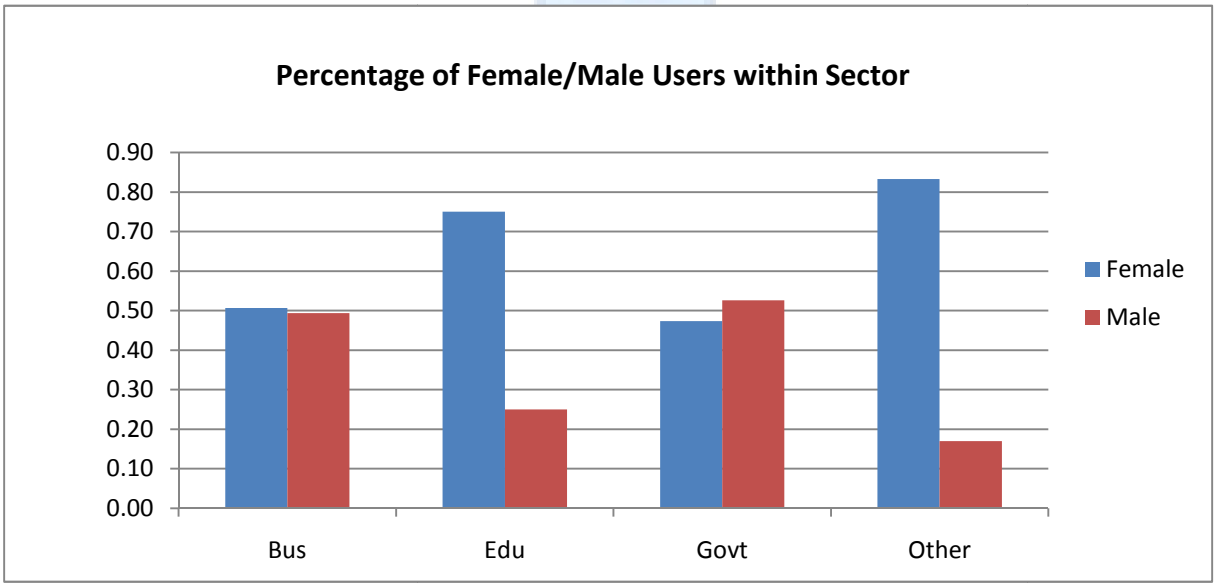


Figure 7: Gender Mind Map Usage Rate Given Sector Mind Map User



Of those individuals using mind maps, Table 4 lists primary application areas for each sector. “Brainstorming” ranked as number 1 application area in all three sectors. “Process improvement” only appears in the business sector rankings, whereas “conducting research” only appears in the educational sector rankings. Other application areas such as “project management” and “problem solving” appear in all three sectors.

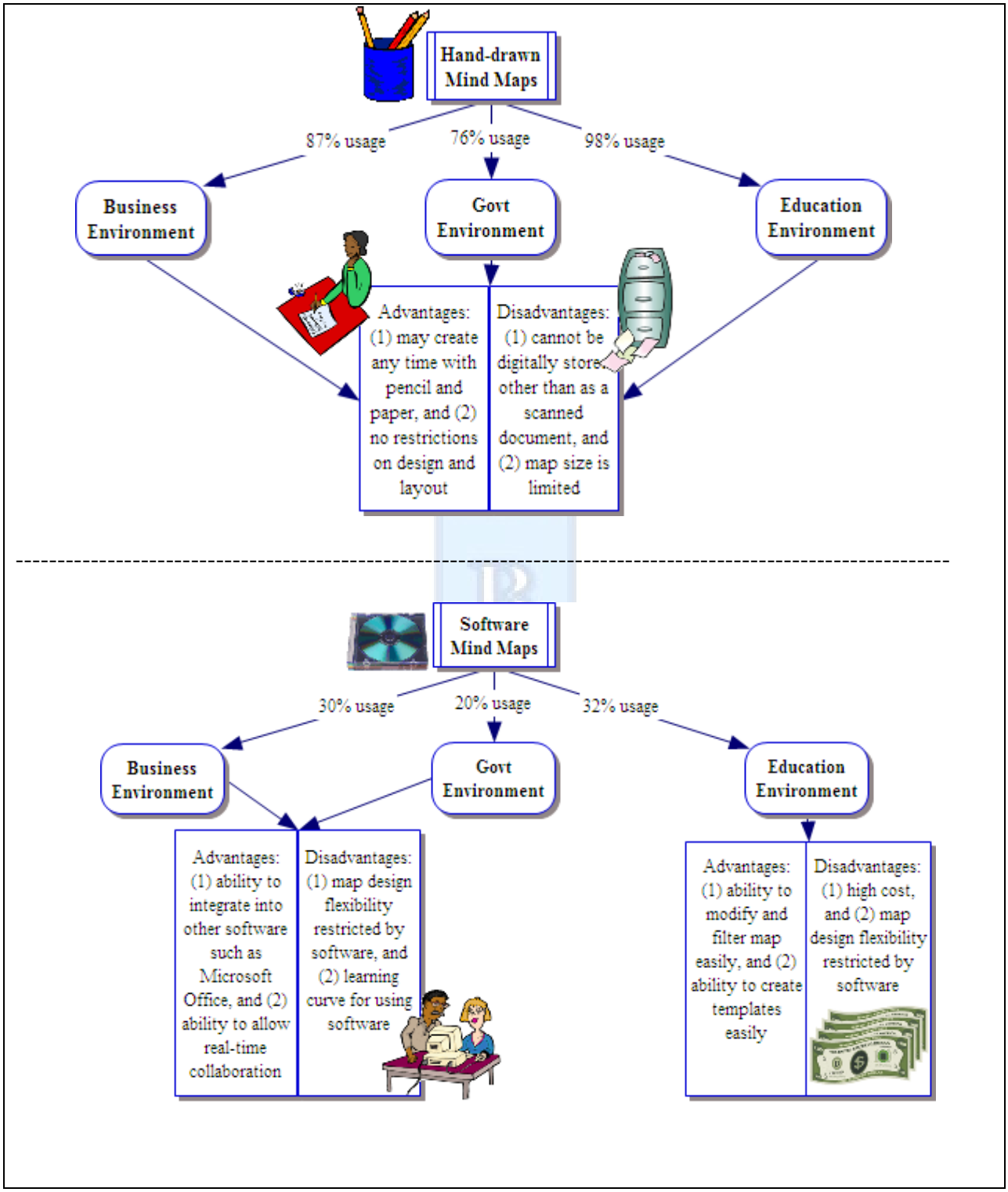
Table 4: Mind Map Application Rankings

Sector	Rank 1	Rank 2	Rank 3	Rank 4
Business	Brainstorming	Process improvement	Problem solving / Decision making	Project planning
Education	Brainstorming	Problem solving / Decision making	Preparing presentations	Conducting research
Govt	Brainstorming	Project planning	Problem solving / Decision making	Preparing presentations

Of respondents that use mind maps, what preference do they have with regard to hand-drawn maps and mind mapping software? A significant percentage of those using mind maps indicate they use only hand-drawn maps. Figure 8 lists the percentages and rankings for advantages and disadvantages of hand-drawn maps and mind mapping software for each sector. Across all sectors, there is agreement regarding rankings of advantages and disadvantages for hand-drawn maps. The chief advantage of hand-drawn maps is the ability to create a map anytime, whereas the disadvantage is the map cannot be digitally stored.

With respect to mind mapping software advantages and disadvantages, however, government and business sectors differ from those in the education sector as shown in Figure 8. The most popular mind mapping software within the education sector is Inspiration. MindManager is the favorite within the business sector, whereas within the government sector our survey respondents did not show a clear preference.

Figure 8: Hand-drawn and Software Mind Maps – Sector Usage Rates and Ranking of Advantages and Disadvantages



Conclusion

A profile of a mind map user from the education sector is one that constructs hand-drawn maps, but a significant number employ mind mapping software (such as Inspiration). Users appreciate the ease in which a hand-drawn map may be created at any time or place, but they also see the drawback given today's technology of not having an electronic copy available. An advantage of mind mapping software is the ability to modify maps easily, but the cost is a deterring factor. Users in the education environment indicate that mind maps help them organize their ideas. They use mind maps for brainstorming, problem solving, preparing presentations and conducting research.

Most mind map users from the business environment and government environment are more like-minded than those from the education sector. They construct hand-drawn maps but a significant number of users employ software (such as MindManager). Business and government users share the same attitudes with users in education regarding the advantages and disadvantages of using hand-drawn maps. However, those in business and government differ in what they perceive as advantages and disadvantages of mind mapping software. Business users typically utilize mind maps for brainstorming and process improvement. Government users typically use mind maps for brainstorming and project planning.

Mind mapping techniques are not for everyone as evidenced by the overall usage rate of 35 percent. Many are not aware that mind mapping techniques exist. There is a learning curve with using mind mapping software. However, mind mapping software takes mind mapping beyond the realms of pen and paper. This is primarily because desk-top generated maps can be much larger and a lot more complex, and they allow users to build relationships, create dynamic links to other data sources and foster collaboration. As more and more individuals use mind maps, then software with these capabilities will become more popular.

Mind mapping appears to show a great deal of promise as a technique that can be used in a variety of applications making it suitable for education, business, government or personal settings, but it is far from a general purpose tool such as a word processor or spreadsheet application. As more new and innovative mind-mapping software applications continue to be introduced into the marketplace, the use of mind-mapping for structuring concepts and sharing ideas is likely to increase. Whether mind-mapping becomes as prevalent as outlining, flash cards, PowerPoint presentations and other traditional forms remains to be seen. At this point, mind-mapping popularity is on the increase, and it is certainly worthy of more attention in the research literature.

References

Abi-El-Mona, Issam and Adb-El-Khalick, Fouad (2008). The influence of mind mapping on eighth graders' science achievement. Vol 108(2), 298-313.

Adam, Anna and Mowers, Helen (2007). Getting Inside Their Heads. *School Library Journal*, Vol. 7(9), 24-25.

Akinoglu, Orhan and Yasar, Zeynep (2007). The Effects of Note Taking in Science Education Through the Mind Mapping Technique on Students' Attitudes, Achievement and Concept Learning. *Journal of Baltic Science Education*, Vol. 6(3), 34-42.

Blum, Jonathan (2007). The Mysterious Mind Map. http://www.thestreet.com/story/10394689/3/the-mysterious-mind-map.html

Buzan, Tony (1970), *Make the Most of Your Mind*, Colt Books, Cambridge.
Buzan, Tony (1996), *The Mind Map Book: How to Use Radiant Thinking to MaximizeYour Brain's Untapped Potential*, Plume, New York.
Kirchner, Bharti (2009). Mind-map your way to an idea. *Writer*, Vol. 122(3), 28-29.
Lamont, Judith (2009). Managing critical knowledge in higher education. *KMWorld*, Vol. 18(5), 20-24.
Lane, Alan (2009). Putting the Right and Left Together, *Communication World*, 24-25.
McComas, W. and Olson, J. (1999). The Nature of Science as expressed in international science education standards documents: a qualitative consensus analysis. Toward Scientific Literacy, *HPSST Conference Proceedings*, 551-559.
Mintzes, J. J., Wandersee, J. H. & Novak, J. D. (1999). *Assessing Science Understanding – A Human Constructivist View*. San Diego, CA: Academic Press.
Näykki, Piia and Järvelä, Sanna (2008). How Pictorial Knowledge Representations Mediate Collaborative Knowledge Construction In Groups. *Journal of Research on Technology in Education*. Vol. 40(3), 359-387.
Ornstein, Robert (1977). *The Psychology of Consciousness*, Harcourt Brace Jovanovich, New York, NY.
Pressley, M., VanEtten, S., Yokoi, L., Freebern, G., & VanMeter, P. (1998). The Metacognition of College Studentship: A Grounded Theory Approach. *Metacognition in Theory and Practice,* Mahwah NJ, 347-367.
Sperry, Roger W (1968). Hemispheric Deconnection and Unity in Conscious Awareness. *Scientific American*, Vol. 23, 723-35.
Van Hool, Jane (2004). Every Picture Sells a Story. *Supply Management*, Vol. 9(20), 28-30.
Zampetakis Leonidas A, Loukas Tsironis and Vassilis Moustakis (2007). Creativity Development in Engineering Education: the Case of Mind Mapping. *The Journal of Management Development*, Vol. 26(4), 370.
Wilcox, Andrew (2003). Mindmanaging Your Projects. *Engineering Management* Vol. 13(3), 24-27.
Wycoff, J. (1991). *Mindmapping: Your personal guide to exploring creativity and problem-solving*. New York: Berkley Publishing Group, 43.