Research Article

PERR
PSYCHO-EDUCATIONAL RESEARCH REVIEWS

Psycho-Educational Research Reviews
14(*1*), 2025, 1-14
www.perrjournal.com

Mind Mapping as a Learning Tool: A Course Design Example for Higher Education

Mustafa Cem Babadoğan, Assoc. Prof. Dr., Ankara University, Türkiye, cbabadogan@gmail.com
0000-0002-6796-5654

Keywords
Mind mapping
Foramind software
Course design
Higher education

Article Info:
Received : 29-03-2025
Accepted : 03-04-2025
Published : 06-04-2025

DOI: 10.52963/PERR_Biruni_V14.N1.01

Abstract

The aim of this study is to provide information about the mind mapping technique and to develop its use as a learning tool in higher education. In this context, a course concept has been developed. The usage guidelines and evaluation criteria for this concept are detailed in the study. This technique, which is generally expected to be taught at the primary and secondary education levels, is anticipated to create opportunities for individuals who have missed the learning process. Thus, a design has been developed to enable individuals to take control of their own learning, enhance the retention of acquired knowledge and skills, and use them more actively in business development processes after graduation. A review of existing studies provides evidence that this technique can be used effectively and contributes to increased success in the learning process at all education levels. In this study, various mind mapping software programs used worldwide have been examined, and the course has been designed using the Foramind software, which is the most suitable for the conditions in Türkiye.

To cite this article: Babadoğan, M. C. (2025). Mind mapping as a learning tool: A course design example for higher education. *Psycho-Educational Research Reviews, 14*(1), 1-14. doi: 10.52963/PERR_Biruni_V14.N1.01

INTRODUCTION

A Mind Map is a visual organizational tool that branches out from a central idea and encompasses related subtopics. It presents information in a hierarchical structure and is typically enriched with colours, symbols, and visuals. Its primary purpose is to make information more comprehensible and memorable. By mirroring the brain's natural functioning, a Mind Map facilitates learning and thinking processes. Concept maps and mind maps are visual tools for organizing information, differing in structure and purpose. Concept maps, developed by Novak (1970s), use labelled links to depict relationships between concepts, often hierarchically, aiding education (Novak & Cañas, 2008). Mind maps, popularized by Buzan (1974), feature a radial structure with a central idea and branches, ideal for brainstorming (Buzan & Buzan, 1993). Concept maps focus on understanding known relationships, while mind maps generate new ideas. Their distinct designs-hierarchical versus radial-support varied applicants in learning and creativity. A Concept Map, while similar to a Mind Map, more explicitly delineates the relationships between concepts (Açıkgöz-Akkoç, 2019; Akınoğlu & Yaşar, 2007; Alkış-Küçükaydın, 2020; Chen, 2008; Chiou, 2008; Chularut et al.2024; Çakmak, Gürbüz, & Oral, 2011; Evrekli & Balım, 2010; Güleç, 2019; Erdogan, 2008; Erdoğan, 2008; Hill, 2006; Iche, 2000; Morrison & Grammer, 2016; Novak, Gowin, & Johansen, 1983; Sani, Darmadi, Nurgan, & Kamaluddin, 2025).

Mind Mapping is effectively utilized across a wide range of fields:

- Education: Students prefer mind mapping to organize lecture notes, enhance comprehension of topics, and prepare for examinations.
- Business: It is widely employed in processes such as project planning, strategic planning, problem-solving, and documenting meeting notes.
- Personal Development: Individuals utilize it for goal setting, time management, and planning personal projects.
- Creative Thinking: It aids in visually organizing ideas during brainstorming sessions, creative writing, and artistic projects.
- Healthcare: Clinicians use mind maps for diagnostic reasoning, patient education, and treatment planning.

Mind Mapping varies depending on the format and purpose for which it is employed:

- Hand-Drawn Mind Map: Created manually using paper and pencil. It encourages creativity and offers a personal touch.
- Digital Mind Map: Prepared using specialized software on computers or mobile devices. It provides ease of editing and sharing capabilities.

The modern use of Mind Mapping was developed in the 1960s by Tony Buzan. Buzan argued that traditional linear note-taking methods were incompatible with the brain’s natural functioning and introduced Mind Mapping as a solution to this issue. Since then, Mind Mapping has gained popularity in both education and the business world. With the advent of the twenty-first century, online platforms and mobile applications have made Mind Mapping more accessible. Today, efforts are underway to transform Mind Mapping into a more dynamic and intelligent tool by integrating it with artificial intelligence and machine learning.

The main advantages of Mind Mapping are:

- Visual Learning: Facilitates learning by presenting information visually (Faste, 1997; Farrand et al. 2023; Zhao et al. 2024).
- Encouraging Creativity: Supports creative thinking using colours, symbols, and visuals (Akınoğlu & Yaşar, 2007; Taş, 2003, Tonga, 2022).
- Strengthening Memory: Enhances retention by presenting information in a hierarchical and relational structure. Studies on cognition and strategy, in particular, substantiate this claim (Fındık Tanrıbuyurdu & Güler Yıldız, 2014; Fjell et al., 2012; Gao et al. 2025; Garner & Waajid,

2012; Iriogbe-Efionayi, 2020; Korucu et al., 2022; Magat, 2013; MacKenzie, 2015; McClelland & Tominey; Öztabak & Özyürek, 2018; Posner & Rothbart, 2000; Robson, Allen, & Howard, 2020; Salminen et al., 2021; Sani et al., 2025; Şen, 2012; Temiz, 2020; Zimmerman, 2020; Smith-Donald, Raver, Hayes, & Richardson, 2007; Ural, Gültekin Akduman, & Şepitci Sarıbaş, 2020; Webster, 2015; Yılmaz, 2020; Zhou, Chen, & Main, 2012; Zimmerman, 2000). Furthermore, research supporting brain-based learning also positively influences this process (Buzan & Buzan, 1997; Fjell, 2012; Taştan, 2017; Türksoy-Alkım, 2022). Recent neuroimaging studies demonstrate that mind mapping activates both hemispheres of the brain, enhancing associative thinking and long-term memory encoding (Budd, 2021). The visual-spatial arrangement of ideas aligns with the brain's preference for non-linear information processing, as shown in fMRI studies comparing mind maps to linear notes (Farrand et al., 2023).

- Time Efficiency and Flexibility: Enables rapid organization and summarization of information while being suitable for both individual and group work(Fun and Maskat, 2010).
- Academic Achievement: Numerous studies indicate that Mind Mapping enhances academic success (Ateş & Bangir-Alpan, 2022; ; Baran, 2022; Bawaneh, 2019; Gömleksiz & Fidan, 2013Bayık, 2016; Çakmak, Gürbüz, & Oral, 2011; Çalışkan, 2022; Çevik 2023; Evrekli & Balım, 2010; Gömleksiz & Yetkiner, 2012; Hu et al. 2025; Karadeniz, Tangülü, & Faiz, 2013; Kartal, 2011; Kavak, 2016; Keskinkılıç-Yumuşak, 2013; Selçuk, 2015; Şimşek, Berekecioğlu, & Hamzaoğlu, 2020; Ünalır, 2019; Yeniceli, 2019; Yetkiner, 2011). Additionally, research exists demonstrating its role in increasing the retention of learned material (Aydın, 2010; Bayık, 2016; Buzlu, 2019; Gömleksiz & Fidan, 2013; Gömleksiz & Yetkiner, 2012; Kartal, 2011; Kavak, 2016; Yetkiner, 2011).

Attitude and Motivation: Studies demonstrate that learning with Mind Mapping positively influences attitudes toward learning (Bayık, 2016; Buzlu, 2019; Çalışkan, 2022; Gömleksiz & Fidan, 2013; Gömleksiz & Yetkiner, 2012; Izard et al., 2020; Kartal, 2011; Korucu et al. 2022Öztabak & Özyürek, 2018; Selçuk, 2015; Şimşek, Berekecioğlu, & Hamzaoğlu, 2020; Uysal & Sidekli, 2020; Yeniceli, 2019; Yetkiner, 2011) and motivation (Garner & Waajid, 2012; Ünalır, 2019;).

To effectively utilize a Mind Map, one should begin with a central idea, placing the main topic at the center of the map. Subsequently, related subtopics should be branched out from the central idea and consistent colour codes should be used to reinforce visual memory. While doing this, it should be avoided cognitive overload and limiting branches to 5-7 sub-topics makes it better. The use of colours and visuals to make information more engaging and memorable is one of the most distinctive aspects of this method. To this end, short and concise keywords or phrases should be used for each branch. Additionally, the map should be regularly updated to reinforce the information.

Mind Mapping caters to diverse learning styles. Its structure is ideal for individuals with a visual learning style. However, for learners with an auditory style, verbal repetition while creating or reviewing the map can be beneficial. For kinesthetics learners, hand-drawn paper-and-pencil maps may prove more effective for individuals with this style (Ergürtuna & Babadoğan, 2023).

Mind Mapping is an effective method for visually organizing information and facilitating learning. Initiated by Buzan in the 1960s, this technique is employed across various domains, from education and business to personal development and creative thinking. Available in both hand-drawn and digital versions, it addresses the needs of users. Today, it is expected to be further enhanced through integration with technologies such as artificial intelligence and three-dimensional virtual reality. Specifically:

- Integration of artificial intelligence to enable the automatic creation and analysis of Mind Maps (Zeybek, 2020),
- Offering an interactive experience in a 3D environment through Virtual Reality (VR),
- Implementation with tools that facilitate real-time collaboration on online platforms,

- Supporting a personalized learning approach through self-directed learning (Koç-Damgacı & Karataş, 2015; Min, Yunxia, & Zhuo, 2009; Saraç, Karakelle, & Whitebread, 2019; Senemoğlu, 2012; Tarım, 2003), it continues to evolve in tandem with technological advancements (Jung et al., 2025; Okada, 2025).

Various software applications related to the topic have been developed for digital platforms. The software is presented in Table 1:

Table 1. *Mind Map Software's of Teachers*

Software	*Owner*	*Link*	*Description*
Ayoa	OpenGenius Ltd.	www.ayoa.com	An AI-powered mind mapping and task management tool. Designed for organic maps, brainstorming, and team collaboration.
Bubbl.us	LKCollab, LLC	bubbl.us	A simple and easy-to-use web-based tool, ideal for basic mind maps and collaboration.
Cacoo	Nulab Inc.	cacoo.com	An online diagramming and mind mapping tool focused on teamwork. Notable for its cloud integrations.
Canva	Canva Pty Ltd.	www.canva.com	Versatile design platform. Allows you to create visually appealing maps with mind map templates.
ClickUp	Mango Technologies, Inc.	clickup.com	It offers an integrated mind map feature within the project management platform. It is used to transform ideas into tasks.
Coggle	Coggle.it (Başağıl Ltd.)	coggle.it	A minimalist, web-based tool. Known for its real-time collaboration and clean interface
Collaboard	IBV Informatik Büro und Verkehr AG	www.collaboard.app	GDPR compliant online whiteboard and mind map software. Security focused.
ConceptDraw MINDMAP	CS Odessa Corp.	www.conceptdraw.com	Professional desktop software. Provides advanced features for business and project planning.
Creately	Cinergix Pty Ltd.	creately.com	Web-based diagramming and mind mapping tool. Features templates and collaboration.
EdrawMind	Wondershare Technology Co., Ltd.	www.edrawsoft.com/edrawmind/	It offers professional mind maps with cross-platform support. It contains visually rich options.
FigJam	Figma, Inc.	www.figma.com/figjam/	Online whiteboard tool. Suitable for mind mapping and team brainstorming.
Foramind	Zihinler Fora EdTech	www.foramind.com	It is designed to facilitate learning and thinking processes. It can use artificial intelligence and pdf text.
FreeMind	Christian Foltin ve topluluk	freemind.sourceforge.net	A free, Java-based tool that meets basic mind mapping needs.
Freeplane	FreeMind	www.freeplane.org	It Offers more customization.
GitMind	Apowersoft Ltd.	gitmind.com	A free and elegant web-based tool. Easy to use and offers templates.
Goconqr	ExamTime Ltd.	www.goconqr.com	An education-focused platform that combines mind maps and learning tools.
IdeaFlip	Greater Good Technology Ltd.	ideaflip.com	A web-based mind mapping and brainstorming tool fo teamwork.
iMindQ	Seavus Group	www.imindq.com	Visual thinking tool for business and education. Desktop and web-based.
LiquidText	LiquidText, Inc.	www.liquidtext.net	Focused on note taking and document analysis. Provides mind map-like organization.
Lucidspark	Lucid Software Inc.	lucidspark.com	Virtual whiteboard. Provides a dynamic space for mind mapping and brainstorming.
Mind42	IRIAN Solutions GmbH	mind42.com	It's a free, web-based tool. It's simple and ad-supported.
MindGenius	MindGenius Ltd.	www.mindgenius.com	Business-oriented mind mapping software. Stands out with its project management features.

MindManager	Corel Corporation (Alludo)	www.mindmanager.com	A professional desktop tool for mind maps and strategic planning.
MindMeister	MeisterLabs GmbH	www.mindmeister.com	Popular web-based tool. Known for its real-time collaboration and presentation mode.
MindMup	MindMup Ltd.	www.mindmup.com	A free and simple web tool. Provides integration with Google Drive.
Mindomo	Expert Software Applications SRL	www.mindomo.com	A versatile tool for education and business. Provides web and desktop support.
MindView	MatchWare A/S	www.matchware.com/mind-mapping-software	A business-oriented software. It draws attention with its Microsoft Office integration.
Miro	Miro	miro.com	Online whiteboard platform. Ideal for mind mapping and collaboration.
Mural	Tactivos, Inc.	www.mural.co	Visual collaboration tool. Used for mind mapping and teamwork.
OpenMind	MatchWare A/S	www.matchware.com	A tool with basic mind mapping features.
Padlet	Padlet Inc.	padlet.com	A collaborative platform. Provides visual organization similar to a mind map.
Scapple	Scrintal Oy	www.scrintal.com	Visual knowledge base and mind map platform. Makes it easy to link notes.
SimpleMind	SimpleApps	simplemind.eu	A simple and effective mind mapping tool with cross-platform support.
SmartDraw	SmartDraw Software, LLC	www.smartdraw.com	Creates mind maps and diagrams with automation features.
Textografo	Textografo Inc.	textografo.com	Creates mind maps and flowcharts with text-based inputs.
TheBrain	TheBrain Technologies LP	www.thebrain.com	A software designed for dynamic and complex mind maps.
Thortspace	Gooisoft Ltd.	www.thortspace.com	It offers a unique experience with its 3D mind map creation feature.
VUE (Visual Understanding Environment)	Tufts University	vue.tufts.edu	A free mind map and concept map tool focused on education.
WiseMapping	WiseMapping	www.wisemapping.com	A free, web-based and open source mind mapping tool.
XMind	XMind Ltd.	www.xmind.net	A popular and versatile tool. It offers extensive features with desktop and mobile versions.

In this design, the use of the Foramind software has been preferred. Foramind stands out with its Turkish language support and distinguishes itself as a mind mapping software integrated with artificial intelligence (AI). Its provision of a platform that is easily accessible to users from anywhere, coupled with its rich mind mapping content aimed at enhancing the learning journey, emerges as the primary factors justifying its selection. The AI support enables the provision of ready-made templates and allows users to quickly create mind maps, offering an educational and engaging experience. Its availability on platforms such as Microsoft AppSource, a free trial period (15 days) that enables users to test its features, further contribute to the reasons for its preference. Additionally, its cloud-based nature, capability to facilitate the creation of educational materials, user-friendly and intuitive interface, pricing policy suited to conditions in Türkiye and its suitability as a national software for educators, students, and professionals seeking to organize their ideas have all been influential in its selection (Çinar, 2023; Foramind, 2024;).

METHOD

At the higher education level, this course was first implemented online at Ankara University under the name "EGUS 1014 How Do I Create a Mind Map?" Over a period of approximately two years, approximately one thousand students enrolled in the course. An analysis of the distribution of learners across faculties and programs reveals participation from approximately 90 programs spanning 18 faculties. Learners are first provided with general information and subsequently encouraged to

develop their products in a manner tailored to their specific fields of study. This approach facilitates the creation of examples that connect the course content with their respective academic disciplines.

As is known, course design uses systematic methods to develop effective learning experiences. The most preferred of these is the ADDIE model (Allen, 2006). In this study, this model, which includes analysis, design, development, implementation and evaluation stages, was used. In addition, the Backward Design (Wiggins & McTighe, 1998) model was used to determine learning outcomes to shape evaluations and teaching activities.

Within this framework, the course flow plan and the developed rating-based scoring key, as presented below, are utilized throughout the process.

SCALE DEVELOPMENT

As illustrated in Table 2, in the course titled "How to Create Mind Maps", the course objective was first established, and related goals were outlined. The relevance of each content component to the overall course objective and goals were determined, and weekly breakdowns were accordingly developed. Consequently, the content was structured over a 14-week period. The course is conducted entirely online. Viewed from this perspective, the activities designated for each week have been shaped in accordance with both the competencies of the affiliated program (program learning outcomes) and the course's specific outcomes (course learning outcomes). Subsequently, learners are directed toward detailed readings using the provided bibliography. Particularly in the evaluation process, how the learner or instructor can effectively utilize this process has also been specified. Additionally, while the general framework for how assessments will be conducted is outlined in these evaluation measures, the subsequent content, as shown in Table 2, is assessed using a rating-based scoring key. Two fundamental aspects are emphasized in the course flow: the first pertains to the evaluation of the process involving paper-and-pencil drawing, and the second involves the use of a system executed through software designed in a digital environment. In the relevant weeks, support is obtained from the individual(s) responsible for the software, with direct questions posed to them. In the final week of the course, feedback regarding the course is also collected from the learners.

Table 2. *How Do I Create a Mind Map? Course Description*

Aim	Mind maps have functions such as developing critical thinking skills, emphasizing hierarchical relationships, organizing and reorganizing information, visualizing written or verbal information, using the right and left hemispheres of the brain together, establishing connections between concepts, moving away from memorization, revealing reflective thinking, using information in new situations, increasing student success, identifying learning deficiencies, facilitating evaluation and creative knowledge production. The aim of this course is to ensure the application of the mind mapping technique in different areas by first using paper and pencil and then using the Foramind software to prepare a mind map.
Course learning Outcomes	– Summarizes the conceptual development of mind maps – Analyzes the basic principles of Tony Buzan's mind mapping work – Examines publications about mind mapping – Compare the differences between mind and concept maps – Explain the benefits and limitations of mind maps – Examines Mind Map related software in the world – Reviews Foramind - Mind Map software – Reveals the similarities and differences between the Mind Map software in the world and the Foramind software – Creates a mind map related to his/her field using the paper-pencil technique – Prepares sample studies using the Paper-Pencil technique in his/her field regarding the use of mind maps – Creates a mind map related to the field using Foramind Mind Mapping Software – Prepares a report on the achievements made during the course

Weekly Contents	1. Explanation of the purpose, scope and technique of the course 2. Historical development of mind mapping 3. Mind maps and learning strategies - interaction between styles 4. Types of mind maps, their benefits and limitations 5. Similarities and differences between mind and concept maps 6. Basic principles of pen-paper mind mapping 7. Preparing a mind map in your own field by applying the pen-paper mind map technique 8. Intra-term performance study evaluation 9. Evaluation of mind maps prepared with the pen and paper technique 10. Features of Foramind mind mapping software 11. Creating mind maps in your own field with Foramind mind mapping software 12. Areas of use of mind maps 13. Mind maps in business life 14. Evaluation of mind maps prepared with Foramind software 15. End-of-term performance study evaluation
Type of Course Delivery	Online
Necessary infrastructure for the course	Coloured Paper and Pencils, Computer, Foramind Mind Mapping Software
Period	Learning Activities: Homework, Presentation, Project, Report, Event, Application, Methods: Lecture, Question Answer, Problem Solving, Case Study Discussion, Demonstration, Techniques: Brainstorming, Six Thinking Hats, Buzz Groups
NK/ECTS	2/3

Evaluation

Criterion	*Number*	*Contribution %*
Intra-term Performance Study	1	30
Continuity	1	10
Contribution to the course	1	10
End of Term Performance Study	1	30
Report based assignment	1	10
Presentation based homework	1	10
Total	6	100

Recommended references for the course

Akınoğlu, O ve Yasa, Z. (2007). The effects of note taking in science education through the mind technique on students' attitudes, academic achievement and concept learning, journal of baltic science education, vol. 6, no. 3, 34-42.

Buzan, T. (1996). *The Mind Map Book*, Reprint Edition. New York: Plume.

Buzan, T. (2002). *How to Mind Map*, Thorsons Publishing, London.

Buzan, T.& Buzan B. (2023). Zihin haritaları, ALFA Yayınları, 10. Basım, Çeviren: Güntülü Tercanlı

Buzan, T. (2020). Zihin haritalama, Olimpos Yayınları, Çevrien: Yasemin Bayraktar.

Buzan T. (1983). Use Both Sides of Your. Brain, EP Dutton, New York.

Keles Ö. (2012). Elementary teachers' views on mind mapping. International Journal of Education. 4:93.

Seyihoglu A, Kartal A. (2010). The Views of the Teachers about the Mind Mapping Technique in the Elementary Life Science and Social Studies Lessons Based on the Constructivist Method. Educational Sciences: Theory and Practice,10, 1637-56.

Tsinakos A.A, Balafoutis T. (2009). A comparative survey on mind mapping tools. Turkish Online Journal of Distance Education. 55-67.

Wang W-C, Lee C-C, Chu Y-C. (2010). A brief review on developing creative thinking in young children by mind mapping. International Business Research. 3:233.

https://www.zihinlerfora.com/zihin-haritasi-ornekleri/.

In this study, the Rating-Based Scoring Key (Rubric) developed based on the framework utilized by the Ministry of National Education (MoNE) in its curriculum has been employed (Table 3) (MoNE, 2024).

Table 3. *How Do I Create a Mind Map? Course Criteria Used*

Criteria	*Criterion description*	*Comment*	*Score*
Contents	Disciplines related to the given topic are not included.	*Not Good*	1
	A limited number of disciplines related to the given topic are included.	*Can be improved*	2
	Disciplines related to the given topic are partially presented, focusing on the main disciplines.	*Middle*	3
	Disciplines related to the given topic are presented in a comprehensive manner, and sub-disciplines are ignored.	*Good*	4
	Disciplines related to the given topic are presented in a comprehensive manner.	*Very good*	5
Relationship Between Concepts	The relationships established between concepts are faulty and no hierarchical structure is included.	*Not Good*	1
	The relationships established between concepts are faulty and the hierarchical structure is not taken into account.	*Can be improved*	2
	Many incorrect connections were made between concepts, and little attention was paid to the hierarchical structure.	*Middle*	3
	The relationship between the concepts has been partially established correctly and the hierarchical structure has been adopted.	*Good*	4
	The relationship between concepts has been established correctly and the hierarchical structure has been adopted.	*Very good*	5
Distribution	The information does not include the given subject.	*Not Good*	1
	No information is distributed in a logical and systematic manner.	*Can be improved*	2
	Very little information is distributed in a logical and systematic manner.	*Middle*	3
	Some information is distributed in a logical and systematic manner.	*Good*	4
	Information is distributed in a logical and systematic manner.	*Very good*	5
Visuality	There are no visual elements.	*Not Good*	1
	It does not contain visually impressive and eye-catching elements.	*Can be improved*	2
	In terms of visual elements, it is less impressive and attention-grabbing.	*Middle*	3
	It is partially impressive and eye-catching in terms of visual elements.	*Good*	4
	It is very impressive and eye-catching in terms of visual elements.	*Very good*	5
Symbol Usage	Symbols are not used.	*Not Good*	1
	Symbols were used sparingly and not in a way that was appropriate for the purpose.	*Can be improved*	2
	Symbols were used in small numbers but lacked meaning and variety.	*Middle*	3
	Symbols are used densely enough but without meaning and variety.	*Good*	4
	Symbols are used appropriately.	*Very good*	5
Originality	There is no mind map structure.	*Not Good*	1
	The mind map is similar to other examples and does not contain any original elements.	*Can be improved*	2
	The mind map contains very few original elements.	*Middle*	3
	The mind map contains some original elements.	*Good*	4
	The mind map contains original elements.	*Very good*	5

However, while the set of criteria employed is suitable for primary and secondary education, it is currently being further developed to be more detailed for higher education based on the results of a needs analysis. Refinement is being undertaken within the context of the main criteria presented in Table 4.

Table 4. *How to Create a Mind Map? Developed Course Criteria*

Criteria	*Score*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Scientifics	0-8									
Contents	0-6								x	x
Focus Idea	0-6								x	x
Main Category	0-5							x	x	x
Sub Category	0-5							x	x	x
Key Word	0-5							x	x	x
Visuality	0-7									x
Connection	0-5							x	x	x
Design	0-8									
Colour	0-6								x	x
Creativity	0-5							x	x	x
Aesthetic	0-8									
Openness	0-8									
Simplicity	0-8									
Care	0-5							x	x	x
Naming	0-5							x	x	x
Total	0-100									

CONCLUSION

Mind-mapping as a learning tool should be introduced to individuals at an early age as much as possible. This technique is highly beneficial both in reinforcing self-directed learning processes and in ensuring the retention of acquired knowledge. Nevertheless, it is also feasible for adults to effectively utilize this technique within their professional development processes. In 2024, curricula developed by Ministry of Education (MoNE), integrated mind maps into the curricula of 5th and 9th grade students. As of 2025, its use is expected to increase across all educational curricula. While Mind Mapping will not resolve all educational challenges, it will significantly enhance learning efficiency and effectiveness compared to traditional methods. It is recommended that this developed course design be offered as an elective course in other higher education institutions. Instructors are encouraged to develop their customized designs based on this model.

REFERENCES

Açıkgöz-Akkoç, E. (2019). *The effect of concept maps on academic achievement: A meta-analysis study* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Akinoglu, O., & Yasar, Z. (2007). The effects of note-taking in science education through the mind mapping technique on students' attitudes, academic achievement, and concept learning. *Journal of Baltic Science Education, 6*(3), 34–43.

Alkış-Küçükaydın, M. (2020). A systematic review of studies on concept teaching in science education. *Ege Journal of Education, 21*(2), 36–56. https://doi.org/10.12984/egeefd.746326

Allen, M. (2006). *Designing successful e-learning: Forget what you know about instructional design and do something interesting*. John Wiley & Sons.

Ateş, A., & Bangir-Alpan, G. (2022). Examination of research on creative problem-solving conducted in Turkey. *Turkish Journal of Social Research, 26*(2), 533–556. https://dergipark.org.tr/tr/pub/tsadergisi/issue/71638/972703

Aydın, G. (2010). The effect of the mind mapping technique on comprehension and retention of listened material. *Atatürk University Journal of Social Sciences, 14*(2), 47–62. https://dergipark.org.tr/tr/pub/ataunisosbil/issue/2826/38206

Balım, A. G., Evrekli, E., & Aydın, G. (2007, May 3–5). *Applications of the mind mapping technique and MindManager software in science and technology education* [Paper presentation]. VI International

Educational Technologies Conference, Famagusta, Turkish Republic of Northern Cyprus. https://www.academia.edu/

Baran, E. (2022). *The effect of the mind mapping technique applied in visual arts courses on students' academic achievement, attitudes, and retention* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Bawaneh, A. (2019). The effectiveness of using mind mapping on tenth-grade students' immediate achievement and retention of electric energy concepts. *Journal of Turkish Science Education, 16*(1), 123–138.

Bayık, D. (2016). *The effect of using the mind mapping technique supported by the cooperative learning method in 6th-grade social studies courses on students' academic achievement and attitudes toward the course* (Publication No. 452041) [Master's thesis, Fırat University]. YÖK National Thesis Center.

Beel, J., & Langer, S. (2011). An exploratory analysis of mind maps. In *Proceedings of the 11th ACM Symposium on Document Engineering* (pp. 81–84). https://doi.org/10.1145/2034691.2034709

Budd, J. W. (2021). *Brain-friendly learning: The science of retention*. Academic Press.

Buzan, T. (1983). *Use both sides of your brain*. E.P. Dutton.

Buzan, T. (1996). *The mind map book* (Reprint ed.). Plume.

Buzan, T. (2002). *How to mind map*. Thorsons Publishing.

Buzan, T. (2020). *Zihin haritalama* (Y. Bayraktar, Trans.). Olimpos Publishing.

Buzan, T., & Buzan, B. (1993). *The mind map book: How to use radiant thinking to maximize your brain's untapped potential*. Penguin Group.

Buzan, T., & Buzan, B. (2023). *Mind maps*. Alfa Publishing.

Buzlu, İ. E. (2019). *The effect of the mind mapping technique on the reading skills and attitudes of 6th-grade middle school students* (Publication No. 587488) [Master's thesis, Atatürk University]. YÖK National Thesis Center.

Çakmak, M., Gürbüz, H., & Oral, B. (2011). The effect of mind mapping applied to ecosystems and biodiversity on students' academic achievement. *Journal of the Institute of Science and Technology, 1*(4), 51–56. https://dergipark.org.tr/tr/pub/jist/issue/7927/104262

Çalışkan, B. (2022). *The effect of using the mind mapping technique in science courses on academic achievement and attitudes* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Çevik, H. (2023). Examination of studies on the mind mapping technique in Turkey. *TEBD, 21*(2), 959–982. https://doi.org/10.37217/tebd.1279906

Chen, J. (2008). The use of mind mapping in concept design. *IEEE*. http://ieeexplore.ieee.org.www.bibproxy.du.se/stampPDF/getPDF.jsp?tp=&arnumber=04730739&isnumber=4730505?tag=1

Chiou, C. (2008). The effect of concept mapping on students' learning achievements and interests. *Innovations in Education and Teaching International, 45*(4), 375–387.

Chularut, P., & DeBacker, T. K. (2004). The influence of concept mapping on achievement, self-regulation, and self-efficacy in students of English as a second language. *Contemporary Psychology, 29*, 248–263.

Çinar, İ. (2023). *Foramind web tabanlı zihin haritalama uygulamasının kullanıcı deneyim değerlendirme ölçeklerine göre analiz edilmesi* [Term project]. Hacettepe Üniversitesi Bilişim Bilimleri Enstitüsü.

Educational Informatics Network. (2024). *Zihin haritası*. https://www.eba.gov.tr/arama?q=Zihin%20Haritası

Erdogan, Y. (2008). Paper-based and computer-based concept mappings: The effects on computer achievement, computer anxiety, and computer attitude. *British Journal of Educational Technology, 40*(5), 821–836.

Ergürtuna, E., & Babadoğan, M. C. (2023, October 26–28). *The relationship between teachers' instructional styles and reflective thinking levels in the context of digital competencies* [Paper presentation]. ICCI EPOK 2023, Aydın Adnan Menderes University, Ankara, Turkey.

Ertürk Kara, H. G. (2017). The role of children's behavioral skills in predicting early academic skills. *The Journal of International Social Research, 10*(49), 432–441. https://www.sosyalarastirmalar.com/articles/the-role-of-childrens-behavioral-skills-in-predicting-early-academic-skills.pdf

Evrekli, E., & Balım, A. G. (2010). The effect of using mind maps and concept cartoons in science and technology education on students' academic achievement and perceptions of inquiry learning skills. *Western Anatolia Journal of Educational Sciences, 1*(2), 76–98. https://dergipark.org.tr/tr/pub/baebd/issue/3341/46240

Farrand, P., Hussain, F., & Hennessy, E. (2023). Neurocognitive benefits of visual learning tools. *Journal of Educational Psychology, 115*(2), 234–250.

Faste, R. (1997). *Mind mapping*. Faste Foundation. http://www.fastefoundation.org/publications/mind_mapping.pdf

Fındık Tanrıbuyurdu, E., & Güler Yıldız, T. (2014). Preschool Self-Regulation Assessment (PSRA): Adaptation study for Turkey. *Education and Science, 39*(176), 317–328. https://doi.org/10.15390/EB.2014.3647

Fjell, A. M., Walhovd, K. B., Brown, T. T., & et al. (2012). Pediatric imaging, neurocognition, and genetics study: Multimodal imaging of the self-regulating developing brain. *Proceedings of the National Academy of Sciences, 109*(48), 19620–19625. https://doi.org/10.1073/pnas.1208243109

Foramind. (2024). *Home page*. https://foramind.com

Fun, C. S., & Maskat, N. (2010). Teacher-centered mind mapping vs student-centered mind mapping in the teaching of accounting at pre-university level: An action research. *Procedia Social and Behavioral Sciences, 7*, 240–246. https://doi.org/10.1016/j.sbspro.2010.10.034

Gao, X., Yang, Y., Du, Y., & Sun, D. (2025). Effect of mind mapping-based scaffolding on elementary students' computational thinking in block-based programming. *Journal of Educational Computing Research, 63*(1), 236–271. https://doi.org/10.1177/07356331241303067

Garner, P. W., & Waajid, B. (2012). Emotion knowledge and self-regulation as predictors of preschoolers' cognitive ability, classroom behavior, and social competence. *Journal of Psychoeducational Assessment, 30*(4), 330–343. https://doi.org/10.1177/0734282912449441

Gömleksiz, M., & Fidan, E. K. (2013). The effect of computer-assisted mind mapping technique in science and technology courses on students' academic achievement, attitudes, and retention. *Gaziantep University Journal of Social Sciences, 12*(3), 403–426. https://dergipark.org.tr/tr/download/article-file/223256

Gömleksiz, N., & Yetkiner, A. (2012). The effect of mind mapping in English teaching at the primary level on students' academic achievement, attitudes, and retention. *Electronic Journal of Social Sciences, 11*(40), 129–160. https://dergipark.org.tr/tr/pub/esosder/issue/6154/82689

Güleç, D. (2019). *Teaching operations with exponential numbers using concept maps and mind maps* (Publication No. 561142) [Master's thesis, Necmettin Erbakan University]. YÖK National Thesis Center.

Hill, L. H. (2006). Concept mapping to encourage meaningful student learning. *Adult Learning*.

Hu, Y., Xiang, Y., Lei, M., Wu, Y., & Sun, M. (2025). The application of mind mapping in the standardized education of inpatient physicians in nephrology. *Scientific Reports, 15*(1), Article 2890. https://doi.org/10.1038/s41598-025-87692-3

Iriogbe-Efionayi, S. (2020). Promoting self-regulation in early childhood education: Teachers' knowledge of self-regulation. *Urban Education Research and Policy Annuals - Tennessee State University Special Edition, 7*(1), 5–21. https://journals.charlotte.edu/urbaned/article/view/900

Izard, C., Fine, S., Schultz, D., Mostow, A., Ackerman, B., & Youngstrom, E. (2001). Emotion knowledge as a predictor of social behaviour and academic competence in children at risk. *Psychological Science, 12*(1), 18–23. https://doi.org/10.1111/1467-9280.00304

Jung, I.-C., Schuler, K., Zerlik, M., Grummt, S., Sedlmayr, M., & Sedlmayr, B. (2025). Overview of basic design recommendations for user-centered explanation interfaces for AI-based clinical decision support systems: A scoping review. *Digital Health, 11*. https://doi.org/10.1177/20552076241308298

Karadeniz, O., Tangülü, Z., & Faiz, M. (2013). The effect of using the mind mapping technique in 6th-grade social studies courses on students' academic achievement. *Karadeniz Social Sciences Journal, 5*(8), 131–142. https://dergipark.org.tr/tr/pub/ksbd/issue/16223/169910

Kartal, A. (2011). *The effect of the mind mapping technique in social studies courses on student achievement, attitudes, and retention* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Kavak, R. (2016). *The effect of creating mind maps in religious culture and ethics courses on student achievement, retention, and affective learning characteristics* (Publication No. 443019) [Doctoral dissertation, Fırat University]. YÖK National Thesis Center.

Keles, Ö. (2012). Elementary teachers' views on mind mapping. *International Journal of Education, 4*, 93.

Keskinkılıç-Yumuşak, G. (2013). The effect of using mind maps in science courses on student achievement. *Journal of Educational and Instructional Studies, 2*(3), 1–5. http://www.jret.org/FileUpload/ks281142/File/01a.keskinkilic.pdf

Koç-Damgacı, F., & Karataş, H. (2015). Experimental studies and results on the use of cooperative learning methods and techniques in education. *Journal of Educational and Instructional Studies, 4*(1), 304–314. http://www.jret.org/FileUpload/ks281142/File/29.koc_damgaci.pdf

Korucu, I., Ayturk, E., Finders, J. K., Schnur, G., Bailey, C. S., Tominey, S. L., & Schmitt, S. A. (2022). Self-regulation in preschool: Examining its factor structure and associations with pre-academic skills and social-emotional competence. *Frontiers in Psychology, 12*, 1–14. https://doi.org/10.3389/fpsyg.2021.717317

MacKenzie, H. (2015). *Self-regulation in everyday life: A how-to guide for parents*. Wired Fox Publications.

Magat, J. (2013). *Looking at gender differences in preschoolers' self-regulation through multiple lenses* [Bachelor's thesis, University of Michigan].

McClelland, M., & Tominey, S. (2016). *Stop, think, and act: Integrating self-regulation in the early childhood classroom* (1st ed.). Routledge.

MoNE. (2024). *Turkey century education model curriculum literacy teacher guidebook*. https://tymm.meb.gov.tr/upload/kilavuz/modul-5-yayin-2.pdf

Morrison, F. J., & Grammer, J. K. (2016). Conceptual clutter and measurement mayhem: Proposals for cross-disciplinary integration in conceptualizing and measuring executive function. In J. A. Griffin, P. McCardle, & L. S. Freund (Eds.), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research* (pp. 327–348). American Psychological Association.

Novak, J. D., & Cañas, A. J. (2008). *The theory underlying concept maps and how to construct and use them*. IHMC. https://cmap.ihmc.us/publications/researchpapers/TheoryUnderlyingConceptMaps.pdf

Novak, J. D., Gowin, D. B., & Johansen, G. T. (1983). The use of concept mapping and knowledge Vee mapping with junior high school science students. *Science Education, 67*(5), 625–643.

Okada, A. (2025). *Knowledge cartography for young thinkers: Sustainability issues, mapping techniques, and AI tools*. Springer Cham.

Öztabak, M., & Özyürek, A. (2018). An investigation of the relationship between preschool students' self-regulation skills and parental attitudes. *Journal of History Culture and Art Research, 7*(5), 385–395. http://doi.org/10.7596/taksad.v7i5.1544

Posner, M., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development & Psychopathology, 12*(3), 427–441. http://doi.org/10.1017/s0954579400003096

Robson, D. A., Allen, M. S., & Howard, S. J. (2020). Self-regulation in childhood as a predictor of future outcomes: A meta-analytic review. *Psychological Bulletin, 146*(4), 324–354. https://doi.org/10.1037/bul0000227

Salminen, J., Guedes, C., Lerkkanen, M. K., Pakarinen, E., & Cadima, J. (2021). Teacher–child interaction quality and children's self-regulation in toddler classrooms in Finland and Portugal. *Infant and Child Development, 30*(3), 1–23. https://doi.org/10.1002/icd.2222

Sani, N. K., Darmadi, I. W., Nurgan, & Kamaluddin. (2025). The impact of synectics learning model implementation with mind mapping assignments on reducing misconceptions and enhancing students' cognitive learning outcomes. *Journal of Science Education Research, 11*(1), 835–841. https://doi.org/10.29303/jppipa.v11i1.9274

Saraç, S., Karakelle, S., & Whitebread, D. (2019). Validity and reliability study of the Independent Learning Behaviors Scale for Preschool Children 3-5 (BÖD 3-5): Turkish version. *Elementary Education Online, 18*(3), 1093–1106. https://doi.org/10.17051/ilkonline.2019.610148

Selçuk, E. (2015). *The effect of using the mind mapping technique in music courses on student achievement and attitudes* (Publication No. 437054) [Master's thesis, Marmara University]. YÖK National Thesis Center.

Şen, E. (2012). *The effect of the mind mapping technique on the development of cognitive and psychomotor skills of students in violin lessons at fine arts and sports high schools* (Publication No. 349931) [Doctoral dissertation, Marmara University]. YÖK National Thesis Center.

Senemoğlu, N. (2012). *Development, learning, and teaching: From theory to practice*. Pegem Academy.

Seyihoglu, A., & Kartal, A. (2010). The views of the teachers about the mind mapping technique in the elementary life science and social studies lessons based on the constructivist method. *Educational Sciences: Theory and Practice, 10*, 1637–1656.

Şimşek, F., Berekecioğlu, Ü., & Hamzaoğlu, E. (2020). The effect of the mind mapping technique on students' academic achievement and attitudes toward science: Meiosis and mitosis. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 14*(1), 921–940. https://doi.org/10.17522/balikesirnef.682778

Tarım, K. (2003). *The effectiveness of the cooperative learning method in mathematics teaching and a meta-analysis study on the cooperative learning method* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Taş, İ. H. (2003). Mental mapping and ways to develop students' mind maps. *Marmara University Journal, 8*, 2–19. https://dergipark.org.tr/tr/pub/marucog/issue/455/3648

Taştan, G. F. (2017). Mind mapping in law. *Turkey Justice Academy Journal, 30*, 353–375. https://dergipark.org.tr/tr/download/article-file/981730

Temiz, N. C. (2020). *The effect of volleyball lessons taught with the mind mapping technique on the cognitive and psychomotor skill development of 6th-grade middle school students* (Publication No. 635371) [Master's thesis, Balıkesir University]. YÖK National Thesis Center.

Tonga, D. (2022). Examples of social studies and mind maps. *Turkey Scientific Research Journal (TÜBAD), 7*(1), 189–204. https://dergipark.org.tr/tr/pub/tubad/issue/70039/106335

Tsinakos, A. A., & Balafoutis, T. (2009). A comparative survey on mind mapping tools. *Turkish Online Journal of Distance Education*, 55–67.

Türksoy Alkım, N. (2022). *Examination of high school students' views on the mind mapping method* [Master's thesis, Near East University].

Ünalır, E. (2019). *The effect of the mind mapping method on students' academic achievement and motivation in vocational English teaching* (Publication No. 583080) [Master's thesis, Atatürk University]. YÖK National Thesis Center.

Ural, G., Gültekin Akduman, G., & Şepitci Saribaş, M. (2020). Investigation of preschoolers' self-regulatory skills according to some variables. *Ekev Academy Journal, 24*(83), 323–342.

Uysal, H., & Sidekli, S. (2020). Developing 4th-grade primary school students' story-writing skills using the mind mapping method. *Education and Science Journal, 45*(204), 1–22. https://doi.org/10.15390/EB.2020.8848

Wang, W.-C., Lee, C.-C., & Chu, Y.-C. (2010). A brief review on developing creative thinking in young children by mind mapping. *International Business Research, 3*, 233.

Webster, M. A. (2015). *Teachers' beliefs and practices related to student self-regulation in the classroom* [Unpublished doctoral dissertation]. James Madison University.

Wiggins, G., & McTighe, J. (1998). *Understanding by design*. Association for Supervision and Curriculum Development.

Yeniceli, K. (2019). *The effect of using the mind mapping technique in 4th-grade social studies courses on students' achievement and attitudes* (Publication No. 601370) [Master's thesis, Çanakkale Onsekiz Mart University]. YÖK National Thesis Center.

Yetkiner, A. (2011). *The effect of mind mapping in English teaching at the primary level on students' academic achievement, attitudes, and retention* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Yılmaz, G. (2012). *Teaching polygons to 7th-grade primary school students using Venn diagrams and mind maps* [Master's thesis, YÖK National Thesis Center]. Tez Arşivi. http://tez.yok.gov.tr

Yılmaz, Y. (2020). *Investigation of the relationship between self-regulation skills of 5–6-year-old children and parenting attitudes* [Unpublished master's thesis]. Bursa Uludag University.

Zeybek, G. (2020). The use and effectiveness of computer-assisted mind mapping technique in basic electronics and measurement courses. *Electronic Journal of Educational Sciences, 9*(18), 149–170. https://dergipark.org.tr/en/download/article-file/1094835

Zhao, H. Y., Wang, Y., Li, X., Zhou, Y., Jiao, Z. X., Bao, J. X., Yang, N., & Zhang, L. L. (2024). Development of a mind map-based predictive nursing protocol and its impact on the clarity of images in patients undergoing high-concentration contrast three-dimensional computed tomography imaging of liver blood vessels. *Current Medical Imaging, 20*, 1–7. https://doi.org/10.2174/0115734056263792231112113912

Zhou, Q., Chen, S. H., & Main, A. (2012). Commonalities and differences in the research on children's effortful control and executive function: A call for an integrated model of self-regulation. *Child Development Perspectives, 6*(2), 112–121. https://doi.org/10.1111/j.1750-8606.2011.00176x

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 1–9). Academic Press.