

## **CHAPTER IV**

### **FINDINGS AND DISCUSSION**

#### **A. Findings**

This research involved a total of six participants, each identified with initials P1 to P6. Data collection was conducted using in-depth interviews consisting of open-ended questions and probe questions to gain rich narrative responses. Each section in the findings is derived directly from participants' statements and is supported by direct quotes. The structure aims to provide a clear representation of participant perspectives while ensuring the data remains factual, without researcher interpretation.

These findings are then discussed in relation to relevant theoretical frameworks and analyzed using Miles and Huberman's (2014) interactive data analysis model, which includes data reduction, data display, and conclusion drawing and verification. The first discusses what are the experiences of the participants using Mind Mapping strategies in dialogic collaborative learning. The second asks what are the challenges students face in using Mind Mapping as a dialogic collaborative learning tool.

#### **1. The Experiences of The Participants Using Mind Mapping Strategies in Dialogic Collaborative Learning**

a. The Experiences of Mind Mapping Techniques

Participants stated that Mind Mapping is a more creative and engaging learning method compared to other methods, especially in the context of summarizing presentations, papers, scientific writings, and essays. They consider Mind Mapping to be “the door that most helps student creativity and is very engaging for students,” and they stated that as a teacher, they would be very entertained and interested in the students’ work created with Mind Mapping.

Every participant reported that Mind Mapping aided in their methodical information organization. P1 explained that Mind Mapping forces them to distinguish between essential information and less important or redundant content, which results in a more concise and focused representation of knowledge. As P1 described :

*“Mind Mapping really helps in organizing information because it teaches us to sort out what’s truly important and discard less relevant content.”*

*“In Mind Mapping, we don’t use too many connecting words, so everything we write is meaningful”* noted P3.

This practice of condensing information encourages a deeper understanding of the material. P5 added that Mind Mapping simplifies the way their brain stores information because it

transforms extensive textual content into clear, visual points or branches. They noted:

*“Mind Mapping makes it easier for the brain to store information or points I’ve learned”*

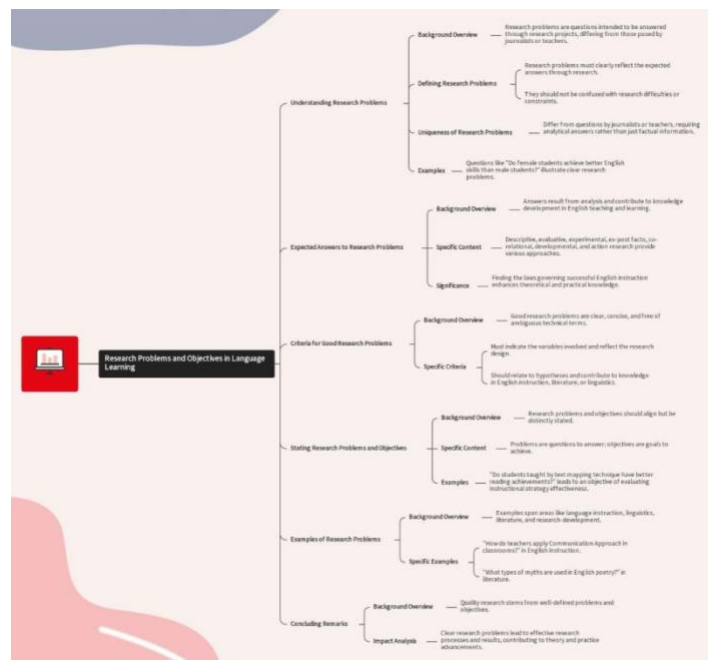


Figure 4.1. The example of Software Mind Mapping by P3

This aligns with P2’s comment that, when working with mind maps, they usually identify key branches first before filling in details, which reflects an organized approach to handling information.

*“Usually, once I have a given topic, I immediately create the necessary branches, then read the text provided by the lecturer and fill in the branches”*

Participants shared that their use of Mind Mapping started in early education, from middle school through to university. P1 reported having consistently used Mind Mapping since junior high school, expressing a sustained appreciation for this technique.

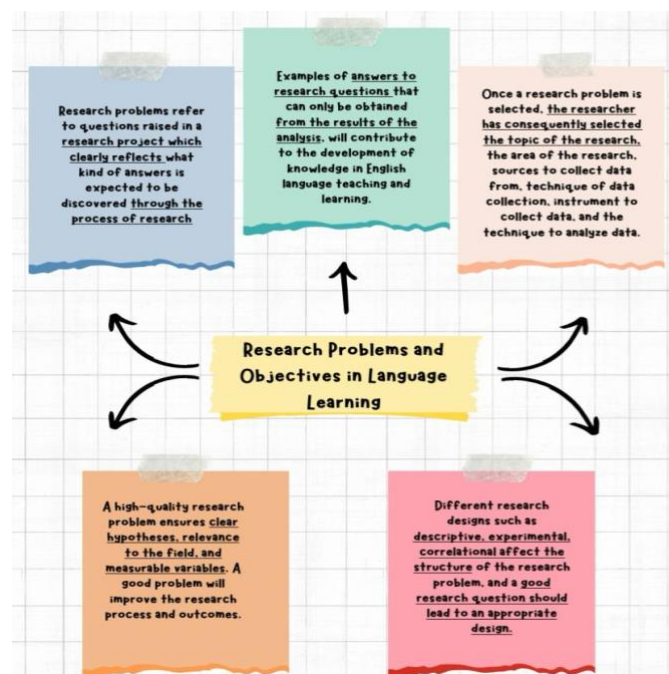


Figure 4.2. The example of Software Mind Mapping by P1

The majority of participants had positive experiences using Mind Mapping, both manually and digitally. Mind Mapping is

considered very helpful in summarizing a lot of material, simplifying information, and making the learning process more enjoyable and engaging.

Participants revealed that they have been using Mind Mapping since middle school, high school, and even in college, and they still enjoy this method. This long experience shows that Mind Mapping is an effective and sustainable learning strategy for enhancing critical thinking and creativity skills. This also indicates that Mind Mapping can be applied across educational levels and remains relevant in the context of collaborative learning. P5 told about her experiences:

*“Mind Mapping is very helpful in organizing information because it teaches us to sort out what is truly important and eliminate less relevant or superficial content. In Mind Mapping, we also don’t use too many conjunctions, so everything we write tends to be meaningful. It also encourages us to compare pieces of information, which, in my view, really trains our critical thinking. I have been using Mind Mapping since I was in junior high school, through senior high, and now in college. So far, I still really enjoy using it”*

Some participants assert that manual Mind Mapping is more effective in honing creativity, critical thinking skills, and training the motor skills of the hands and brain of students, especially for early childhood and teenage students. This is in line with literature

findings that state that Mind Mapping using images, colors, and simple words can optimize the functioning of the right and left brain, stimulate creativity, and sharpen analytical and logical thinking.

Additionally, manual writing and drawing activities help train fine motor coordination and strengthen cognitive processes, which are difficult to replace with the use of digital applications or AI that tend to be passive, merely pressing buttons or copy-pasting. Digital Mind Mapping is considered more complicated, especially in terms of editing and connecting elements, although some participants find digital more practical due to the undo feature. P1 and P2 told about their experiences:

*“Personally, I prefer doing it manually because it’s simpler and easier. When using digital tools like Canva, it’s more complicated to connect elements, copy-paste, or delete. With manual methods, I find it easier to design things myself, choose colors or highlighters as I like, such as tree roots or other shapes, and connect lines with colors from my imagination”*

*“I prefer doing it manually. When I’m given paper, I can create it the way I want, and if there are mistakes, I can easily erase them. Also, manual methods help me stay focused and not distracted by other things. With digital tools, there are too many features that may cause the content to be inconsistent or less optimal”*

Mind Mapping is often used in both individual and group tasks, especially when the material being studied is extensive and requires an effective summary. P3 emphasized that:

*“It’s most effective when working on large amounts of material, such as in reading classes or research assignments, because it helps summarize and structure ideas more clearly”*

The use of Mind Mapping is considered enjoyable, motivating, and enhances the spirit of learning. Participants feel more engaged due to the creative process and personalized design. The positive consequences of using mind maps for learning and the accessibility of freely available Mind Mapping software have led to a recent increase in the use of mind maps in the classroom. Teachers and trainers can find a rational strategy or teaching path and improve subject matter recall by using Mind Mapping when organizing lessons. This can help programs function more smoothly and increase the confidence of teachers. The use of Mind Mapping as a teaching tool offers a successful strategy for encouraging pupils to comprehend concepts more fully. Because of its adaptability, it can be used in a variety of teaching settings.

b. Interaction and Collaboration

Mind Mapping is effectively used in collaborative learning, such as group discussions, exchanging ideas, and providing feedback. In group situations, participants feel they complete tasks more quickly and gain new insights from their peers' ideas. P3 and P4 emphasized that:

*“In class, Mind Mapping can definitely support collaborative learning. When I use it in class, I usually divide students into groups and have them discuss the topic together. Through discussion, they can share ideas and create the map collaboratively”*

*“Yes, I’ve used it in group activities where students had to work together to create a mind map about a certain topic. It helped them exchange opinions and agree on the structure together”*

Some participants feel more comfortable working individually because they can express their creativity without limitations, while others benefit from group discussions, especially in exchanging ideas, clarifying points, and receiving feedback. P3 has experience in group discussion, as stated below:

*“Yes, one effective strategy is dividing tasks based on each member’s skills. I was once in a group of four, and we divided the tasks according to our strengths. Two people were good at drawing, and the other two were good at summarizing. So we collaborated some did the illustrations, others wrote the summaries, but we still maintained good communication and helped one another throughout the process”*



All participants acknowledged that Mind Mapping acts as an effective tool to share and organize ideas within the group. For example, P1 emphasized that Mind Mapping helped in clearly conveying ideas among group members, making it easier to express thoughts collectively. P3 also supported this view, explaining that Mind Mapping supports the distribution of ideas, thus facilitating communication in a group setting. These statements indicate that Mind Mapping can function as a visual medium where individual inputs converge into a shared conceptual framework. Despite its advantages, participants reported several challenges related to communication during collaborative Mind Mapping tasks.

P2 noted that *“too many branches or points sometimes confuse the audience during presentations.”* P4 shared that *“miscommunication occurs when the mind map is too complex or unclear.”* P6 reported, *“Sometimes communication is hindered by unclear roles and job division.”*

Participants proposed practical strategies to improve group collaboration when using Mind Mapping. P1 shared an experience where the group divided tasks according to each member's strengths, such as having some members focus on drawing while others specialized in summarizing the content.

This division of labor allowed the group to leverage individual expertise while maintaining effective communication. P6 suggested adopting digital tools like Canva that enable multiple users to edit simultaneously, combined with clear role assignments for ideation, text editing, and design tasks. This structured approach was seen as a way to reduce miscommunication and promote fairness within the group.

In addition to task-related challenges, some participants noted that interpersonal dynamics influenced the quality of collaboration. P1 described how high levels of competitiveness among adolescents sometimes created conflicts and obstructed group harmony. Similarly, P3 observed that judgmental or harsh attitudes during group activities could negatively affect interactions.

These descriptions suggest that emotional and social factors, in addition to technical or procedural ones, may have an impact on the effectiveness of collaborative Mind Mapping. Feedback from teachers or lecturers after the Mind Mapping presentation is considered very helpful in improving understanding and the quality of the final result.

c. Influence on Creativity and Critical Thinking

Mind Mapping has been proven to significantly influence the development of creativity and critical thinking skills of

participants. The process of designing Mind Mapping (color selection, shapes, patterns, and point placement) encourages participants to think creatively and express ideas visually. The use of diverse colors and shapes enriches the work and makes the material easier to remember.

The participants' responses indicate that Mind Mapping has a notable influence on both creativity and critical thinking in the learning process. Their experiences highlight how Mind Mapping enables them to generate ideas quickly, express thoughts visually, and engage with information critically. P6 emphasized that:

*“Yes, using Mind Mapping feels more creative and engaging. From what I remember, Mind Mapping has been used to summarize presentations, papers, scientific writing, and essays. Among all these methods, Mind Mapping is the one that most supports students' creativity and draws their interest. As a future teacher, I would definitely be entertained and impressed by my students' Mind Mapping results”*

Several participants emphasized that Mind Mapping fosters creativity by enabling them to create visually appealing and uniquely designed maps. For example, P3 and P5 stated:

*“I can make mind maps with colorful designs and unique lines, which trains my creativity and critical thinking”*

*“Because Mind Mapping only contains certain key points, it doesn't help much when it comes to answering questions that require deeper critical thinking. That's why, aside from creating a mind map, I also make sure to fully understand the material. I*

*usually prepare a separate small note to write down additional important information that doesn't fit or is intentionally left out of the mind map. As for challenges, I personally haven't found any moment where Mind Mapping felt ineffective. I believe it's already very effective in improving students' insight and imagination"*

Mind Mapping requires participants to read, sort, and summarize information so that only the important points are included. This process trains the ability to analyze, synthesize, and evaluate information. They emphasize that Mind Mapping is very helpful in organizing information by sorting and selecting truly important information, as well as discarding less relevant or superfluous information.

This shows that Mind Mapping is not just a visual tool, but also a cognitive process that requires the ability to select and synthesize information. This sorting process is important in dialogic collaborative learning, as participants are encouraged to interact critically with the material and their groupmates. However, some participants acknowledged limitations. P4 mentioned,

*"Because Mind Mapping only includes certain key points, it does not fully help when answering questions requiring deeper critical thinking. That's why I also make additional notes to understand the topic better beyond the mind map."*

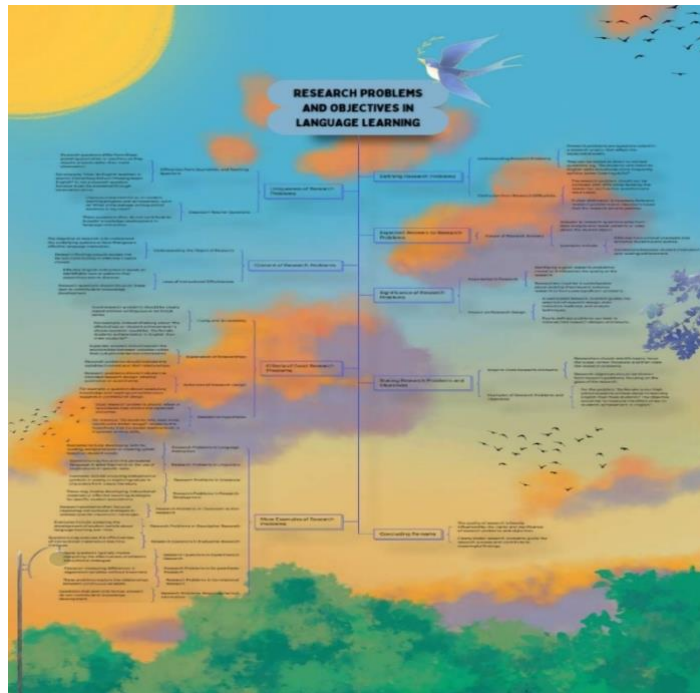


Figure 4.3. The example of Software Mind Mapping by P4

This statement aligns with findings from various sources that mention that Mind Mapping allows students to express ideas freely and creatively using colors, images, and engaging visual structures. Mind Mapping encourages students to develop new ideas and discover connections between concepts in a non-linear manner, thereby honing their creativity optimally.

Some participants adapted Mind Mapping for ice breaking, guessing concepts, or creatively grouping information in

classroom learning. Some participants utilize AI or digital applications to assist in the Mind Mapping process, although there is still a preference for more personal results through manual methods

## **2. The Challenges Students Face in Using Mind Mapping as a Dialogic Collaborative Learning Tool**

### **a. Obstacles in Collaboration**

In collaboration, differing preferences in the use of Mind Mapping (manual vs. digital) can become an obstacle. Students who are accustomed to manual Mind Mapping might have difficulty adapting to the digital style of their groupmates, or vice versa.

*“Sometimes, it’s hard to agree with group members on how to organize the map. We have different ideas about what should go where. We usually overcome this by discussing the outline first before drawing. That way, everyone has a role and we avoid misunderstandings. However I’ve done collaborative Mind Mapping during group projects. Each member contributes ideas, and then we decide how to arrange them. It helps us brainstorm better”*

Participants stated that, in general, they did not feel any significant challenges in using Mind Mapping because they were already accustomed to and liked this strategy. This indicates that

Mind Mapping has become a familiar and comfortable method for participants in the learning process.

In some cases, collaboration in Mind Mapping is dominated by certain individuals who are more experienced or have strong ideas, causing other members to be less actively involved. This hinders dialogic learning, where each group member should contribute equally. P1 further said:

*“It does have an impact, especially in exchanging ideas about the mind map like asking friends about their mind maps, how they choose their topics or organize their content. Since I prefer working individually, I think Mind Mapping is more effective when used in class depending on the subject”*

In the collaborative process, students must collectively determine the key points and how to organize them in a mind map. However, differences of opinion regarding the content, structure, and visual layout of Mind Mapping often become obstacles. These disagreements can disrupt the smoothness of dialogue and cooperation, as each member has different perspectives and ways of thinking. As a result, the process of creating a mind map becomes hindered and less effective in conveying ideas collectively. P5 emphasized that

*“Mind Mapping supports idea-sharing, but it can also be a hindrance in some cases. I have used Mind Mapping since I was a*

*teenager, and at that age, competitiveness tends to be high. As a result, our attitude and behavior might become more judgmental or even dismissive toward groupmates. We might feel that our ideas are superior, which can hinder and negatively affect our group interactions although this usually only happens in the moment”*

Agreeing on the structure, design, and content of Mind Mapping within a group can be a challenge in itself. Differences of opinion regarding key points, visual layout, and color usage can trigger conflicts and hinder collaboration efficiency.

Not all group members actively participate or are able to convey their ideas clearly. These communication barriers can reduce the effectiveness of dialogue and collaboration in creating mind maps. Students who lack confidence or do not fully understand the material tend to be passive, resulting in ideas that are less rich and do not represent the contributions of all members.

These obstacles can reduce students' motivation to actively participate in dialogic learning using Mind Mapping. If students find the collaboration process difficult and unenjoyable, they are likely to be less interested in using Mind Mapping as a learning tool, thus reducing the potential of dialogic learning.

b. Time Consuming



Mind Mapping requires sorting relevant information from numerous sources, and this process often takes a lot of time. Students need to read, understand, and summarize the material before they can write it in a mind map.

Creating visually appealing and effective mind maps requires time and attention to detail. Students often get caught up in choosing aesthetically pleasing colors, shapes, and layouts, thereby neglecting the substance of the material that should be the main focus.

One of the shortcomings of the maps highlighted in many studies was that participants felt they were time-consuming to create and added to their already challenging academic effort (Harrison & Gibbons, 2013). The majority of learners also thought that another drawback of the measure in question was the limited time they had to make the maps. P1 and P3 told her challenges about time consuming:

*“The challenge is usually time, especially if we’re asked to read a journal or a book that’s more than five pages long within a short deadline. It can be less effective and lead to burnout when trying to extract key points. On the other hand, regular Mind Mapping allows for more freedom in note-taking”*

*“The challenge I faced was selecting the right information to include in the mind map. With so much information, I had to read everything and filter it, which was time-consuming. Also, with the*

*current availability of AI tools, I sometimes rely less on my own thoughts”*

Before creating a mind map, students must read and thoroughly understand the material to be able to sift through the truly important information. This process takes time because students have to select keywords and main concepts from texts that are often long and complex. P2 emphasized that:

*“The first challenge is that I’m usually slow in creating one because I tend to focus on the visuals or layout rather than the written points. I pay a lot of attention to creativity, especially in coloring and shapes, so it takes a long time to complete. The second challenge is the limited time in class, which affects the final result”*

In the context of collaboration, aligning schedules, discussing, and integrating ideas from each group member requires extra time. This process can become more complicated if group members have different schedules or work styles.

#### c. Different Techniques and Types

Participants have different understandings and experiences of Mind Mapping, which can lead to variations in techniques and approaches in its creation. These differences can hinder collaboration and reduce the effectiveness of Mind Mapping as a learning tool. The participants shared several challenges and

hindrances encountered while using Mind Mapping, as well as suggestions for improving its effectiveness.

*“My suggestion is to preserve the use of manual Mind Mapping, even in this digital age. Manual Mind Mapping sharpens creativity, critical thinking, and cognitive skills. It also trains students’ hand coordination and brain development especially for younger students. Compared to just clicking or decorating with AI or Canva, traditional methods offer deeper engagement”* noted by P5.

P1 mentioned that the competitive nature among peers during group Mind Mapping sometimes led to negative attitudes, such as being judgmental or defensive, which hindered group interaction:

*“Because we’ve used Mind Mapping since young, sometimes competitiveness makes us behave rudely or act possessive about our ideas, which affects our interaction in the group”*

P4 pointed out time constraints as a major challenge, especially when Mind Mapping is combined with reading large amounts of material under strict deadlines:

*“Usually the problem is time, especially when we have to read journals or books more than 5 pages within a limited time. This causes burnout and makes it less effective”*

Each participant may have different ways and techniques in creating mind maps, such as the use of colors, branch shapes, information placement, or keyword selection. These differences

can cause difficulties in unifying ideas into a coherent mind map when working in groups. The inconsistency of these techniques can cause confusion and slow down the collaboration process. P5 emphasized that:

*“ Mind Mapping supports idea-sharing, but it can also be a hindrance in some cases. I have used Mind Mapping since I was a teenager, and at that age, competitiveness tends to be high. As a result, our attitude and behavior might become more judgmental or even dismissive toward groupmates. We might feel that our ideas are superior, which can hinder and negatively affect our group interactions although this usually only happens in the moment”*

Mind Mapping can be applied to various types of tasks and subjects, but not all students are able to adapt quickly and effectively. Some students may struggle to apply Mind Mapping to abstract or complex material. Because Mind Mapping can be created in various types and styles, students need to negotiate to determine the structure, layout, and content of the mind map together. These differences in techniques can lead to differing opinions, which require time and effective communication to ensure that the resulting mind map represents the contributions of all members.



Figure 4.4. The example of Handwritten Group Mind Mapping by P6

Also, don't give too little time for the task. When time is too limited, students can feel pressured and end up creating low-effort mind maps without any competitive or creative drive. P1 told about her challenges:

*“When time is too limited, students can feel pressured and end up creating low-effort mind maps without any competitive or creative drive”*

For students who are still beginners or not very familiar with Mind Mapping techniques, the creation process takes longer

because they need to practice and try several times to make the results neat and effective. Often, redrawing is necessary to improve the mind map so that it becomes more artistic and easier to understand.

Mind Mapping has been frequently employed in many different disciplines into adult/higher classroom instruction as a strategy for engaging students in an educational experience that is meaningful. Mind Mapping helps learners build thinking critically, problem solving, and teamwork abilities (Arulselvi, 2017). Mind Mappings also help students retain knowledge, discover misconceptions, and receive feedback. Mind Mapping can improve academic achievement across a variety of areas. Although the significance of conceptual maps to learning is well-known, some of the tool's limitations should be noted.

Although technology can assist in creating mind maps, not all students have the same skills or access to digital tools. These limitations can create gaps and hinder collaboration within groups. If using digital Mind Mapping, students need time to learn how to use applications or software that can sometimes be complicated, making the creation process longer.

## **B. Discussion**

The focus of this research project is to investigate participants' experiences and challenges with Mind Mapping. This section contains a description of the results. In addition to the conversations and experiences shared during interviews. A number of theoretical arguments were used to justify the findings. This section is organized according to research questions, which include: 1) What are the experiences of the participants using Mind Mapping strategies in dialogic collaborative learning? 2) What are the challenges students face in using Mind Mapping as a dialogic collaborative learning tool?

### **1. The Experiences of The Participants Using Mind Mapping Strategies In Dialogic Collaborative Learning**

#### **a. The Experiences of Mind Mapping Techniques**

The participants generally have positive experiences using Mind Mapping as a tool to facilitate dialogic collaborative learning. Consistent with Buzan, (2006) theory, Mind Mapping was perceived as an effective and creative method to organize and synthesize complex information visually. Participants reported that Mind Mapping helped them to distill large volumes of information into concise, meaningful points, which enhanced their comprehension and retention. This is consistent with Buzan,

(2006) claim that Mind Mapping uses both directions of the brain through integrating logical organization with artistic vision, resulting in deeper cognitive engagement.

b. Interaction and Collaboration

In collaborative learning, Mind Mapping allows students to work together to create complex concept maps. This activity not only enhances understanding of the material but also strengthens interpersonal skills such as communication, teamwork, and leadership. When students discuss to determine the important elements in a mind map, they learn to listen, express opinions, and resolve conflicts constructively. Thus, Mind Mapping serves as a learning tool that not only focuses on academic outcomes but also on the social-emotional development of students.

Furthermore, Mind Mapping was found to facilitate meaningful dialogue and exchange of ideas among group members. Participants described how sharing and discussing their mind maps led to richer understanding and critical feedback, which are essential components of dialogic learning. However, the preference for individual work by some participants suggests that Mind Mapping can be flexibly adapted to accommodate different learning styles, either as a solitary or collaborative activity.



According to Cui & Teo (2021), Mind Mapping is recommended as a good technique to absorb information presented in the text they need to take the key words and connect one key word to other key words in order to connect one idea to other idea and get the main idea or the big idea of the text, get the specific information and to be able to retain the information. That's why the student's will have a good ability to rewrite what they have read and as the consequences. Mind Mapping is a good technique to solve the students problem in organize information carefully.

Additionally, Mind Mapping has also been proven to enhance interactive engagement and the exchange of ideas. The creative process of making a mind map encourages students to be more active and participate in learning. This method provides space for students to express their ideas in a unique and personal way, making them feel more motivated to understand and delve into the material. In collaborative learning, Mind Mapping also strengthens students' interpersonal skills by encouraging cooperation and effective communication among them.

#### c. Influence on Creativity and Critical Thinking

Most participants assert that manual Mind Mapping is more effective in honing creativity, critical thinking skills, and training the motor skills of the hands and brain of students, especially for

early childhood and adolescent students. This is consistent with studies that show that Mind Mapping with images, colors, and basic words can improve the work of both the right and left brains, Increase creativity, and sharpen analyzing and logical thinking. This relates to the pros and cons of Mind Mapping primarily by Husni (2018).

They preferred manual Mind Mapping over digital applications, citing greater freedom in creativity, ease of correction, and personal satisfaction in designing their maps. This preference underscores the importance of tactile and visual engagement in learning, which supports the development of fine motor skills and cognitive processes. The emotional engagement and motivation reported by participants further reinforce the role of Mind Mapping as an enjoyable and stimulating learning strategy that encourages active participation.

Although digital technology and AI are rapidly advancing, the use of manual Mind Mapping is still recommended because it provides a more in-depth and interactive learning experience. Research shows that both traditional and digital Mind Mapping methods have their benefits, but the manual method stimulates students' creativity and motor activities more, while the digital

method offers convenience and efficiency. This had to do with Mind Mapping's advantages by Buzan, (2006).

Moreover, Mind Mapping was highlighted as a powerful tool to enhance creativity and critical thinking. The process of selecting key ideas, organizing them hierarchically, and designing visual elements encouraged participants to think critically about the content and express their understanding creatively. This finding is consistent with previous research indicating that Mind Mapping stimulates higher-order thinking skills by requiring analysis, synthesis, and evaluation of information.

## **2. Challenges Faced by Students in Using Mind Mapping as a Dialogic Collaborative Learning Tool**

### **a. Obstacles in Collaboration**

Despite the positive experiences, participants also reported several challenges in using Mind Mapping, particularly in collaborative settings. One significant obstacle was the difficulty in coordinating and agreeing on the structure, content, and design of the mind map among group members. Differences in individual preferences, techniques (manual vs. digital), and levels of familiarity with Mind Mapping often led to conflicts or inefficiencies. This challenge highlights the inherently personal

nature of Mind Mapping, as emphasized by Tony Buzan, (2006) where each individual's cognitive style influences their approach to mapping. Therefore, successful collaboration requires effective communication, negotiation, and flexibility to integrate diverse perspectives.

This reinforces previous findings that the main obstacles in using Mind Mapping are more subjective and related to visual creativity, rather than the understanding or application of the strategy itself. These aesthetic challenges can affect participants' confidence and the time taken to complete tasks, thus requiring special attention in the learning process.

b. Time Consuming

Time consumption was another major challenge. Participants indicated that the process of reading, selecting key points, and designing a visually appealing mind map was time-intensive. The creative aspect, while beneficial, also demanded considerable attention to detail and often slowed down the completion of tasks. In group work, coordinating schedules and merging individual contributions further extended the time required. These findings suggest that educators should allocate sufficient time for Mind Mapping activities and provide scaffolding to help students manage their time effectively. This related to the disadvantages of

Mind Mapping by Machado and Carvalho (2020). Previous research supports that effective Mind Mapping requires time for the processes of information sorting, visual design, and creative reflection. Providing sufficient time also increases student engagement and motivation in learning, thereby optimizing learning outcomes.

c. Different Techniques and Types

Differences in techniques and types of Mind Mapping created barriers. Students' varying levels of digital literacy and access to technology influenced their ability to engage fully with digital Mind Mapping tools. Some students felt more comfortable with manual methods, while others preferred digital applications, leading to challenges in harmonizing the group's approach. This disparity underscores the need for educators to provide clear guidance and training on Mind Mapping tools and to foster an inclusive environment that respects individual preferences. This related to the disadvantages of Mind Mapping by Machado and Carvalho (2020).

Finally, the challenges in collaboration and time management impacted students' motivation and engagement. When obstacles were not adequately addressed, some students experienced frustration or disengagement, which could diminish the potential

benefits of Mind Mapping as a dialogic learning tool. This emphasizes the importance of facilitator support in guiding group dynamics, resolving conflicts, and encouraging positive interaction.