

information to be presented visually or enable students to visualize it, foster creativity, and help organize and structure knowledge, and they can be used for both instructional and assessment purposes.

Concept maps are tools used in all areas of education and instruction for organizing and representing knowledge, and they schematically display the logical relationships and hierarchical structure among concepts (Cañas & Novak, 2014). These instructional tools consist of a structure that connects concepts and the relationships between these concepts through propositions or key words (Vázquez-Cano et al., 2013; Novak & Cañas, 2007).

Mind maps are based on the visualization of information in a non-linear manner and on associating a central concept with different concepts through branches (Johnson, 2014). A mind map is based on the visualization of information obtained from different sources through keywords in a colorful and attention-grabbing manner (Edwards & Cooper, 2010).

Social studies is a course that contains a large number of abstract concepts due to its interdisciplinary structure. The intensity of abstract concepts may cause students to encounter various difficulties in the process of making sense of knowledge. Therefore, the recognition and effective use of visual learning tools such as concept maps and mind maps by prospective teachers are important in terms of increasing the quality of teaching-learning processes.

Various studies in the literature address the use of concept maps and mind maps in the teaching process. These studies have reported the positive effects of concept maps (Aykutlu & Şen, 2012; Bes-Piá et al., 2011; Cañas & Novak, 2014; Çoban, 2007; Duru, 2023; Güneş et al., 2006; Kalaycı & Çakmak, 2000; Kaptan, 1998; Kavak, 2009; Kaymaz, 2022; Novak & Cañas, 2007; Sarıca & Çetin, 2012; Sever et al., 2009; Şahin, 2002; Ullah, 2020; Valadares, 2013; Vázquez-Cano et al., 2013; Yılmaz & Çolak, 2011) and mind maps (D'Antoni & Zipp, 2006; Duru, 2023; Edwards & Cooper, 2010; Johnson, 2014; Kaya, 2025; Liu et al., 2014; Rezapour-Nasrabad, 2019; Sajadi et al., 2024) on learning and teaching.

In addition, studies conducted with prospective teachers and/or based on their experiences (Bulut et al.,

2021; Demirci & Kabataş Memiş, 2021; Horzum, 2018; İnel et al., 2011; Orak & Kandemir, 2023; Şahin, 2001; Şahin & Ergene, 2024; Tekin et al., 2013; Tuluk, 2015; Tuluk, 2020; Turan Oluk & Ekmekçi, 2019; Ünal & Bozoğan, 2019; Ünlü et al., 2006; Yenil & Arslan, 2025; Yenil et al., 2022) are quite limited in the literature. These studies mainly focus on prospective teachers' preparation of concept maps and remain largely limited to fields such as science and mathematics. In this context, it is observed that studies addressing the experiences of social studies prospective teachers in preparing both concept maps and mind maps together are limited.

This study aims to reveal the knowledge levels of social studies prospective teachers regarding concept maps and mind maps, their experiences in using these tools, and the awareness they developed at the end of the process. In addition, it is believed that this study will contribute to social studies prospective teachers' recognition of visual learning tools such as concept maps and mind maps, their ability to use these tools effectively, and the development of instructional awareness during this process. Furthermore, the findings obtained may help develop recommendations regarding the use of such visual and conceptual learning tools in teacher education programs.

Purpose of the Study

The purpose of this study is to reveal the opinions of prospective social studies teachers regarding concept maps and mind maps and the experiences they have during the process of preparing these maps. In addition, it is aimed to determine prospective teachers' views regarding the usability of concept and mind maps in social studies teaching. In line with this purpose, the main research problem of the study is expressed as follows: *“How do prospective social studies teachers experience the process of preparing concept maps and mind maps, and what are their opinions regarding the usability of these maps in social studies teaching?”*

Within the framework of this main problem, the following sub-problems were examined in this study:

1. How do prospective social studies teachers experience the process of preparing concept maps and mind maps?

- a. What are the general impressions of prospective social studies teachers regarding the process of preparing concept and mind maps?
 - b. What difficulties do prospective social studies teachers encounter while preparing concept/ mind maps?
 - c. What personal gains does preparing concept and mind maps provide for prospective social studies teachers?
2. What are the opinions of prospective social studies teachers regarding the usability of concept maps and mind maps in social studies teaching?
 - a. What are the intentions of prospective social studies teachers to use concept and mind maps in the teaching process in the future?
 - b. According to prospective social studies teachers, what are the possible effects of concept/mind maps on the social studies teaching process?

METHODOLOGY

Research Model

This study was conducted within the framework of the qualitative research approach using a basic qualitative research design. Basic qualitative studies aim to reveal individuals' experiences, perceptions, and the meanings they attribute to these experiences regarding a particular phenomenon (Merriam, 2023). In this study, the opinions of prospective social studies teachers regarding concept maps and mind maps and their experiences during the process of preparing these maps were examined. Accordingly, the experiences of prospective teachers regarding concept and mind maps and their views on the usability of these tools in social studies teaching were obtained through qualitative data collection tools and analyzed using the content analysis method.

Study Group

The study group of this research consists of 28 prospective social studies teachers studying in the second year at the faculty of education of a state university during the 2024-2025 academic year. The study group was determined using the convenience sampling method. This sampling method allows the

identification of individuals who are suitable for the purpose of the research and are easily accessible to the researcher (Sönmez & Alacapınar, 2014). The reason for selecting participants from second-year students is that prospective teachers have already been introduced to field courses and have developed a basic awareness of teaching methods.

Data Collection Tools

In the study, more than one qualitative data collection tool was used in order to increase reliability and ensure data diversity (Yıldırım & Şimşek, 2016). In this context, the data were collected through a semi-structured final interview form, reflective journals, and participant products.

The semi-structured interview form was prepared to reveal prospective teachers' experiences regarding the process of preparing concept and mind maps, the difficulties they encountered, the gains they obtained, and their views regarding the usability of these tools in social studies teaching. Reflective journals enabled participants to express their experiences, thoughts, and evaluations regarding their learning processes throughout the implementation process. In addition, the concept maps and mind maps prepared by the participants were used as document data of the research.

The data collection tools were developed by the researchers in line with the purpose of the study and the research questions. In order to ensure content validity, the prepared forms were examined by an academic expert in the field and the necessary revisions were made. In addition, the forms were administered to three prospective social studies teachers within the scope of a pilot application, and the clarity and comprehensibility of the questions were evaluated. By using different data collection tools together, data triangulation was ensured (Patton, 2018), and the reliability of the study was attempted to be increased.

Data Collection Process

The data collection process of the study was conducted through an application-based process. In the first stage, prospective teachers were given a brief introduction to the basic features of concept

and mind maps and the processes of preparing them. Then, the participants were asked to prepare concept and mind maps on a topic of their choice. After completing the activity, the participants were asked to write reflective journals in order to reflect on their experiences during the process, the difficulties they encountered, and the developments they noticed in themselves.

The reflective journals were collected at the end of the implementation process and evaluated as one of the data sources of the study. After the completion of the process, semi-structured interviews were conducted with the participants, and the concept and mind maps prepared by them were collected as document data of the study. All the data obtained were analyzed together.

Data Analysis

The content analysis method was used in the analysis of the data, and the codes were reported together with their frequencies. In this process, first, the interview records and reflective journals were examined, and codes were created by identifying meaningful statements from the data. Then, similar codes were brought together to form categories and themes.

In order to increase the reliability of the study, the researcher triangulation method was used during the coding and theme development process (Patton, 2018). In this context, the codings made by the researchers were compared, and the themes were finalized through a joint evaluation. In addition, data triangulation was ensured by comparing the data obtained from different data sources (interviews, reflective journals, and participant products) (Merriam, 2023). In the research process, the voluntary participation of the participants was taken as a basis, and the obtained data were used only for scientific purposes.

FINDINGS

In this section, the findings obtained as a result of the analysis of the qualitative data collected from prospective social studies teachers are presented. The findings are presented within the framework of codes or themes formed based on the data obtained from

interview forms, reflective journals, and participant products.

Experiences of Prospective Teachers in the Process of Preparing Concept/Mind Maps

In this section, the difficulties encountered by prospective teachers during the process of preparing concept and mind maps, their impressions of the process, the changes in their levels of knowledge, and the reflections on their personal development are discussed. Participant experiences were evaluated in line with the qualitative data obtained from interview forms and reflective journals.

Findings Regarding the General Impressions of Prospective Teachers About the Process of Preparing Concept and Mind Maps

When the participant statements were examined, it was observed that the process of preparing concept and mind maps provided various gains, especially in terms of creativity, retention of knowledge, and the development of different thinking skills. Based on the responses given by the participants to the question “What would you say about the process of preparing concept and mind maps?”, Figure 1 was created.

When Figure 1 is examined, it is seen that the participants evaluated the map preparation process as an experience that supports learning, encourages creative thinking, and provides instructional awareness. Examples from the participants’ statements are presented below:

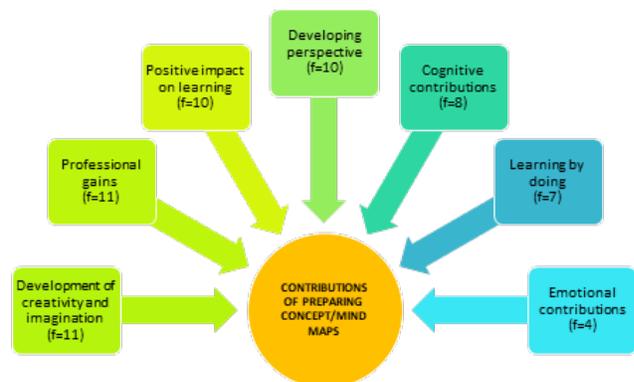


Fig.1: Gains Achieved by Participants Through Training and Practice

- K2: *“The process of preparing the maps enabled me to think about what I can do for effective learning for children and how I can generate ideas; it increased my creativity.”*
- K8: *“It improved my drawing skills. I began to look at events from different perspectives. I saw how permanent it is in learning.”*
- K20: *“I gained a good experience. I learned that a map can explain the topic better.”*

The findings obtained from these statements show that the process of preparing concept and mind maps provides participants with benefits such as developing their creativity, learning how to make knowledge more permanent, gaining different ways of thinking, and improving instructional skills. At the same time, participants evaluated this process as an enjoyable, relaxing, and learning-facilitating experience. Examples of the participants’ responses to the question “How did I experience the concept and mind map preparation process?” are presented below.

- K2: *“I learned how to use mind and concept maps more effectively. I discovered the creativity within myself.”*
- K8: *“I saw how lasting the traces of concept and mind maps are in learning. It also increases focus through pictures and drawings. I realized that I can draw while preparing concept and mind maps and that I can establish connections between concepts.”*
- K20: *“I gained experience in this subject.”*

These findings show that the process of preparing concept and mind maps not only provides prospective teachers with conceptual knowledge but also contributes to creative thinking, the development of instructional strategies, and self-awareness.

Findings Regarding the Difficulties Encountered by Prospective Teachers While Preparing Concept/Mind Maps

This section presents the findings obtained from the interview and reflective journal data regarding the difficulties encountered by participants during the process of preparing concept and mind maps. The most challenging points in the process were identified as



Fig. 2: Challenges Experienced by Participants While Creating Concept and Mind Maps

visualization, determining the topic, and establishing relationships between concepts. Participants were asked the question: “What were the points you had difficulty with while preparing concept and mind maps?” Based on the responses obtained from the participants, Figure 2 was created.

According to Figure 2, the most frequently experienced difficulty was drawing mind maps and visualization (f=20). The majority of the participants stated that their drawing skills were limited and therefore they found the process challenging. The second common difficulty was the selection of an appropriate topic or concept. Participants also reported experiencing indecision during the stages of determining the topic for the map and establishing relationships between concepts. Examples from the participants’ statements are presented below:

- K2: *“I had some difficulty deciding how to choose a topic. I benefited from textbooks and artificial intelligence for this.”*
- K9: *“I had difficulty choosing the topic, so I got help from the textbook.”*
- K18: *“I had difficulty finding concepts. I managed the concept map better. I was able to do this by conducting research. However, I had difficulty*

creating visuals in the mind map. The visuals and the topic had to be connected with each other. I may have struggled a little in these parts.”

The findings obtained show that prospective teachers particularly had difficulty in visualization and in establishing relationships between concepts during the process of creating concept and mind maps. This situation suggests that the participants did not previously have sufficient experience in using or designing such tools. Especially in the process of creating mind maps, the requirement for “creative thinking” was both a developmental and challenging factor for the participants. However, some participants stated that although they initially found the process challenging, they discovered their own learning paths through research and trial. This indicates that the difficulties also turned into learning opportunities.

The difficulties experienced by participants during the process of preparing concept/mind maps were also reflected in their reflective journals. The responses given by the participants to the question “What was the most difficult part for me during the map preparation process?” are presented below:

K2: “I had difficulty deciding which topic to choose. I could not decide what to do.”

K9: “I had difficulty choosing the topic. Not every topic can be mapped.”

K18: “I had difficulty determining the concepts and establishing connections between them.”

The statements included in the participants’ reflective journals are also consistent with the interview data. In the journals, difficulties were particularly expressed regarding drawing, determining an appropriate topic, and establishing connections between concepts. An example of a concept map prepared by one of the participants is presented in Figure 3.

When Figure 3 is examined, it can be seen that the participant attempted to organize the concepts within a certain hierarchical structure. However, it is noteworthy that the linking phrases explaining the relationships between the concepts are limited and that some relationships between the concepts are represented only through lines. This situation indicates that the participant experienced difficulty in clearly expressing the relationships between the concepts.

Findings Regarding the Personal Gains Provided by the Process of Preparing Concept and Mind Maps for Prospective Social Studies Teachers

Participants were asked the question: “What contributions did the concept and mind map preparation activity provide for you?” Based on the responses given by the participants, Figure 4 was created.

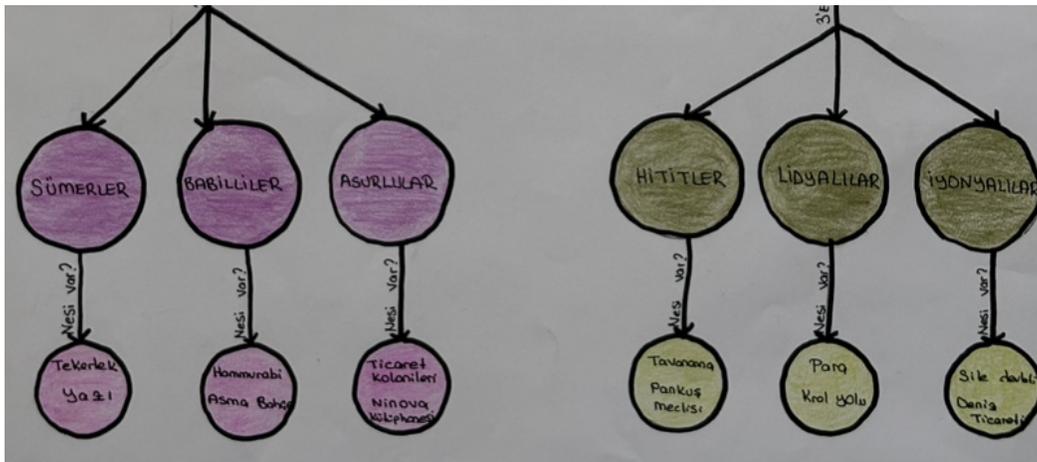


Fig. 3: An Example of a Concept Map Prepared by a Participant (K18)

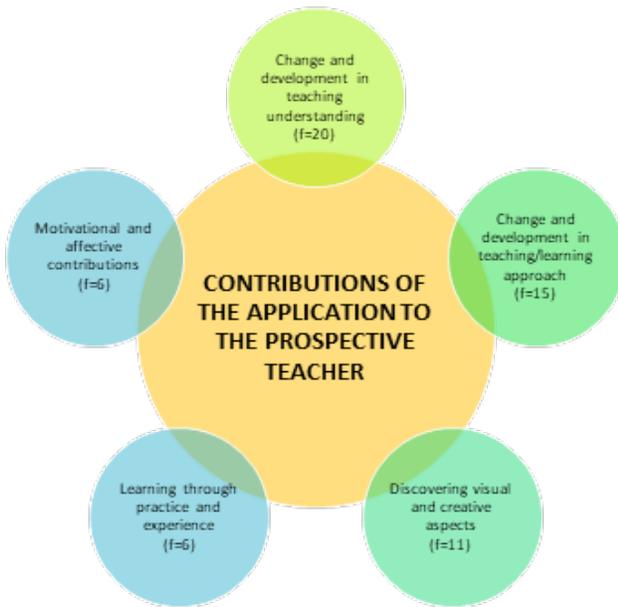


Fig. 4: Contributions of the Application to the Prospective Teacher

Most of the participants stated that the process of preparing concept and mind maps positively influenced both their understanding of teaching (f=20) and their approaches to learning (f=15). In addition, many participants expressed that they realized their potential in visualization and material development (f=11), that they had now gained experience in this regard (f=6), and that such activities increased their interest in the teaching process (f=6). Examples from the participants' statements are presented below:

K12: *"It showed that students learn better not only by listening to information but also by visualizing and relating it. It directed my understanding of teaching toward a more student-centered approach that prioritizes active participation. I learned how a seemingly simple drawing can affect learning."*

K14: *"I felt a little closer to my profession. I had the opportunity to carry out an application for the first time."*

K23: *"Using different maps for students contributed to me. I gained experience in conducting lessons in a way that is both enjoyable and instructive."*

Participants stated that through this process they realized that teaching is not merely the transmission

of information; rather, it is a learning process that activates students and supports visualization and association. Similar reflections were also observed in the participants' reflective journals. Some of the responses given by the participants to the question *"What developments did I notice in myself during the process of preparing concept and mind maps?"* are presented below:

K12: *"I learned how to explain things better through drawings. I thought this was more enjoyable. I realized that explaining through drawings is not that difficult."*

K14: *"I learned to establish logical relationships and associations. I became better at making connections."*

K23: *"Thanks to these maps, I realized that the lesson can be more enjoyable and oriented toward active participation. My cognitive development improved further."*

Participant statements indicate that the process of preparing concept and mind maps created awareness in prospective teachers regarding their understanding of teaching. Participants stated that they realized that teaching is not merely the transmission of information but rather a learning process that activates students and supports making connections. In addition, many participants reported experiencing positive awareness regarding their own visualization skills and their potential for material development.

Usability of Concept and Mind Maps in Social Studies Teaching According to Prospective Teachers

In this section of the study, the participants' intentions to use concept and mind maps in social studies teaching and the possible effects of these maps on the teaching process of the social studies course were examined. In this context, the data obtained from the participants' responses to the interview form and their reflective journals were evaluated.

Findings Regarding Prospective Teachers' Intentions to Use Concept and Mind Maps in the Teaching Process in the Future

Participants were asked the question: *"Would you consider using concept and mind maps in your future*

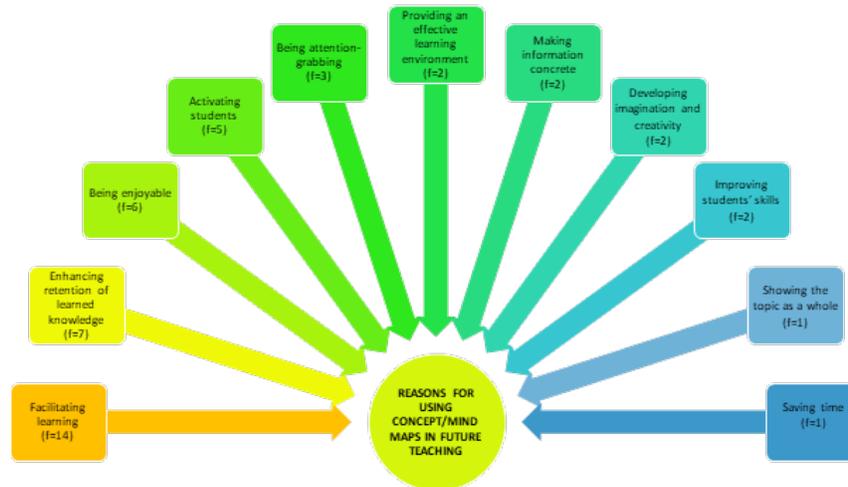


Fig. 5: Reasons for Using Concept/Mind Maps in Future Teaching

teaching career? Why?” All of the participants stated that they would use these tools. The reasons for the participants’ intentions to use these tools are presented in Figure 5.

Participants justified their intention to use concept and mind maps in the future based on the positive effects of these tools on learning processes. The most frequently emphasized effects were that these tools facilitate learning (f=14), make learned information more permanent (f=7), provide an enjoyable learning environment (f=6), and activate students in the learning process (f=5). Examples from the participants’ statements are presented below:

K2: “Yes, I would consider using them. Because I think they will make the lesson enjoyable and interesting. They can attract students’ attention.”

K11: “Yes, I would use them. I would like to use them because they provide easier learning and permanence.”

K17: “Yes, I am considering using them. Because they help students understand the topic more easily. They also make the lessons more enjoyable.”

These findings show that prospective teachers’ tendency to use concept and mind maps in the future is quite high. When their reasons are examined, it is seen that the participants believe these tools make learning processes more active, enjoyable, and permanent. Similar reasons were

also observed in the participants’ reflective journals. Some of the responses given by the participants to the question “Why/how would I use concept and mind maps in my teaching career?” are presented below:

K2: “I would use them to explain a topic by simplifying it. Students may find the lesson more interesting and enjoyable. I can also use them to provide prior knowledge about the topic.”

K11: “I would use these maps especially when children have difficulty learning topics and during the evaluation stage of the lesson.”

K17: “I can use concept and mind maps to help students understand the topic better, to ensure permanent learning, and to increase students’ participation in the lesson. Learning becomes easier, and the lesson can become more enjoyable.”

When the participants’ statements are examined, it is seen that prospective teachers evaluate concept and mind maps as tools that facilitate learning, support retention, and increase students’ participation in the lesson.

Findings Regarding the Effects of Concept and Mind Maps on the Teaching Process of the Social Studies Course

Participants were asked the question: “In your opinion, what effects might concept and mind maps have on the teaching process of the social studies

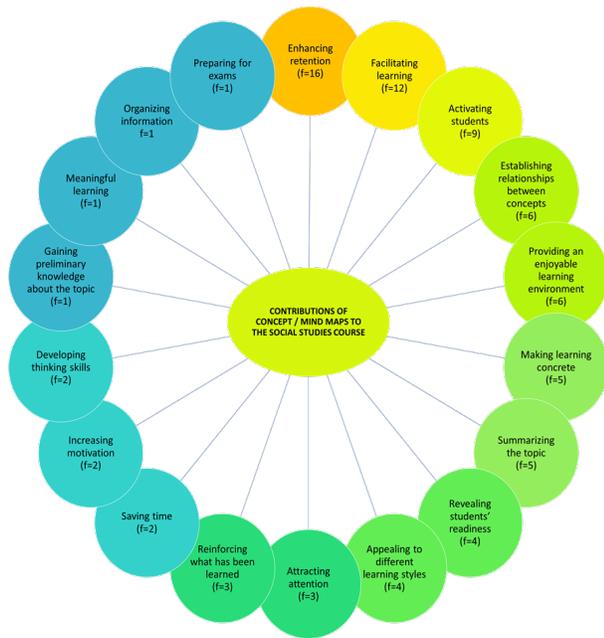


Fig. 6: Contributions of Concept/Mind Maps to the Social Studies Course

course?” Based on the responses given by the participants, Figure 6 was created.

A large majority of the participants mentioned that concept and mind maps particularly contribute to making learning permanent (f=16), facilitating learning (f=12), and activating students (f=9). In addition, it was emphasized that mind and concept maps are powerful tools that enable the establishment of relationships between concepts (f=6) and provide an enjoyable learning environment. Examples from the participants’ statements are presented below:

K4: “They enable students to see things more concretely, help them think, assist them in gaining prior knowledge before the topic, and help concretize the subjects.”

K9: “The student becomes active and reinforces learning. They are useful in teaching complex topics and make them easier.”

K25: “The presence of visuals and brief information attracts students’ attention and increases retention. It enables them to see the topic as a whole.”

When the participants’ statements are examined, it is seen that prospective teachers evaluate concept

and mind maps as instructional tools that facilitate learning, support retention, and increase students’ participation in the lesson. In addition, it is understood that participants think these tools can make the learning process more engaging and enjoyable. Participants also explained the contributions of concept and mind maps to the teaching process in their reflective journals. Some of the responses given by the participants in their reflective journals to the question “What do I think about the effects of concept/mind maps on the teaching process?” are presented below:

K4: “I had a very good time while preparing these maps. I think students will also find them enjoyable. In addition, they will think more creatively. It is also useful in attracting attention.”

K9: “Concept and mind maps are, in my opinion, instructional tools that ensure effective and active participation. They increase retention, support creative thinking, and make learning easier. They also develop students’ imagination.”

K25: “These maps will be attention-grabbing for students. I think they will increase class participation, learning level, and retention. At the same time, they will provide an enjoyable learning environment.”

When the interview and reflective journal data are evaluated together, it is understood that prospective teachers view concept and mind maps as instructional tools that facilitate learning, support retention, and increase students’ participation in the lesson.

DISCUSSION

Discussion on the Experiences of Prospective Teachers in the Process of Preparing Concept/Mind Maps

Following the training on concept/mind maps and the implementation carried out, the data obtained from the interviews conducted with the participants and the reflective journals indicate that the participants’ general impressions regarding the process of preparing concept and mind maps were positive. This process contributed to participants’ gaining awareness regarding their personal, pedagogical, and cognitive/professional development. Participants stated that

they experienced development particularly in areas such as creative thinking, visual expression, making knowledge more permanent, developing a student-centered understanding of teaching, and recognizing their own potential.

When the literature is examined, there are various studies indicating that concept and mind maps provide similar contributions to the learning process. Kalaycı and Çakmak (2000) stated that concept maps positively affect students' abilities to organize knowledge, their motivation, and their creativity. Novak and Gowin (1984) also emphasized that concept maps support creativity in the process of establishing relationships between concepts (as cited in Wandersee, 1990). Similarly, Yılmaz and Çolak (2011) revealed that concept maps support learning and increase students' socialization and creativity. In addition, Cañas and Novak (2014) stated that concept maps enable information to be organized in a meaningful way and help students relate new knowledge to their prior knowledge. Kavak (2009) and Sarıca and Çetin (2012) concluded in their studies that concept maps increase retention.

Buzan (2009) defined mind maps as effective tools that facilitate recall and develop creativity and thinking skills. In another study on mind maps (Yenil et al., 2022), prospective teachers defined mind maps as tools that enable the association of concepts and visualize them. In this context, it can be stated that the results obtained from the present study largely overlap with the findings reported in the literature.

Participants reported encountering various difficulties during the process of preparing concept and mind maps. The most frequently mentioned difficulties were concentrated in the stages of drawing, determining an appropriate topic, and establishing relationships between concepts. Similar difficulties have also been reported in various studies in the literature. For example, Ünlü et al. (2006) found that prospective secondary school physics teachers; Aktaş and Güler (2011) found that prospective classroom teachers; and Tuluk (2015) found that prospective mathematics teachers had difficulty using meaningful relationships between concepts when preparing concept maps.

In the study conducted by Şahin and Ergene (2024), it was observed that linking phrases were rarely used

in the concept maps created by prospective primary school mathematics teachers. This situation is thought to be related to the structure of the Turkish language. It has been suggested that languages that do not have an agglutinative structure like Turkish may have advantages in using linking phrases in concept maps (Ünlü, 2006). In a study conducted with prospective teachers, Şahin (2001) emphasized that the most challenging aspect of the concept map preparation process was determining the hierarchical structure and lateral relationships between concepts. İmer Çetin and Taşar (2015) stated that the concept maps prepared by prospective teachers included a limited number of concepts and that sufficient relationships were not established between these concepts. In both studies, this situation was associated with prospective teachers' lack of subject matter knowledge.

The findings obtained in this study also show that prospective teachers had particular difficulty in establishing relationships between concepts and in visualization during the process of preparing concept and mind maps, and this situation largely overlaps with the findings reported in the literature.

The training provided and the concept/mind map preparation activity carried out in the study provided participants with significant personal gains. Participants stated that they found this process beneficial in terms of developing a more student-centered, visually supported, and participation-based understanding of teaching. In addition, many participants indicated that they gained positive awareness regarding their own visualization skills, drawing abilities, and potential for developing instructional materials.

Bülbül (2015) stated in his study that university students benefited from concept maps when generating questions and summarizing, and that they found lessons conducted with concept maps enjoyable. Yenil et al. (2022) concluded in their study that prospective teachers perceived mind maps as a visual learning and note-taking tool created with keywords that facilitates the association of concepts. Orak and Kandemir (2023) reported that teaching with concept maps increased the motivation of prospective science teachers and improved their cognitive, affective, and psychomotor (drawing) skills.

The findings obtained from this study also reveal that the process of preparing concept and mind maps contributes to the development of prospective teachers' understanding of teaching, helps them recognize their visualization skills, and enables them to gain a more student-centered perspective toward the teaching process. In this respect, the findings of the present study largely overlap with those reported in the literature.

Discussion on the Usability of Concept and Mind Maps in Social Studies Teaching According to Prospective Teachers

The data obtained from the interviews conducted with the participants and their reflective journals indicate that prospective teachers tend to use concept and mind maps in their future teaching practices. Participants frequently emphasized advantages such as facilitating learning, making knowledge more permanent, providing an enjoyable learning environment, and actively engaging students in the lesson as reasons for this tendency.

This tendency is also supported by the findings of various studies conducted on the subject. For example, İnel et al. (2011) reported that prospective science and technology teachers, and Orak and Kandemir (2023) reported that prospective science teachers planned to use concept maps in their professional careers. Similarly, Yenil et al. (2022) found that prospective primary school mathematics teachers planned to use mind maps. In these studies, prospective teachers also evaluated concept/mind maps as attention-grabbing tools that support students' active participation, increase the retention of knowledge, are more functional than traditional note-taking, and are compatible with constructivist teaching approaches. Similarly, Demirci and Kabataş Memiş (2021) stated in their study that prospective science teachers enjoyed creating concept maps. These findings indicate that prospective teachers' positive attitudes toward concept and mind maps are consistent with the results in the literature and demonstrate that these tools have a high potential for use in the teaching process.

The data obtained from interviews and reflective journals also revealed that prospective teachers

evaluate concept and mind maps as effective methods in social studies teaching. Participants stated that these tools support learning not only cognitively but also affectively by facilitating learning, making knowledge more permanent, increasing active participation, enabling the establishment of relationships between concepts, and providing an enjoyable and attention-grabbing learning environment.

These results largely overlap with the existing literature. For example, D'Antoni and Zipp (2006), in their study with doctoral students, stated that mind maps enable knowledge to be organized more effectively. Vázquez-Cano et al. (2013) emphasized that concept maps improve students' abilities to construct and manage knowledge. Bes-Piá et al. (2011) reported that students found concept maps particularly useful for identifying key ideas, seeing the overall structure of the lesson, and summarizing the topic.

Cañas and Novak (2014) and Valadares (2013) stated that concept maps facilitate meaningful learning, while Ullah (2020) indicated that this method contributes to preventing rote learning. Rezapour-Nasrabad (2019) reported that the use of mind maps is perceived by students as an effective, motivating, and beneficial teaching method. In Kaya's (2025) study, high school students stated that mind maps were effective in organizing and visualizing information, increasing motivation, and attracting attention.

In addition, various studies have indicated several benefits of concept/mind maps, such as organizing information systematically (Çoban, 2007; Şahin, 2001; Yılmaz & Çolak, 2011), showing relationships between concepts (Kortelainen & Vanhala, 2004; Şahin, 2001), enabling the review of knowledge (Evrekli et al., 2012; Şahin, 2001), and making learned knowledge more permanent (Kavak, 2009; Kılıç & Sağlam, 2004; Kürümlüoğlu, 2019; Sarıca & Çetin, 2012).

Bülbul (2015) reported that after conducting an applied study with concept maps, students stated that they found these tools useful and that they would use them in the future. This finding also corresponds with prospective teachers' positive views regarding concept and mind maps. In addition, the literature mentions various other benefits of concept and mind

maps. Aykutlu and Şen (2012), İmer Çetin and Taşar (2015), Kürümlüoğlu (2019), and Bulut et al. (2021) stated that concept maps can be used to identify misconceptions, while Vanides et al. (2005) reported that concept maps drawn by students can provide a different perspective in evaluating students' perceptions about a topic.

The findings of this study also reveal that concept and mind maps have significant potential in developing prospective teachers' understanding of teaching and supporting learning through visualization-based approaches. In this context, including more visual learning tools such as concept and mind maps in teacher education programs may contribute to prospective teachers' development of a more student-centered understanding of teaching.

CONCLUSION

This study aimed to examine prospective teachers' experiences in the process of preparing concept and mind maps and their views on the use of these tools in social studies teaching. Based on the findings of the study, the following conclusions were reached:

- Prospective teachers generally evaluated the concept and mind map preparation process positively.
- The process contributed to the development of creativity, visualization skills, and awareness of student-centered teaching.
- Prospective teachers experienced some difficulties particularly in visualization, determining appropriate topics, and establishing relationships between concepts.
- The participants considered concept and mind maps as effective tools that facilitate learning, support retention, and increase students' active participation.
- Prospective teachers stated that they intend to use concept and mind maps in their future teaching practices.

RECOMMENDATIONS

Based on the findings obtained from this study, the following recommendations can be proposed:

- The study revealed that prospective teachers particularly experienced difficulties in esta-

blishing relationships between concepts and in visualization while preparing concept and mind maps. Therefore, it may be recommended that teacher education programs include more gradual and practice-based activities related to the preparation of concept and mind maps.

- Participants stated that concept and mind maps make learning more permanent and support students' active participation in the lesson. In this context, it may be recommended that concept and mind maps be used particularly in the teaching of topics that involve intensive conceptual structures in social studies education.
- The study indicated that prospective teachers evaluated concept and mind maps as tools that make the teaching process more enjoyable and attention-grabbing. Therefore, it may be recommended that visual organizers supporting students' active participation be utilized during the teaching process.
- The study also revealed that prospective teachers developed positive attitudes toward using concept and mind maps in the teaching process. Accordingly, it may be recommended that opportunities be created for prospective teachers to use concept and mind maps in real classroom environments during their teaching practicum (internship) process.
- It was observed that some prospective teachers initially had difficulty with visualization and drawing; however, they developed awareness of these skills by the end of the implementation process. Therefore, it may be recommended that teacher education programs include practices that support prospective teachers' visual expression and visualization skills.
- Considering that concept and mind maps can be used not only as instructional tools but also as alternative assessment tools for evaluating students' conceptual learning, it may be recommended to develop practices that incorporate these tools into assessment processes.

LIMITATIONS

This study has several limitations. First, the research was conducted with social studies prospective teachers studying at a single state university; therefore, the findings cannot be generalized to all prospective teachers. Second, the data were obtained through interview forms, reflective journals, and participant products, which are based on participants' self-reports.

Ethics Statements

The study was conducted in accordance with the principles of research ethics. Ethical approval for this study was obtained from the Ethics Committee of Kafkas University Social and Human Sciences Ethics Committee (Decision No: E41647, Date: 23.10.2025). Participation in the study was voluntary. All participants were informed about the purpose of the research and provided their informed consent before participating. The confidentiality and anonymity of the participants were ensured throughout the research process, and the data collected were used only for scientific purposes.

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Generative AI Statement

As the author of this study, I used the AI tool ChatGPT for language editing and minor wording improvements. After using this tool, I carefully reviewed and verified the final version of the manuscript. The author take full responsibility for the content of the published work.

REFERENCES

1. Aktaş, M. & Güler, H. K. (2011). Sınıf öğretmeni adaylarının dörtgenler kavramına ilişkin oluşturdukları kavram haritalarının değerlendirilmesi. *Gazi Eğitim Fakültesi Dergisi*, 31(2), 605-618.
2. Aykutlu, I. & Şen, A. İ. (2012). Üç aşamalı test, kavram haritası ve analogi kullanılarak lise öğrencilerinin elektrik akımı konusundaki kavram yanlışlarının belirlenmesi. *Eğitim ve Bilim*, 37(166), 275-288. <https://educationandscience.ted.org.tr/article/view/1094/1079>
3. Bes-Piá, A., Blasco Tamarit, E., & Muñoz-Portero, M. J. (2011). Different applications of concept maps in higher education. *Journal of Industrial Engineering and Management (JIEM)*, 4(1), 81-102. doi:10.3926/jiem.2011.v4n1.p 81-102
4. Bulut, Ö. L., Oluk, N. T. & Ekmekçi, G. (2021). Kimya öğretmen adaylarının çözeltiler ve çözünme konularındaki kavram yanlışlarının kavram haritaları ile belirlenmesi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 41, 1359-1407. <https://shorturl.at/dDtGt>
5. Buzan, T. (2009). *Akıl haritaları: Yaratıcılığınızı harekete geçirin ve hayatınızı dönüştürün*. Boyut Yayınları.
6. Bülbül, F. (2015). *Yabancı dil olarak Türkçe öğretiminde okuduğunu anlama becerisinin kavram haritası aracılığıyla geliştirilmesi: Bir eylem araştırması* [Yayımlanmamış Doktora Tezi, Çanakkale On Sekiz Mart Üniversitesi] YÖK Tez Merkezi.
7. Cañas, A. J. & Novak, J. D. (2014). Concept mapping using cmaptools to enhance meaningful learning. In: Okada, A., Buckingham Shum, S., Sherborne, T. (Eds.) *Knowledge cartography. advanced information and knowledge processing*. Springer, London. https://doi.org/10.1007/978-1-4471-6470-8_2
8. Çoban, B. (2007). Öğretim tekniği olarak kavram haritalarının atletizm dersinde kullanılması. *Fırat Üniversitesi Sosyal Bilimler Dergisi*, 17(1), 161-171.
9. D'Antoni, A. V. & Zipp, G. P. (2006). Applications of the mind map learning technique in chiropractic education: A pilot study and literature review. *Journal of Chiropractic Humanities*, 13, 2-11. [https://doi.org/10.1016/S1556-3499\(13\)60153-9](https://doi.org/10.1016/S1556-3499(13)60153-9)
10. Demirci, T. & Kabataş Memiş, E. (2021). Examining the views of preservice science teachers on creating concept maps. *Science Education International*,

- 32, 264-272. <https://doi.org/10.33828/sei.v32.i3.10>.
11. Duru, T. (2023). *7. sınıf sosyal bilgiler dersi etkin vatandaşlık öğrenme alanında zihin, bilgi ve kavram haritası kullanımının öğrenci başarısına etkisi* [Yayımlanmamış Yüksek Lisans Tezi, Kastamonu Üniversitesi]. YÖK Tez Merkezi.
12. Edwards, S. & Cooper, N. (2010). Mind mapping as a teaching resource. *The Clinical Teacher*, 7 (4), 236-239. <https://doi.org/10.1111/j.1743-498X.2010.00395.x>
13. Evrekli, E., İnel Ekici, D. & Balım A. G. (2012). Kavram ve zihin haritası kullanımının öğrencilerin kavramları anlama düzeyleri ile fen ve teknolojiye yönelik tutumları üzerindeki etkileri. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi* 12(1), 229-250. <https://shorturl.at/iWpvx>
14. Güneş, T., Güneş, M. H. & Çelikler, D. (2006). Fen bilgisi öğretmenliği programı biyoloji II ders konularının öğretilmesinde kavram haritası kullanımının öğrenci başarısı üzerine etkileri. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD)*, 7(2), 39-49.
15. Johnson L. R. (2014). Using mind maps to teach medical students. *Medical Education*, 48(11), 1033-1134. <https://doi.org/10.1111/medu.12551>.
16. Horzum, T. (2018). Matematik öğretmeni adaylarının dörtgenler hakkındaki anlamalarının kavram haritası aracılığıyla incelenmesi. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, 9(1), 1-30. <https://doi.org/10.16949/turkbilm.333678>
17. İmer Çetin, N. & Taşar M. F. (2015). Using concept maps to determine pre service science teachers views about the nature of science. *Journal of Theory and Practice in Education*, 11(4), 1185-1206. <https://dergipark.org.tr/en/download/article-file/63500>
18. İnel, D., Evrekli, E., Deniz, H. & Balım A.G. (2011). Fen öğretmen adaylarının kavram haritalarına ilişkin görüşleri. *Uşak Üniversitesi Sosyal Bilimler Dergisi*, 4, 239-266. <https://dergipark.org.tr/tr/download/article-file/202383>
19. Kalaycı, N ve Çakmak, M. (2000). Kavram haritalarının öğretim sürecinde kullanılması. *Kuram ve Uygulamada Eğitim Yönetimi*, 24, 571-580. <https://dergipark.org.tr/en/pub/kuey/issue/10372/126943>
20. Kaptan, F. (1998). Fen öğretiminde kavram haritası yönteminin kullanılması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 14, 95-99. <https://dergipark.org.tr/en/download/article-file/88113>
21. Kandemir, K., & ASLAN, B. (2025). An Investigation of History Teachers' views on the place and use of oral history in history teaching. *International Journal of Education Technology and Scientific Researches*, 10(31), 202-219.
22. Kavak, S. (2009). İlköğretim 8. sınıf fen ve teknoloji dersi maddenin halleri ve ısı ünitesinde kavram haritası tekniği kullanımının öğrencilerin başarısına, bilgilerin kalıcılığına ve *fene karşı tutumlarına etkisi* [Yayımlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi]. YÖK Tez Merkezi.
23. Kaya, N. (2025). *Lise yabancı dil öğrencilerinin İngilizce okuduğunu anlama becerisini geliştirmede zihin haritası tekniğinin kullanımı üzerine bir araştırma* [Yayımlanmamış Yüksek Lisans Tezi, Afyon Kocatepe Üniversitesi]. YÖK Tez Merkezi.
24. Kaymaz, N. N. (2022). *Ortaokul 7. sınıf fen bilimleri dersi hücre ve bölünmeler ünitesinin kavram haritası ile öğretiminin öğrencilerin akademik başarılarına etkisi* [Yayımlanmamış Yüksek Lisans Tezi, Aksaray Üniversitesi]. YÖK Tez Merkezi.
25. Kılıç, D. & Sağlam, N. (2004). Biyoloji eğitiminde kavram haritalarının öğrenme başarısına ve kalıcılığına etkisi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 27, 155-164.
26. Kortelainen, T. & Vanhala, M. (2004). Portfolio, peer evaluation, and mind map in an introductory course of information studies. *Journal of Education for Library and Information Science*, 45(4), 273-285.
27. Kürümlüoğlu, M. (2019). *6. sınıf sosyal bilgiler dersi demokrasinin serüveni ünitesindeki kavram yanlışlarını giderme: Bir eylem araştırması* [Yayımlanmamış Yüksek Lisans Tezi, Kırşehir Ahi Evran Üniversitesi] YÖK Tez Merkezi
28. Liu, Y. Zhao, G. Ma, G. & Bo, Y. (2014). The effect of mind mapping on teaching and learning: A meta-analysis. *Standard Journal of Education and Essay*, 2(1), 17-31. <https://shorturl.at/7Z0cz>

29. Merriam, S. B. (2023). *Nitel araştırma desen ve uygulama için bir rehber* S. Turan (Çev. Edt.). Nobel Yayıncılık.
30. Novak, J. D. ve Cañas, A. J. (2007). Theoretical origins of concept maps, how to construct them, and uses in education. *Reflecting Education*, 3(1), 29-42. <https://shorturl.at/1V6NA>
31. Orak, G. & Kandemir, N. (2023). Fen bilgisi öğretmen adaylarının kavram haritası destekli çevre eğitimi hakkındaki görüşleri. *Uluslararası Beşeri Bilimler ve Eğitim Dergisi*, 9(19), 97-119. <https://doi.org/10.59304/ijhe.1191559>
32. Patton, M. Q. (2018). *Nitel araştırma ve değerlendirme yöntemleri* M. Bütün & S. B. Demir (Çev. Edt.). Pegem Akademi.
33. Rezapour-Nasrabad, R. (2019). Mind map learning technique: An educational interactive approach. *International Journal of Pharmaceutical Research*, 11, 11593-11597. <https://shorturl.at/z3TD9>
34. Sajadi, A. S. Babajani, A., Maroufi, S. S. & Sarraf, N. (2024). Using the mind map method in medical education, its advantages and challenges: A systematic review. *Journal of Education and Health Promotion*, 13(1), 1-13. DOI: 10.4103/jehp.jehp_1323_23
35. Sarıca, R. & Çetin, B. (2012). Öğretimde kavram haritaları kullanımının öğrencilerin akademik başarısına ve kalıcılığa etkisi. *İlköğretim Online*, 11(2), 306-318. <https://dergipark.org.tr/en/pub/ilkonline/issue/8589/106735>
36. Şeyda Nur Atasever, "Preparing Teachers for the Age of Generative AI: Competency Frameworks for AI-Supported Pedagogy", *Insight: Journal of Educational Research and Innovation*, vol. 1, no. 1, pp. 43-52, Jun. 2025.
37. Sönmez, V. & Alacapınar, F. (2014). Örneklendirilmiş bilimsel araştırma yöntemleri. Anı Yayıncılık.
38. Şahin, F. (2001). Öğretmen adaylarının kavram haritası yapma ve uygulama hakkındaki görüşleri. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, (10), 12-25. <https://dergipark.org.tr/en/download/article-file/114854>
39. Şahin, F. (2002). Kavram haritalarının değerlendirme aracı olarak kullanılması ile ilgili bir araştırma. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, (11), 17-31. <https://dergipark.org.tr/en/download/article-file/114844>
40. Şahin, H. & Ergene, Ö. (2024). İlköğretim matematik öğretmen adaylarının seriler konusuna ait oluşturdukları kavram haritalarının incelenmesi. *Recep Tayyip Erdoğan Üniversitesi Eğitim Fakültesi Dergisi*, 4(2), 46-65. <https://dergipark.org.tr/en/pub/refad/article/1503266>
41. Tekin, N., İnci, T., Aslan O. & Yağız, D. (2013). Fen ve teknoloji öğretmen adaylarının kavram haritalarına yönelik tutumları ve kavram haritası hazırlayabilme becerilerinin çeşitli değişkenler açısından incelenmesi. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, 38, 133-148. doi: 10.15285/EBD.2013385571.
42. Tuluk, G. (2015). Ortaokul matematik öğretmeni adaylarının açı kavramına ilişkin oluşturdukları kavram haritalarının değerlendirilmesi. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, 6(2), 323-337. <https://doi.org/10.16949/turcomat.36234>
43. Tuluk, G. (2020). Pedagojik Formasyon Programındaki Matematik Öğretmen Adaylarının Pedagojik Alan Bilgisine Yönelik Zihin Haritaları. *Kastamonu Education Journal*, 28(3), 1541-1557. <https://doi.org/10.24106/kefdergi.4096>
44. Turan Oluk, N., & Ekmekçi, G. (2019). Farklı kavram haritası oluşturma yöntemlerinin karşılaştırılması: Kimya öğretmen adayı görüşleri. *Kastamonu Education Journal*, 27(3), 1163-1177. <https://doi.org/10.24106/kefdergi.2786>
45. Ullah, A. M. M. S. (2020). Concept map and knowledge. *Education Sciences*, 10(9), <https://doi.org/10.3390/educsci10090246>
46. Ünal, C. & Bozdoğan, A. E. (2019). Fen bilgisi öğretmen adaylarının fen bilimleri dersi öğretim programı algılarının zihin haritaları ile belirlenmesi. *OPUS International Journal of Society Researches*, 10(17), 1201-1228. <https://doi.org/10.26466/opus.526192>
47. Ünlü, P., Ingeç, Ş. & Taşar, M. (2006). Investigating teacher candidates' knowledge structures about momentum and impuls by the method of using concept maps. *Education and Science*, 31(139), 70-79. <https://educationandscience.ted.org.tr/article/view/689>
48. Valadares, J. (2013). Concept maps and the meaningful learning of science. *Journal for Educators, Teachers and Trainers*, 4, 164-179. <https://>

- dialnet.unirioja.es/servlet/articulo?codigo=4264879
49. Vanides, J., Yin, Y., Tomita, M. & Ruiz-Primo, M. A. (2005). Using concept maps in the science classroom. *Science Scope*, 28(8), 27-31. <https://l24.im/PT68Hn>
50. Vázquez-Cano, E., López-Meneses, E., & Fernández-Márquez, E. (2013). Concept mapping for developing competencies in European Higher Education Area. *International Journal of Humanities and Social Science*, 3(17), 7-18. <https://l24.im/AHXM9W>
51. Wandersee, J. H. (1990). Concept mapping and the cartography of cognition. *Journal of Research in Science Teaching*, 27(10), 923 -936. <https://doi.org/10.1002/tea.3660271002>Digital Object Identifier (DOI)
52. Yenil, T. & Arslan, Ç. (2025). Examination of mind map evaluation rubrics created by prospective mathematic teachers . *New Era International Journal of Interdisciplinary Social Researches*, 10(27), 119-137. <https://doi.org/10.5281/zenodo.14940465>
53. Yenil, T., Arslan, Ç. & Tapan Broutın, M. S. (2022). İlköğretim matematik öğretmen adaylarının zihin haritasıyla ilgili görüşleri. *Kırklareli Üniversitesi Sosyal Bilimler Dergisi*, 6(2), 213-236. <https://doi.org/10.47140/kusbder.1127975>
54. Yıldırım, A. ve Şimşek, H. (2016). *Sosyal bilimlerde nitel araştırma yöntemleri*. Seçkin Yayıncılık.
55. Yılmaz, K. & Çolak, R. (2011). Kavramlara genel bir bakış: kavramların ve kavram haritalarının pedagojik açıdan incelenmesi. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 15(1), 185-204. <https://l24.im/XzV4>

APPENDIX / APENDICES

Appendix A

Interview Form Questions

1. What would you say about the process of preparing concept and mind maps?
2. What were the points you had difficulty with while preparing concept and mind maps?
3. What contributions did the concept and mind map preparation activity provide for you?
4. Would you consider using concept and mind maps in your future teaching career? Why?
5. In your opinion, what effects might concept and mind maps have on the teaching process of the social studies course?

Appendix B

Reflective Journal Questions

1. How did I experience the concept and mind map preparation process?
2. What was the most difficult part for me during the map preparation process?
3. What developments did I notice in myself during the process of preparing concept and mind maps?
4. Why/how would I use concept and mind maps in my teaching career?
5. What do I think about the effects of concept/ mind maps on the teaching process?

Appendix C

Sample Concept/Mind Map Prepared by a Participant

