Metaphorical Perceptions of Teachers Regarding Technology-enhanced Social Studies Instruction

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ABSTRACT

This study aims to identify the metaphors created by social studies teachers for technology-supported instruction in social studies education. The study is conducted using the qualitative research design of "phenomenology". The study group consists of a purposive sample of 156 social studies teachers working in schools affiliated with the Ministry of National Education in different regions of Turkey. The metaphors of social studies teachers regarding the use of technology in social studies education were collected through an online survey form. To reveal teachers' metaphors for technology-supported instruction in social studies education, statements such as "According to me, technology-supported instruction in social studies education is like. because." were used. Content analysis was used for data analysis in the research. Social studies teachers produced 50 metaphors related to technology use. These metaphors were categorized based on their common characteristics. The metaphors created by social studies teachers were visualized using figures and tables, categorized, and explained with quotations from participants' justifications. The most frequently used category of metaphors related to technology-supported instruction in social studies education is the technology category, with 19 metaphors. It was concluded that social studies teachers generally have positive perceptions regarding technology-supported instruction.

Key words: Social Studies Education, Social Studies Teachers, Metaphor, Technology-supported Instruction

INTRODUCTION

Technological advancements and societal changes have led to significant developments and innovations in the field of education, much like in other aspects of life. These developments have given rise to alternative educational activities and played a crucial role in the planning and implementation of instructional activities. Over time, significant changes have occurred in the process of planning and implementing educational activities. In parallel with the rapid pace of technological progress, the current style of teaching has moved away from traditional approaches and transformed into "technology-enhanced instruction." The fast-paced technological advancements in the world of education have led educators to rethink their learning and teaching methods and integrate traditional classroom settings with the digital world. Technology-enhanced instruction involves the use of digital tools and platforms that enrich students' learning processes and enhance their interactions. Nowadays, various technological tools such as smart boards, tablets, smartphones, and online education platforms are widely used in learning environments. In this context, technology-enhanced instruction stands out as an approach that enriches students' learning experiences, enhances interactions, and accelerates

the transformation in education. However, alongside the discussions about the use of technology in education, "metaphors" serve as a significant linguistic tool that helps teachers express their experiences and thoughts. Today, technology plays a crucial role in transforming the processes of learning and teaching in the field of education. The integration of technology into education helps students learn more effectively, enables teachers to teach more efficiently, and enriches learning environments. With the increased integration of modern technologies into the instructional process, new orientations and approaches have emerged in education, giving the teaching profession a new meaning and bringing new responsibilities to teachers (Karakoç-Öztürk, 2021; General Directorate of Teacher Training and Development, 2017).

As a response to changing needs and expectations, the general competencies of the teaching profession in Turkey and teacher training programs have been restructured. These reforms also encompass developments in technology-supported instruction in today's educational context (Ministry of National Education, 2017; Higher Education Council-YÖK, 2018). In order to meet the requirements of the modern education approach, the reform efforts regarding the general qualifications of the teaching profession have been meticulously updated by examining teaching certificates from

international organizations (such as the Council of Europe, World Bank, UNESCO and UNICEF) and various countries (such as the United States, Australia, Finland, France, the United Kingdom, Canada and Singapore). This updating process has been carried out with comprehensive and long-term involvement from all relevant stakeholders (Ministry of National Education, 2017). Thanks to the program updates conducted in 1997, 2006, 2009, and 2018, teacher training programs have been restructured to meet the demands of the time (YÖK, 2018).

With changing technologies and programs, it has been observed that technology integrated into education has led teachers to frequently use metaphors to conceptualize and express technology-supported instruction (Mishra & Koehler, 2006; Tonbuloğlu & İşman, 2014). Metaphors are linguistic tools that help us make abstract or complex concepts more understandable and memorable by associating them with concrete or familiar objects. They make complex or abstract ideas more comprehensible. Especially, Social Studies teachers express their experiences, perceptions, and changes in learning environments related to technology-supported instruction through metaphors. Social Studies teachers also frequently use technology to provide their students with a more effective and engaging learning experience. When describing their experiences and thoughts related to technology-supported instruction, Social Studies teachers often make use of metaphors (Gurney, 1995; Kövecsec, 2010; Moser, 2000).

The use of technology in Social Studies classes can help students learn the subject in a more engaging and effective manner. Technology contributes to the development of important skills such as "Digital Literacy" and "Media Literacy," aiming to teach students how to use information and communication technologies consciously and safely. Educational technologies can be effectively utilized in most of the topics covered in Social Studies. Researchers emphasize that instructional technologies are effective tools in transferring targeted skills to students in Social Studies classes. The use of technology can facilitate collaboration among students and provide them with environments where they can enhance their creativity and competencies. The effective use of technology with other learning areas, skills, and activities specified in the curriculum increases the efficiency of Social Studies classes and helps students to enjoy this subject more. From this perspective, technology can contribute to making the content of the lessons more interactive, engaging, and student-centered (Demir, 2017; Yerli, 2018; Yeşilyurt, 2019).

In this article, the metaphorical perceptions of Social Studies teachers regarding technology-supported instruction will be examined. These metaphorical perceptions are significant indicators of how teachers understand technology, how they envision presenting it to students, and how they shape their instructional strategies. Additionally, they can contribute to a deeper understanding of the role and impact of technology-supported instruction in education. The study aims to go beyond typical explanations to gain a deeper understanding of individuals' experiences regarding

technology-supported instruction in social studies education. Metaphors are considered systematic tools for providing additional explanations and expanding the application domain (Güneş & Fırat, 2016). In this context, it is believed that supporting existing research on technology-supported instruction in social studies education (Akçalı-Avcı & Baş, 2020; Akgün & Akgün, 2021; Demir, 2017; Güneş et al., 2021; Yeşilyurt, 2019;) with more comprehensive explanations can contribute to the development of general competencies in the teaching profession and social studies teachers' skills in planning and delivering technology-supported instruction. Research examining the metaphorical perceptions of social studies teachers towards technology can help us better understand how teachers conceptualize technology and how these perceptions impact their teaching strategies. This could contribute significantly to teacher education and professional development by assisting teachers in using technology more effectively. Metaphors can allow teachers to better grasp complex technology concepts and communicate them more effectively to students. Research can contribute to teachers developing more effective strategies for technology-enhanced social studies instruction. The use of metaphors can provide teachers with new perspectives to enhance students' understanding and can be seen as a step towards improving their overall competency. Enhancing technology-supported teaching skills can help teachers deliver better education. The research findings can assist in shaping educational policies and decisions to promote technology-supported instruction, contributing to the modernization of the education system. Additionally, by comprehensively addressing existing research in the field of technology-supported social studies teaching, this research can add a new dimension to the literature in this area and guide future researchers. Accordingly, in line with the overall purpose of the study, the metaphors created by social studies teachers for technology-supported instruction in social studies education are sought to be identified. In pursuit of this general aim, the answers to the following questions have been sought:

1. What are the metaphors used by social studies teachers in technology-supported social studies education?
2. Which conceptual categories with common characteristics are included in social studies teachers' metaphors?
3. What are the justifications for the metaphors created by social studies teachers?

METHOD

Research Design

This study was conducted using the qualitative research design of "phenomenology." Phenomenology focuses on phenomena that researchers are aware of but do not have an in-depth and detailed understanding of. It provides a suitable research framework for exploring phenomena that are familiar to us but not fully comprehended. The phenomenological design is used to understand and explain participants' experiences, feelings, thoughts, and beliefs. This approach respects and accepts participants as they are while minimizing the researcher's biases. Phenomenological studies aim to gain

insights and deep understanding by emphasizing participants' real experiences and perceptions. Researchers explore these experiences through one-on-one interviews, focus groups, or diaries. The phenomenological design is a research method used in the social sciences and psychology. This method is employed to understand individuals' experiences, emotional reactions, and perceptions. The phenomenological design focuses on examining how these experiences are lived and how they are interpreted. Phenomenology aims to comprehend how a phenomenon (any event, object, or experience) is experienced and to explain the meaning of these experiences. The phenomenological design involves the researcher listening to and deeply exploring participants' experiences to understand them. Researchers allow participants to freely express their experiences and record them without attempting to explain or interpret these experiences (Yıldırım & Şimşek, 2013). In this context, a phenomenological design was employed in the research to comprehensively comprehend teachers' experiences regarding technology and to elucidate the meaning of these experiences.

Study Group

The participants in this study were purposefully selected from social studies teachers working in schools affiliated with the Ministry of National Education in different regions of Turkey. Purposeful sampling aims to identify participants who can provide more information about the research topic. Purposeful and easily accessible sampling often involves data collection methods that align with the objectives of a specific research or study. This ensures that data collection is faster and cost-effective, but careful planning and representation should be considered (Patton, 2002). A total of 156 social studies teachers actively teaching during the 2021-2022 academic year participated in the study.

All participating teachers volunteered for the study and had knowledge and experience in technology-supported teaching in social studies education. They acquired these experiences through in-service training provided by the Ministry of National Education and various courses from different units. Six social studies teachers' responses were not considered for evaluation due to incomplete or incoherent answers. Among the evaluated 156 social studies teachers, 102 were male, and 54 were female. Twenty-five teachers had less than 5 years of experience, 34 had 6-10 years of experience, 53 had 11-15 years of experience, and 44 had 16 years or more of experience. One hundred and forty-seven teachers had experience with "Technology-Supported Instruction," while the remaining nine social studies teachers had very little experience with it. The information about the study group is shown in Table 1.

Data Collection Instruments

The social studies teachers' metaphors related to the use of technology in social studies education were collected through an online survey. The survey consisted of two sections. The first section was designed to gather information about the teachers' notes. The second section was designed

Table 1. The information about the study group

Experience	Female	Male
Less than 5 years	12	19
6-10 years	12	24
11-15 years	20	34
16 years or more	10	25
Total	54	102

to prompt social studies teachers to explain technology-supported instruction in social studies education using a metaphor. Participants were given a sentence template as follows: "I think technology-supported instruction in social studies education is like. because." They were asked to express their metaphorical perceptions following the instructions provided.

Data Collection Process and Data Analysis

Participants were asked to create a metaphor using the phrase "is like..." and provide a logical explanation using the phrase "because..." Based on these template expressions, the survey was distributed to the participants via a link on Google Forms.

Social studies teachers spent an average of 15-20 minutes to complete the form. The research data were collected in the final week after the end-of-term exams of the second semester. During this process, care was taken to keep the social studies teachers free from exam and paperwork intensity to ensure maximum participation.

The data obtained during the data collection process were examined in consideration of these content analysis stages and the findings of similar studies in the literature (Ateş & Karatepe, 2013; Büyükalan-Filiz & Türkmeneli, 2019; Çuhadar, 2022; Ekici, 2016). After evaluating their suitability for the research purpose, the data were subjected to the stages of elimination, numbering, coding, category formation, validity-reliability, and data interpretation. Details of each stage are explained below.

In order to analyze the data, the expressions made by the teacher candidates in the online forms were evaluated for their suitability for the research purpose. Out of a total of 156 forms, it was determined that six of them were not filled out appropriately for the research purpose by the teacher candidates. In some of the forms filled out by the participants, either a metaphor was not found, or an explanation for the metaphor was missing, or a coherent explanation consistent with the metaphor written by the participant was not given. Such forms were excluded from the study as they were not suitable for the research purpose. Subsequently, the forms filled out by the participants were numbered from 1 to 150, and the data elimination and numbering process was completed.

In the research, the metaphors used by social studies teachers were listed on a form created for this purpose. The researcher coded and listed the data using traditional methods, such as manual listing, to understand the intensity of metaphorical perception and evaluate the category formation

stage. The metaphors were coded by assigning a number to each one used in the forms used in the analysis process. A total of 50 different codes were obtained. The frequency values of each code and metaphor expression developed by social studies teachers were determined using tabulation and listing methods.

The expressions of social studies teachers were listed and analyzed based on their common characteristics. Then, each metaphor's rationale was individually examined, and categories were formed based on the emphasized features and perspectives of social studies teachers who participated in the study regarding technology-supported instruction in social studies education. During the coding process, the metaphors were subjected to a two-stage control process before being assigned to appropriate categories. As a result of this evaluation, four categories, which were thought to represent the metaphors most effectively, were determined.

In this study, metaphors shared by social studies teachers online and the justifications they provided for these metaphors were examined using content analysis. The main purpose of content analysis is to conceptualize the data and then create a logical structure based on these concepts. The situations describing the metaphors were transformed into categories or themes, and participants' expressions were interpreted with quotations (Creswell & Poth, 2016; Yıldırım & Şimşek, 2013). During the data analysis phase, coding of the metaphors created by participating social studies teachers, categories, and justificatory statements regarding the metaphors were presented and interpreted in the form of figures and tables.

Validity and Reliability

To ensure internal and external validity in the research process, a brief explanation of the research's purpose, metaphors, and metaphor studies was provided in writing at the beginning of the questionnaire administered to the participants. Those who agreed to participate were asked to fill out an online form along with the explanatory text. Additionally, social studies teachers were informed that they should fill out the form on their own. To ensure internal validity, it was thought that the fact that almost all participants were knowledgeable about "Technology-Supported Instruction in Social Studies Education" and only a few teachers (9 teachers) had little knowledge about the subject would enhance the reliability and thus increase internal validity (Bozkuş-Genç, 2021; Creswell & Poth, 2016; Lincoln & Guba, 1986).

To ensure external validity and support transferability, the data coding and analysis process were conducted in line with the stages in the literature and reported in detail. Participants were selected through purposive sampling, and direct quotations from pre-service teachers' metaphors and explanations written in online forms were included in the findings (Büyüköztürk et al., 2016; Lincoln & Guba, 1986).

To ensure reliability and to see whether the metaphoric perceptions of social studies teachers regarding the use of technology in social studies education were accurately reflected in the conceptual categories, the metaphors in these categories were created by two different academics with

studies in the field of qualitative research at similar stages (Creswell, 2007). Metaphors and conceptual categories were independently created by two experts separate from the researcher who analyzed the research data, and the list of metaphors under these conceptual categories was finalized. The reliability of data analysis was calculated using the formula "Reliability = agreement/agreement + disagreement" (Miles & Huberman, 1994). The average reliability of the coders was found to be.93. Additionally, the perspectives of social studies teachers were explained in the findings with direct quotations using participant numbers (e.g., T1).

During the data evaluation process, the "word cloud" technique was used to support the analysis process by highlighting and visually presenting words that were prominently used in expressing the metaphors. The word cloud was created using a program from the website https://wordart.com/create.

FINDINGS

This study examined the views and metaphors of social studies teachers on "Technology-Enhanced Instruction in Social Studies Education." The metaphors created by the participants were visualized using figures and tables and categorized accordingly. Additionally, the study included quotations from social studies teachers supporting these metaphors with logical explanations. The findings initially presented data obtained in line with the first sub-objective. Subsequently, data from the second and third sub-objectives were combined to make them more meaningful for readers. Thus, social studies teachers' views and metaphors on technology-enhanced education in social studies were presented in a more comprehensive manner.

Findings Related to the Metaphors used by Social Studies Teachers in Technology-supported Social Studies Education

In the research, four metaphor categories (technology, life, science, education) were identified, revealing the perceptions of 150 social studies teachers on technology-enhanced social studies education. It was observed that teachers primarily generated 19 metaphors in the technology category and a total of 50 metaphors across all categories.

Table 2 presents the categories related to the metaphors formed by social studies teachers. The metaphors, consisting of four categories, are categorized as follows: technology (19), education (13), life (12), and science (6).

Findings Related to the Conceptual Categories that Share Common Characteristics in the Metaphors of Social Studies Teachers

As seen in Table 3, social studies teachers have created a total of 50 different metaphors related to technology-supported instruction in social studies education. Among these metaphors, virtual journey has been repeated thirteen times and is the most commonly used metaphor by social studies teachers. Laboratory and teacher have been repeated twelve times. Educational robot and journey have been used ten times.

Table 2. Categories related to the metaphors formed by social studies teachers

Metaphor Number	Metaphor Name	f
1	Technology	19
3	Education	13
3	Life	12
4	Science	6

Digital game space and universe have been used nine times, while virtual guide has been used seven times. Virtual laboratory, virtual simulation, educational traveler, audio book, bridge, and friend have been repeated five times. Virtual key, digital compass, map, and atlas have been repeated four times, whereas virtual narrator, virtual game box, mind map, museum, class notebook, and film have been repeated three times. Four metaphors used by social studies teachers (digital atlas, virtual storybook, virtual picture book, and language) have been repeated twice. There are 18 different metaphors used only once by social studies teachers.

In Figure 1, metaphors created by social studies teachers regarding technology-enhanced instruction in social studies education are grouped under the categories of technology (38%), education (26%), life (24%), and science (12%).

According to Figure 2, the most commonly used metaphors by social studies teachers are science, friend, and bridge. The metaphor most frequently used by social studies teachers is "science" because science is closely intertwined with technology.

Findings Related to the Justifications for the Metaphors Generated by Social Studies Teachers

Table 4 shows that there are nineteen different metaphors in the "technology" category. The two most repeated metaphors under this category are "virtual journey" and "digital playground." The opinions of social studies teachers regarding each metaphor are presented in Table 5.

According to Table 5, there are thirteen different metaphors under the "education" category. The two most repeated metaphors in this category are "teacher" and "education robot." The views of social studies teachers regarding each metaphor are shown in Table 6.

According to Table 6, there are twelve different metaphors in the "education" category. The two most repeated metaphors in this category are "journey" and "universe." Social studies teachers' opinions on each metaphor are shown in Table 7.

According to Table 7, there are six different metaphors in the "science" category. The two most recurring metaphors within this category are "laboratory" and "science tree." The opinions of social studies teachers regarding each metaphor are shown in the table.

DISCUSSION AND CONCLUSION

This study aimed to understand social studies teachers' perspectives on technology-supported instruction in social
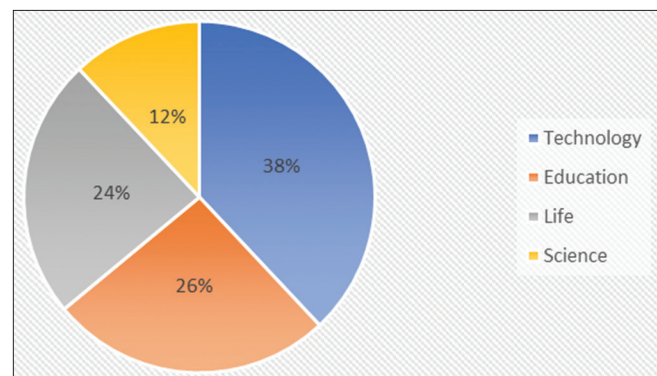
Figure 1. Frequency percentages of metaphor categories generated by social studies teachers

studies education. During the research process, metaphors created by social studies teachers were categorized into four different categories, comprising a total of 50 metaphors.

The first category was identified as "technology," under which social studies teachers generated the highest number of metaphors compared to other categories. A total of 19 metaphors were produced, with four of them being unique. In this category, social studies teachers predominantly envisioned technology-supported instruction in social studies education as "virtual journeys" and a "digital playground." These results align with similar findings in the literature, reflecting positive attitudes towards technology. In a study conducted by Demirbilek and Atila (2021) aiming to determine students' perceptions of the technology concept, it was observed that students generally held a positive view of technology. The study highlighted that students perceived technology as a useful entity and the least rapidly spreading phenomenon. These results are consistent with previous research supporting the presence of teachers with a positive attitude towards technology. Another study by Göksu and Koçak (2020) examined metaphorical perceptions of technology among teacher candidates from 24 different disciplines. The research demonstrated that teacher candidates had a positive perception of educational technologies. Similar results were obtained in other studies as well. For instance, in a study by Altun and Ulusoy (2018), teacher candidates were found to create metaphors primarily in the categories of developing-changing, benefit-harm, and facilitative tool regarding technology. Fidan (2014) found that teacher candidates generated metaphors mainly in the categories of necessity, development, and information source concerning technology. Arslan and Zengin (2017) revealed that teacher candidates focused on evolving and developing aspects of technology and how it facilitated their lives. It has been emphasized that teachers' positive perceptions of technology are associated with successful integration of technology into education. These results indicate that students and prospective teachers generally have a positive attitude towards technology. Students view technology as a useful tool and perceive it as a stable entity rather than a rapidly spreading phenomenon. Prospective teachers also have a positive approach to educational technologies and evaluate them positively. These findings emphasize the importance of positive

Figure 2. Word cloud of metaphors created by teachers for technology-supported instruction in social studies education

attitudes of both students and teachers for the successful use of technology in education. Students' perception of technology as a useful tool can contribute to more effective use of technology in education. The positive perceptions of prospective teachers can encourage them to effectively integrate these technologies. Additionally, these results may suggest the need for educators and educational institutions to provide more resources and support for technology education. Students and prospective teachers who have a positive acceptance of technology may require education and infrastructure support to use technology more effectively in education.

The second category is identified as "education." In this category, social studies teachers consider technology-supported instruction primarily as "teacher" and "educational robot." According to the metaphors generated in this category, social studies teachers believe that technology-supported instruction contributes significantly to social studies education. Through the metaphors they produce about effective teaching, social studies teachers emphasize the new perspective that technology brings to education. They also point out the facilitating and entertaining aspects of technology in the planning and implementation process of education, the changing roles of teachers during this process, and why technology-supported instruction is important for effective teaching and professional development. These findings suggest that social studies teachers have a high level of awareness regarding technology-supported instruction. This awareness can be related to the knowledge and experiences they gained during in-service training and seminars provided by the ministry. In studies focusing on the education category and the metaphor of the teacher, various metaphors have been observed. Mahlios and Maxson (1998) identified different metaphors to define teachers: knowledge source and distributor, parent, authoritarian, producer, passionate for others, sun, gardener, sculptor, light, tree, guide, consultant, authority source, etc. In Cook-Sather's (2003) study, it was noted that students relied more on concrete analogies when describing the concept of education. Students used metaphors such as "fruit tree," "seedling," and "bee" to describe education. Saban (2004) examined the metaphors of

151 teacher candidates related to the concept of a teacher. It was found that teacher candidates mostly perceived teachers as the "source and transmitter of knowledge," "molders and shapers of students," and "healers of students." Çelikten (2006) observed that teachers were defined with different metaphors related to education. Nikitina and Furuoka (2008) found in their study that teachers used different metaphors when explaining the concept of education. Yıldırım et al. (2011) stated that teachers' metaphors about education could be grouped under "education produces" and "education improves." They expressed that students see education as a production process. In the study by Turan et al. (2016), it was noted that teachers expressed the concept of education with various metaphors. Social studies teachers believe that technology-enhanced instruction contributes significantly to social studies education. This indicates a high level of awareness of how technology can be used in education. Social studies teachers emphasize a new perspective that technology brings to education, highlighting how technology can provide a different and more effective way of teaching students. Teachers point out the facilitating and enjoyable aspects of technology in education, which can attract students' interest and make learning more enjoyable. Teachers also highlight that their roles change in technology-enhanced instruction, indicating a teaching model where teachers take on a more guiding and supportive role. These results may indicate that teachers' awareness of technology-enhanced instruction comes from professional development opportunities such as in-service training and seminars provided by the ministry.

In the research, the third category has been determined as "life." In this category, social studies teachers consider technology-supported instruction most relevant to "journey" and "universe" in social studies education. Relevant studies indicate that students use metaphors to explain various subjects, and these metaphors are associated with topics selected from daily life. Gömleksiz et al. (2012) clearly demonstrate that the metaphors generated by students reflect real-life subjects. For instance, students produced metaphors like life, tree, and flower. The reasons for these similarities indicate that students emphasize the necessity of connecting Social Studies Stream with topics from daily life. This finding is consistent

Table 3. Metaphors formed by social studies teachers

Metaphor Number	Technology Metaphor Names	f	Metaphor Number	Education Metaphor Names	f	Metaphor Number	Life Metaphor Names	f	Metaphor Number	Science Metaphor Names	f
1	Virtual Journey	13	1	Teacher	12	1	Journey	10	1	Laboratory	12
2	Digital Playground	9	2	Educational Robot	10	2	Universe	9	2	Tree of Science	8
3	Virtual Guide	7	3	Education Journey	5	3	Bridge	5	3	Lighthouse of Science	3
4	Virtual Laboratory	5	4	Audio Book	5	4	Friend	5	4	Science Super Market	3
5	Virtual Simulation	5	5	Map	4	5	Film	3	5	Science Power Clock	2
6	Virtual Key	4	6	Atlas	4	6	Language	2	6	Bag of Science	1
7	Digital Compass	4	7	Mind Map	3	7	Tunnel	1			
8	Virtual Narrator	3	8	Museum	3	8	Employee	1			
9	Virtual Game Box	3	9	Class Book	3	9	Fast Train	1			
10	Digital Atlas	2	10	Power Bag of Education	1	10	Magic Orange	1			
11	Virtual Book Tale	2	11	Educational Archeology	1	11	Sailboat	1			
12	Virtual Picture Book	2	12	Language Translator	1	12	İnnovative Garden	1			
13	Virtual Photographer	1	13	Musical İnstrument	1						
14	Virtual Waterfall	1									
15	Virtual Firefighter	1									
16	Digital Musician	1									
17	Digital Garden	1									
18	E - Chief	1									
19	Magical Kaleidoscope	1									

Table 4. Social studies teachers' views on the metaphors in the technology category

Metaphor Name	Direct quotation examples
Virtual Journey	*It's like a virtual journey. Because the process of students' access to knowledge is a journey full of discoveries and adventures.* [T43]
Digital Playground	*It's like a digital playground. Because students interactively explore their learning and concepts through games.* [T98]
Virtual Guide	*It's like a virtual guide. Because technology guides and guides students and offers different ways to reach the goal.* [T102]
Virtual Laboratory	*It is like a virtual laboratory. Because the laboratory is seen as a space where students can experiment, explore and have hands-on learning experiences.* [T14]
Virtual Simulation	*It's like a virtual simulation. Because students can experience different scenarios, try to solve problems and practice through technology.* [T28]
Virtual Key	*It's like a virtual key. Because technology-assisted teaching opens the doors of the world of knowledge to students.* [T115]
Digital Compass	*It's like a digital compass. Because technology-assisted teaching can be thought of as a digital compass that guides students. This compass keeps students moving in the right direction and guides them to their destination.* [T87]
Virtual Narrator	*It is like a virtual narrator. Because the narrator tells stories to students throughout their learning process and presents the topics in a more interesting and impressive way.* [T59]
Virtual Game Box	*It's like a virtual game box. Because, students learn by having fun in the virtual world during their learning process.* [T148]
Digital Atlas	*It is like a digital atlas. Because, This atlas offers students the opportunity to explore the world, historical events, geographic regions and more.* [T150]
Virtual Book Tale	*It is like a virtual book tale. Because it gives the students the feeling of traveling on Mount Kaf.* [T4]
Virtual Picture Book	*It is like a virtual picture book. Because technology offers students learning experiences through a variety of media and resources. Students interact with different information and content as they explore the virtual picture book.* [T49]
Virtual Photographer	*It's like a virtual photographer. Because this photographer helps students capture information by looking at it from different angles and perspectives.* [T132]
Virtual Waterfall	*It's like a virtual waterfall. Because, this waterfall provides students with a constant flow of information and feeds their learning needs.* [T90]
Virtual Firefighter	*It's like a virtual firefighter. Because this firefighter intervenes in the difficulties students face in their learning process and helps them complete them successfully.* [T23]
Digital Musician	*It's like a digital musician. Because this musician offers students different learning experiences by using different instruments and melodies.* [T71]
Digital Garden	*It's like a digital garden. Because, in this garden, students gather information flowers from different sources efficiently and enrich the garden by sharing these information flowers.* [T86]
E - Chief	*It's like e-chef is like. Because, e-chef guides students through the process of combining different ingredients, using different ingredients, and finally preparing a delicious meal. Technology similarly helps students in the process of combining information and creating new things.* [T11]
Magical Kaleidoscope	*It's like a magical kaleidoscope. Because, Teachers can think of technology-assisted teaching as students experience a visually magical kaleidoscope. Technology makes learning colorful and engaging by providing students with a wide variety of content and materials.* [T72]

with Kılıç and Güven's (2009) study. Among Social Studies teacher candidates, the most preferred metaphor for the concept of environment is seen to be "life." The research aligns with the studies conducted by Meral et al. (2016), Güven and Akhan (2010) and Aydın (2010), where "life" is the most commonly chosen metaphor for the concept of "environment." The research shows that social studies teachers consider technology-enhanced instruction most suitable for topics such as "journeys" and "the universe." This suggests that technology can potentially be used to enrich learning experiences and increase students' interest in these topics. In conclusion, it underscores the importance of delivering social studies education to students in a meaningful way that can be related to their daily lives.

Finally, the sixth category is the science category. In this category, social studies teachers have emphasized the similarities between technology-enhanced instruction and life-related situations in social studies education, and they have believed that technology is as important as one's life needs in today's educational understanding. In the study by Şenel and Aslan (2014), it was found that science is generally perceived as a "Broad-Infinite Structure," "Dynamic Structure," and "Indispensable Structure," and students frequently use metaphors such as "Light," "Water," and "Life."

Table 5. Opinions of social studies teachers on the education category metaphors

Metaphor Name	Direct quotation examples
Teacher	*It's like a teacher. Because he is both a teacher and a guide.* [T133]
Educational Robot	*It's like an educational robot. Because this robot helps students in their learning process and encourages them to process information more effectively.* [T68]
Education Journey	*It's like an educational journey. Because this journey is like an adventure where students gain knowledge and skills, experience and develop. Technology is a valuable companion that helps students on this educational journey.* [T12]
Audio Book	*It's like an audiobook. Because audiobooks allow students to hear texts more quickly and effectively. Similarly, technology offers students the opportunity to acquire knowledge more quickly and effectively.* [T39]
Map	*It's like a map. Because teachers can see technology as a map for students to achieve their goals. Technology acts as a guide that guides students towards their learning goals and leads them to their desired results.* [T115]
Atlas	*It's like a virtual key. Because technology-assisted teaching opens the doors of the world of knowledge to students.* [T115]
Mind Map	*It's like a mind map. Because Students can organize, associate and organize information through technology. This helps them understand and remember better.* [T124]
Museum	*It's like a museum map. Because teachers can think of technology as a museum full of history, culture and art for students. Technology offers students the opportunity to connect with the past and interact with different cultural experiences through digital collections and exhibits.* [T149]
Class Book	*It's like a class book. Because technology can treat students like a virtual classroom guide. This guide directs students to different sources of information and materials and provides them with tips that make learning easier.* [T148]
Power Bag of Education	*It's like the strong bag of education. Because technology can be perceived as a bag that makes the educational processes of teachers and students more powerful and effective. The tools and resources included enrich learning and provide students with more opportunities.* [T110]
Educational Archeology	*It's like the archaeologist of education. Because, thanks to technology, students can go back and explore historical events, cultures, languages and other information by scraping.* [T125]
Language Translator	*It is like a language translator. Because students can better understand the content presented by the teacher and resources through technology and translate them into their own world.* [T79]
Musical İnstrument	*It is like a musical instrument. Because mastering the instrument helps students provide a balanced learning experience and properly combine different curriculum objectives. Technology enables teachers to motivate students more and create a more effective learning environment.* [T18]

Among the 255 different metaphors created by teacher candidates, the most commonly used metaphors related to science were identified as "Light," "Sun," "Water," "Ocean," "Human," and "World." In the study by Demirbilek and Atila (2021), it was found that middle school students developed 162 different metaphorical perceptions and mostly had positive thoughts about science. The most developed metaphors in this study were "Experiment" and "Invention." Kalaycı's study (2018) revealed that elementary school students generated metaphors belonging to the categories of "Dynamic Science" and "Beneficial/Instructive Science." Students generally emphasized the aspects of "knowledge, technology, intelligence, experiment, and research" in their understanding of "science." Middle school students mostly express the concept of "science" with metaphors such as "science, technology, and experiment." This indicates that students understand science more concretely and experientially (Aktamış & Dönmez, 2016). On the other hand, teacher candidates define the concept of "science" as a more abstract and broad structure. The commonly used metaphors in these definitions are "broad-infinite structure," "dynamic structure," and "indispensable structure" (Şenel & Aslan, 2014). The three most frequently repeated

metaphors by teacher candidates are "Light," "Water," and "Life." These metaphors may have been used to emphasize the importance of science and to express that it is a part of life. Bıyıklı et al. (2014) categorized metaphors related to the concept of "science" into 13 different categories. Middle school students emphasize metaphors in nine of these categories, such as "problem-solving," "dynamism," "effort," "reference source," "production," "value," "source of joy," "application," and "development criterion." The other four categories of "guide," "tool," "infinity," and "need" metaphors are used more by high school students (Bıyıklı et al., 2014). Ayvacı and Er Nas (2010) found that teachers tend to liken science to a field where certain and unchanging truths are revealed. Kuhn (2003) is likely referred to as a study explaining the concept of scientific paradigm. Dikmenli (2010) is a research showing that teachers use the concepts of science and technology interchangeably. Aslan et al. (2009) found that teachers use the concepts of science and technology interchangeably. Similar studies (Kaya, 2012; Özgelen, 2012; Saban, 2008) have detected expressions of technological progress, a country's development, and a good life in science definitions. Teachers often tend to view science as a field where specific and unchanging facts are discovered,

Table 6. Views of social studies teachers on the life category metaphor

Metaphor Name	Direct quotation examples
Journey	*It's like a journey. Because it emphasizes that the process of students' access to knowledge is a journey full of discoveries and adventures. Technology is seen as a compass that guides students through a sea of knowledge. Teachers help students determine their own learning routes, providing a personalized learning experience tailored to their interests and needs.* [T52]
Universe	*It is like the universe. Because it covered the whole world. Technology has also pervaded every part of life.* [T80]
Bridge	*It's like a bridge. Because, this metaphor states that technology functions as a bridge that helps students to establish a connection between past and present and different cultures. Teachers use technology as a tool to enrich history, geography and cultural understanding.* [T19]
Friend	*It's like a friend. Because teachers can help students discover different cultures, geographies and people by using technology as a tool. Thus, students learn and exchange information by communicating around the world.* [T124]
Film	*It's like a movie. Because technology allows students to produce and present their own learning materials using their knowledge and skills.* [T35]
Language	*It is like language. Because students can better understand the content presented by the teacher and resources through technology and translate them into their own world.* [T134]
Tunnel	*It's like a tunnel. Because, students, technology offers a journey that guides students towards new information, ideas and perspectives.* [T29]
Employee	*It is like a Employee. Because teachers see technology-assisted instruction as a tool to develop the skills students will need to be successful in their future lives and in the business world. Therefore, technology-assisted instruction is perceived as an opportunity to prepare students as innovative and competitive individuals.* [T21]
Fast Train	*It's like a fast train. Because it can be thought of as a high-speed train that transmits information quickly and effectively. Compared to traditional teaching methods, technology offers students faster access and richer resources.* [T63]
Magic Orange	*It's like a magic orange. Because this portal allows students to explore different cultures, histories, science fiction stories, works of art and more. Thanks to technology, students have an experience that satisfies their imagination and desire to learn.* [T66]
Sailboat	*It's like a sailboat. Because it sees technology as a wind in the learning journey of students. Technology is thought of as a force that accelerates students' learning processes and brings them new information.* [T139]
İnnovative Garden	*It is like an innovative garden. Because it allows a classroom equipped with technology to be likened to a garden that develops students' different thoughts and abilities. Technology encourages student engagement and creativity by enriching and diversifying teachers' traditional course materials.* [T114]

Table 7. Social studies teachers' views on the metaphor of science category

Metaphor Name	Direct quotation examples
Laboratory	*I It is like a laboratory. Because, some teachers may think of technology as a laboratory that supports students' knowledge discovery, experimentation and practice processes. Technology provides students with interactive simulations, experiment tools and learning applications, helping them to improve their knowledge and skills.* [T105]
Tree of Science	*It's like a science tree. Because each branch offers students a new piece of knowledge or skill.* [T56]
Lighthouse of Science	*It's like a lighthouse. Because, like a lighthouse, technology illuminates teachers and students in a sea of knowledge. Students find light and guidance through technology as they navigate in the dark.* [T37]
Science Super Market	*It's like a supermarket. Because students can easily access a wide range of information and resources on different topics through technology. This allows students to customize their learning experience and define their own learning journey.* [T78]
Science Power Clock	*It's like a science power clock. Because every minute presents students with a new piece of knowledge or skill. Technology can speed up the cycle of this clock of knowledge, helping students learn more in less time.* [T92]
Bag of Science	*It's like the bag of science. Because teachers design the learning environment and course content using technology. There are all kinds of tools and resources that can be found in technology.* [T31]

and they frequently use the terms science and technology interchangeably. The study shows that the concept of science is used to express technological progress, a country's development, and a good life.

As a result, this research and other similar studies indicate that students and teacher candidates generally have a positive perception of technology (Farjon et al., 2019; Tondeur et al., 2013). It has been stated that a positive perception of technology plays a crucial role in successful integration of technology into education. Such positive perceptions can assist educators in using technology effectively and providing students with better learning experiences. Metaphors are

significant indicators reflecting how educational processes are understood and perceived. Metaphors can help educators and researchers gain a better understanding and perspective of the learning and teaching processes. It is observed that students use metaphors to facilitate learning and to connect concepts in a meaningful way, and these metaphors are often based on real-life topics. Subjects such as the Social Studies River and the concept of the environment are among the preferred metaphors since they are closely related to students' lives.

This study could be an important step in understanding and enhancing social studies teachers' perceptions of technology-supported education. Technology plays a significant role in educational processes and teachers' effective use of technology can lead to a more engaging and interactive learning experience for students. In future research, bringing together social studies teachers to explore metaphors related to technology-supported instruction can help identify similarities and differences in their technology usage. These studies can assist in determining the competencies social studies teachers need to develop to be successful in technology-supported instruction, taking into account our country's education needs and available resources. This study can also contribute to defining the content and guidance for technology-supported education programs designed for teachers by the Ministry of National Education. Additionally, in future studies, using metaphors to identify social studies teachers' perceptions of technology-supported instructional practices in their classrooms can shed light on how they wish to use technology and in which areas they require more support. These data can serve as a valuable foundation for designing, planning, and implementing technology-supported instructional professional development programs. Moreover, Teacher Training for Technology Education: Special training should be provided to teachers to enable them to use technology effectively. These training programs should help teachers integrate digital tools more effectively. Increasing Student Engagement: The use of technology can encourage greater student participation. Teachers should make their lessons more appealing and interactive by using interactive digital materials and applications and involve students more. Feedback and Assessment Tools: Technology can be used to better monitor student progress and provide feedback. Teachers should use online assessment tools and digital data to track student performance. Student-Centered Approach: It is important to adopt a student-centered approach in technology-supported education. Teachers should provide customized learning experiences by considering individual student needs. Keeping Up with Current Technology: Technology is constantly evolving, so teachers should keep track of new tools and applications and be open to using them. Updating lesson materials with the latest technologies can engage students more. Collaboration and Sharing: Teachers should share their experiences in effectively using technology and collaborate with other educators. This can facilitate the sharing and dissemination of best practices. Continuous Improvement and Evaluation: Teachers should continually assess and improve their technology-supported social studies

education. They should optimize their lessons using student feedback and performance data.

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