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ORIGINAL RESEARCH

Effect of metaconceptual processes on 7th-grade students' understanding of the concepts of republic, democracy, and the state of law

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Abstract
This study explores how teaching activities that integrate metaconceptual processes impact 7th-grade students' understanding of the republic, democracy, and the state of law. Using a case study approach, the research evaluates students' current knowledge and the effects of metaconceptual teaching. The participants included four students (two girls and two boys) from a diverse public school. The selection was based on various assessments, including the Law-related Conceptual Understanding Test (LRCUT) and the Metacognitive Awareness Inventory (MAI), as well as in-class observations and interviews. The teaching methods included poster creation, concept mapping, concept cards, concept cartoons, and group and class discussions, with a focus on metacognitive processes such as awareness, monitoring, and evaluation. Findings indicate that metaconceptual processes enhance students' understanding, correct alternative conceptions, and make teaching more effective. This study offers insights into the application of metaconceptual teaching for complex concepts, demonstrating that active student participation improves comprehension and relevance to daily life. These results may help shape educational programs and teaching strategies.

Keywords Conceptual change · Metaconceptual processes · Republic · Democracy · The state of law · Social studies · Grade 7 students

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Introduction

The importance of civic education and essential learning skills in the contemporary context

In the contemporary information age, learning skills are indispensable for adequately accessing, understanding, and applying knowledge. For future success, students must develop critical thinking, problem-solving, and independent learning skills. Social studies education helps young people internalize democratic values and develop responsible citizenship. Social studies education plays a central role in this mission by preparing students to become active, informed, and responsible citizens (Barr et al., 2015). Social studies prepares students for civic activity at the local, national, and international levels by studying people, groups, systems, and their interconnections over time and space (National Council for the Social Studies [NCSS], 2023). A deep understanding of these concepts promotes active civic engagement and responsible citizenship among young people.

By integrating insights from history, geography, sociology, economics, political science, and law, social studies builds the cognitive and moral foundations needed to support democratic societies (Doğanay, 2003; Russell III, Waters & Turner, 2014; Sunal & Haas, 2011). Importantly, by examining key political concepts—such as republic, democracy, and the rule of law—students learn the principles of civic equality, accountability, and participation. A thorough understanding of these concepts fosters active civic engagement and responsible citizenship among young people. Ultimately, this education helps young people adopt democratic values and develop respect for human rights, equality, and tolerance (Ochoa-Becker, 2007; Touraine, 1997; Uslu, 2022). Therefore, ensuring students gain a deep, accurate, and enduring understanding of these core democratic principles remains a key challenge for social studies teachers and researchers.

Conceptual challenges in social studies

Like all areas of learning, social studies and civic education involve complex and abstract concepts that students frequently struggle to grasp accurately. It is widely accepted that every context can present its own specific learning difficulties. Students may develop inaccurate or incomplete understandings based on prior experiences, media, or previous schooling. Regardless of age, many students may hold concepts that conflict with scientific understanding (Wade, 1994), highlighting the need for improved conceptual comprehension in education. A solid foundation across various disciplines within social studies also enables students to tackle interdisciplinary problems effectively (Banks & Clegg, 1990).

Concepts are abstractions representing groups of objects sharing common characteristics and applying to various phenomena. They are intangible and evolve with human experience. Examples include “mountain,” “plateau,” and “desert,” with higher-level abstractions like democracy, justice, freedom, rights, and responsibilities (Fancett, 1971). Democracy, in particular, has many interpretations (Dahl, 1998) and serves as a protective barrier against the misuse of authority (Hayek, 2012).

Concepts are abstractions that represent groups of objects sharing common characteristics. They include high-level abstractions such as democracy, justice, liberty, and rights, and evolve through human experience. The inherent difficulty in learning these concepts stems

not only from their abstractness but also from their multi-layered definitions and the potential for conceptual conflict. For instance, democracy has multiple interpretations and serves as a protective barrier against the abuse of authority. The existence of multiple, sometimes conflicting, interpretations often leads to conceptual ambiguity and widespread misconceptions among students.

In this context, students frequently form alternative understandings (misconceptions) in civic and political contexts, highlighting the need for effective instructional approaches specific to these fields (Hofer & Pintrich, 1997; Strike & Posner, 1992). An alternative concept is defined as a mental model that deviates from scientifically accepted views and is based on evidence rather than merely an incorrect answer (Yakışan, Selvi, ve Yürük, 2011). Students' ontological and epistemological assumptions and experiences play a significant role in the development of alternative concepts (Hofer & Pintrich, 1997).

For example, while both the republic and democracy refer to governance by the people, their methods differ: democracy focuses on how individuals acquire power, whereas republics emphasize the public electing a head of state (İnan, 2016). The rule of law is vital for effective governance based on a limited and accountable state (Eryücel, 2013). However, the learning challenge lies in the requirement for systemic thinking, necessitating an understanding of how limited sovereignty and respect for human rights must simultaneously operate as an interconnected system. This represents a major hurdle in the social sciences, where conceptual progression requires students to move from viewing society as merely a 'sum of all individuals' towards understanding complex societal structures (such as institutions and economic systems)—a shift often resisted by value-laden and deeply-held intuitive notions (Lundholm & Davies, 2013; Vosniadou, 2013). This difficulty is amplified in social studies, where the "knowledge" itself is frequently disputed or perceived differently based on historical and cultural circumstances, thereby making the identification and evaluation of mistakes significantly harder (Milligan & Wood, 2010). In order to successfully address these alternative concepts and encourage belief revision, it is essential to comprehend students' pre-existing conceptual ecologies, which include their motives, epistemologies, and prior experiences (Kowalski & Taylor, 2024). Students undergo a conceptual change, a challenging process influenced by their experiences, when they modify their pre-existing concepts. Unless they are persuaded that a new idea is more advantageous, they are hesitant to change their opinions. Teachers engage them in relevant social studies activities to support this change (Sunal & Haas, 2011). Therefore, instruction must be intentionally designed not just to transmit scientifically accurate information, but to actively confront and destabilize these entrenched conceptual structures by presenting compelling, plausible, and fruitful alternatives.

The conceptual change model and the role of metaconceptual processes in conceptual change

While the earliest examples of alternative concept research emerged in science education, where the Conceptual Change Model (CCM) was first developed (Posner et al., 1982), this foundation is also applicable to political education. The CCM, developed to transform students' alternative conceptions, is effective in ensuring durable and accurate educational understanding.

The model suggests that learning occurs through the interaction between new concepts and pre-existing ones. Key ideas in this model include 'status' and 'conceptual ecology.' Conceptual change occurs through shifts in concept status. The four essential conditions for Conceptual Change underlying the CCM are: dissatisfaction with the existing concept, intelligibility of the new concept, plausibility of the new concept, and fruitfulness of the new concept (Hennessey, 2003).

Research on conceptual change has primarily focused on scientific domains, examining how learners' prior conceptions interact with expert knowledge (Vosniadou, 1994). However, civic and political concepts are no less complex and similarly require the transformation of deeply held, experience-based ideas. Consequently, applying conceptual change principles to social studies provides a systematic way to help learners reconstruct their civic conceptions.

According to the CCM, meaningful change occurs when learners become dissatisfied with current explanations, find new concepts intelligible, plausible, and fruitful, and integrate them into a coherent conceptual ecology (Duit et al., 2008; Hennessey, 2003; Hewson & Thorley, 1989; Posner et al., 1982; Strike & Posner, 1992). These processes encourage reflection and comparison between existing and new understandings.

Given the distinctive and resilient nature of misconceptions about political concepts, the adoption of CCM in this study represents more than a theoretical framework—it is a necessary approach. Unlike the natural sciences, alternative concepts in the civic domain are often rooted in intuitive 'folk theories,' superficial media interpretations, and cognitive shortcuts rather than observable physical phenomena. These non-scientific ideas, sometimes referred to as everyday or intuitive concepts, are deeply ingrained and often resistant to change, posing a significant challenge for educators (Legvart et al., 2022). Consequently, such deeply rooted misconceptions cannot be corrected simply by adding new information; rather, they necessitate the deliberate disruption of existing cognitive structures (Connor Desai & Reimers, 2023; Ecker et al., 2021). The conceptual misunderstandings displayed by pre-service teachers when incorporating social science disciplines into social studies content (particularly in economics, history, geography, and civics/politics) point to a critical pedagogical problem that requires identifying and correcting these misconceptions (Miftakhuddin et al., 2019). However, addressing such alternative conceptions through traditional instructional approaches often proves challenging, as these misunderstandings tend to be deeply entrenched and resistant to mere informational correction (Ferrero et al., 2020). Thus, to successfully displace these intuitive concepts, it is necessary to create a key cognitive conflict that highlights the shortcomings of the learner's current comprehension.

Ensuring the first condition of conceptual change—*dissatisfaction*—constitutes a critical pedagogical imperative. To foster this, students need to recognize how their current, shallow explanations (e.g., viewing elections as the sole criterion of democracy) fail to adequately account for complex political scenarios and contradictory situations, such as cases where elections take place but fundamental rights remain restricted. This cognitive conflict compels them to search for a new, more robust conceptual framework.

According to Gürcan (2013), Habermas (2006), and Levitsky and Ziblatt (2018), instruction based on the conceptual change approach in the civic domain allows students to progress from superficial definitions to more complex interpretations of democracy, republic, and the state of law—concepts that underpin democratic governance. The difficulty in grasping these political concepts arises from their abstract, systematic, and multi-layered

nature, which often leads students to confuse democratic mechanisms (such as elections) with core principles, conflate governmental forms (the republic) with political ideology, and equate simple legal compliance with the essential notion of government accountability (the rule of law).

Overcoming these resistant and layered misconceptions necessitates the meticulous fulfillment of the CCM's other conditions (intelligibility, plausibility, and fruitfulness). The activities designed in this study ensure that students find the new, nuanced understandings (e.g., that the rule of law involves government accountability, not just legal compliance) to be intelligible and plausible through concrete case studies, current examples, and analogies. Thus, the CCM provides a rational and structured foundation for addressing deep and contextual misconceptions in political concepts, facilitating a transition from superficial learning to lasting, critical civic understanding.

Conceptual change is influenced by cognitive, metacognitive, motivational, and emotional factors (Pintrich et al., 1993; Sinatra & Pintrich, 2003). Among these, metacognition plays a pivotal role by enabling learners to observe, evaluate, and regulate their own thinking (Flavell, 1979; Schraw, 2002). It acts as a bridge between what students know about their cognitive processes and how they apply this knowledge to manage and improve their learning. Metacognition comprises two primary domains (See Figure 1): Metacognitive Knowledge (Declarative, Procedural, and Conditional Knowledge) and Metacognitive Regulation (Planning, Monitoring, and Evaluation) (Flavell, 1979; Schraw & Moshman, 1995).

Figure 1 visually represents these components, highlighting the essential interplay between knowing and regulating one's learning strategies to optimize cognitive performance. Metacognition allows students to evaluate their current concepts and replace misconceptions with accurate knowledge (Gunstone & Mitchell, 1998). When students are aware of their thought processes, they are better equipped to understand how they learn and recognize changes in their conceptual understanding (Hennessey, 2003). For this reason, integrating metacognitive strategies into the conceptual change process is crucial (Beeth, 1998; Pressley, 2002).

Empirical studies emphasize that metacognitive awareness is vital, as it allows students to identify inconsistencies in their thinking, monitor progress, and evaluate the effectiveness of their learning strategies (Beeth, 1998; Everson and Tobias, 2002; Gunstone and Mitchell,

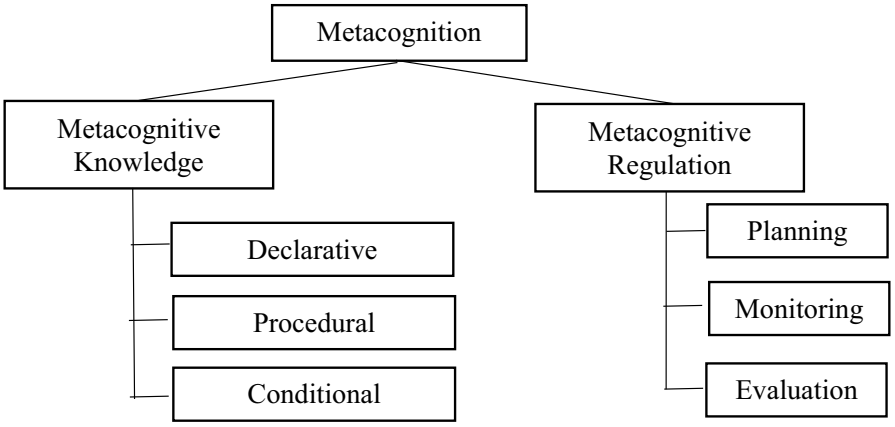


Fig. 1 Components of metacognition

1998; Hartman, 2002a, b; Hennessey, 2003) Both knowledge and experience shape these processes (Pressley, 2002), while effective control decisions depend on establishing an accurate cognitive model necessary for success (Efklides, 2009).

While metacognition broadly encompasses the awareness and regulation of one's cognitive activities, a more specific focus is required when these activities directly target conceptual understanding. In this regard, the transition from *metacognitive* to *metaconceptual* processes becomes essential, as it highlights reflective thinking that operates explicitly on learners' conceptual structures. Building on this foundation, metaconceptual processes focus specifically on the regulation and transformation of conceptual understanding (Altunsoy, Okvuran, & Yürük, 2024; Duez, 2020; Kırbulut, 2012; Nwankwo et al., 2019; Wendt & Huderson, 2020; Yurttaş Kumlu & Yürük, 2020 ; Yürük, 2005; Yürük et al., 2009 Yürük & Eroğlu, 2016; Yürük et al., 2011 Yürük, Selvi, & Yakışan, 2017). Students can better understand and manage conceptual change processes using the metaconceptual processes described by Yürük (2005). Three main categories are used to evaluate these processes: metaconceptual awareness, metaconceptual monitoring, and metaconceptual evaluation. Each step of the metaconceptual processes and their respective subcategories are shown in Table 1.

Table 1 provides a detailed summary of the main types, subcategories, and educational significance of these metaconceptual processes that are directly related to conceptual learning. Examples with real-world applicability from the Social Studies course are given after each defined metaconceptual action. Yürük (2005) summarizes the metacognitive mechanisms that play a key role in transforming students' conceptual world and making learning a conscious process under three main headings. The first of these, metacognitive awareness, involves revealing one's current or past thoughts, established assumptions, and experiences regarding a concept (p. 157). Yürük, who approaches awareness in two dimensions, classifies the learner's recognition of their current mental representation as first-order and their reflection on their previously held ideas and assumptions as second-order. Each of these two categories comprises five distinct types. First-order metacognitive awareness refers to a more dynamic form of awareness in children's cognition, focused on the current contents of their thinking (Yürük, Selvi, Yakişan, 2017). For instance, if a student asserts that population density is merely the total number of individuals in a location when asked about the idea, they are unequivocally revealing their existing cognitive understanding of population density. Second-order metacognitive awareness refers to pupils' recognition of their own thoughts and the components of the conceptual ecology that were previously established in their minds (Altunsoy, Okvuran, & Yürük, 2024). For example, if they make a cognitive reference to a former cognitive structure, indicating that they defined the idea of 'population density' in this way last week, then this implies second-order awareness.

The second process, metacognitive monitoring, is essentially a type of internal control mechanism that engages in real-time and continuously generates information about the individual's cognitive state and thought processes (p. 160). This monitoring, comprehension of concepts, consistency between new and existing concepts, commenting on the relative validity, utility, and plausibility of new and existing ideas, and adopting conceptual changes are a few examples of these activities (Yürük, 2007, pp. 306–307). Put differently, "online" and "instantaneous" procedures that produce data regarding ongoing cognitive activity, thinking abilities, or present cognitive states are referred to as metacognitive monitoring processes. For instance, if a student who is new to the subject says during a group discussion

Table 1 Steps of metaconceptual processes and their subcategories.(Adapted from Yürük, 2005)

Metaconceptual process	Definition	Subcategories	Importance
Metaconceptual Awareness	It creates cognitive conflicts that facilitate the adaptation of individuals' existing knowledge or cognitive structures and promotes conflict resolution.	• First-Order Awareness: Students recognize their current knowledge. • Second-Order Awareness: Students recognize the ideas they held in the past. • Sub-Activities: Mental models, ideas, and concepts.	It requires students to perceive their activities in the learning process consciously and helps them understand their assumptions and beliefs.
Metaconceptual Monitoring	It involves individuals continuously observing and evaluating their cognitive processes.	• Monitoring Understanding: Tracking the understanding of an idea. • Monitoring the Consistency of Ideas: Observing the consistency between new and existing ideas. • Monitoring Idea Change: Tracking changes in students' ideas.	It allows students to track changes by comparing their current and past ideas.
Metaconceptual Evaluation	It involves students evaluating conflicts between different concepts and making decisions based on their assessments.	• Commenting: Making comments on the plausibility or effectiveness of an existing or new idea. • Finding Attractive: Explaining why an idea seems appealing, credible, or valuable. • Defending: Choosing an idea among different options and defending why this idea is superior to the others.	Students select an idea from several options and try to explain why it is superior to the others.

on population density that they only make a connection between the total number of people rather than the concept of population density on the map and the area, they are referring to their initial thoughts.

The third and final category, metacognitive evaluation, is the stage where students arrive at a judgment, that is, make a decision, between competing alternative ideas. At this critical stage, students compare the logical and practical value of the competing ideas and support their choices with reasons (Yürük et al., 2009). This component discusses the idea, offers

personal interpretations, and allows the learner to choose and defend one of several concepts. For example, initially Elif argued that City B (with a larger population) was more densely populated, while Yağız proved based on the formula that City A (with a smaller population but a smaller area) was more densely populated. After listening to the calculations and Yağız's reasoning that 'density does not only mean crowdedness, but also crampedness,' Elif admits that her initial idea is not useful. This case illustrates how metacognitive examination has led to conceptual change. In summary, these three processes—knowing one's existing and past understanding (Awareness), continuously monitoring changes in one's understanding (Monitoring), and defending the most robust solution along with its reasons (Evaluation)—come together to enable students to consciously manage their journey of learning complex concepts.

Metaconceptual teaching and its application in social studies

Metacognitive teaching emphasises guiding students to consciously regulate their conceptual understanding by becoming aware of, monitoring, and evaluating their own thoughts. As defined by Yürük (2005), 'metacognitive processes refer to the conscious organisation of one's conceptual understanding through awareness, control, and evaluation of conceptual change' (p. 87). Within this framework, metaconceptual teaching aims to correct students' alternative concepts and, crucially, help them consciously reflect on how and why their conceptual structures change during learning.

At this point, a three-stage test was first used to determine students' alternative concepts of democracy, republic, and the rule of law. Subsequently, the teaching processes were carried out using a combination of teaching tools designed to externalise students' internal conceptual structures. In particular, concept cartoons have been used to elicit students' initial alternative concepts and to encourage cognitive conflict. This was followed by a daily journaling exercise to encourage continuous monitoring and reflection on conceptual progress. Additionally, students participated in concept mapping and group poster preparation activities to facilitate the comparison of their old and new conceptual understandings, which enabled them to consciously select and reinforce the correct concepts and reasoning. The entire teaching process has used these tools sequentially and cyclically to ensure continuous metacognitive engagement. Throughout the intervention period, these structured activities were further supported by consistent small group and class discussions and concept-focused teacher guidance to ensure that students' developing conceptual understanding was continually articulated and evaluated. When embedded in civic instruction, this metaconceptual process helps learners articulate prior conceptions of democracy, republic, and rule of law; confront inconsistencies; and adopt reasoned, coherent understandings. Social studies education fosters long-lasting conceptual change by assisting students in integrating cognitive, metacognitive, and metaconceptual thought. Furthermore, it fosters a commitment to constitutional ideals and democratic consciousness (Levitsky & Ziblatt, 2018; Ochoa-Becker, 2007; Uslu, 2022). This approach is critical in social studies, where the goal goes beyond merely imparting knowledge to include developing students' critical and reflective thinking abilities and preparing them for informed citizenship (Burgos-Videla et al., 2025). Importantly, this approach guarantees the development of the cognitive flexibility required for responsible decision-making and successful democratic discourse by encouraging the explicit knowledge of their own conceptual constraints.

The purpose of the study

The primary goal of this study is to thoroughly evaluate the potential and effect of metaconceptual teaching activities in correcting alternative conceptions that 7th-grade students have about fundamental social studies concepts, such as the "modern state" (Republic, Democracy, and the State of Law).

Due to the abstract nature of social studies concepts, alternative conceptions or incomplete understandings frequently arise among students, posing obstacles to future learning and leading to problems in conceptual retention. This persistent issue creates a distinct need for instructional models that move beyond traditional information transmission.

Metaconceptual teaching has the potential to effectively address this specific challenge in political education, as these complex concepts (republic, democracy, and state of law) require students to recognize and negotiate multiple, and often conflicting, conceptual frameworks (e.g., textbook definitions versus everyday understandings). In this context, the potential of metaconceptual teaching lies in processes that enable students to consciously manage their conceptual understanding (awareness, monitoring, and evaluation). This approach enables students first to become aware of their own alternative conceptions (metaconceptual awareness), then monitor new and correct information in a way that prevents it from being mixed with old alternative conceptions (monitoring), and finally select the most appropriate social studies concept from among different understandings (evaluation), thereby aiming to increase both the effectiveness and permanence of conceptual change.

Below is an explanation of how the sub-objectives of the research are shaped within the context of this purpose:

1. What is the nature of students' prior conceptions regarding the concepts of *republic*, *democracy*, and *state of law* before the implementation of metaconceptual teaching activities?
2. How do metaconceptual teaching activities influence students' conceptual understanding of *republic*, *democracy*, and *state of law?*

Thus, the study aims to empirically test the power of metaconceptual teaching in eliminating alternative conceptions and ensuring lasting learning in the field of social studies.

Method

This section addresses the research model, participants, data collection tools, and data analysis tools.

The design of the study

This study uses a case study approach, a qualitative research method that focuses on specific instances rather than broader methodologies (Stake, 2005). According to Woodside (2010), case studies aim to explain, understand, predict, or investigate individual control in various contexts, including processes, organizations, and cultures. Historically, case studies were significant in early social sciences research (Given, 2008). This method allows for in-depth

exploration of events that cannot be controlled by the researcher and is characterized by 'how' and 'why' questions (Yıldırım & Şimşek, 2021). Thus, this case study is descriptive and explanatory rather than confirmatory.

Participants

This study was conducted with 7th-grade students attending a public school located in a cosmopolitan area in Ankara, Türkiye. The study used the principle of maximum variation for participant selection (Patton, 2015) to ensure a wide range of alternative concepts. The next step is to evaluate the diversity and organization of students' metaconceptual activities and their effectiveness in addressing alternative concepts. Metaconceptual teaching activities were implemented in two classes taught by the same teacher.

To evaluate the participants, several tools were utilized. The researchers administered a conceptual understanding test to evaluate students' comprehension of social studies concepts. Furthermore, a metacognitive awareness inventory was utilized to determine their levels of metacognitive awareness. To assess their dispositions toward the subject, an attitude scale specific to social studies was applied. Complementing these quantitative measures, weekly classroom observations and the classroom teacher's feedback provided qualitative insights into the students' engagement and learning behaviors.

Based on the data collected from these instruments and teacher feedback, the participant pool was reduced from eight students to four main participants. This reduction was made to focus the case study on students who exhibited the most variation in their conceptual understanding and metacognitive awareness. The selection process also ensured a balanced representation of gender and age among the participants.

To adhere to ethical guidelines, the students chose pseudonyms to protect their identities. This measure ensured the confidentiality of the participants and upheld ethical standards throughout the study. The demographic and evaluative details of the final participants are presented in Table 2, showcasing their diversity in conceptual understanding, metacognitive awareness, and attitudes toward social studies.

The study examined the habits and behaviors of students, both inside and outside the classroom, using questions designed to understand their learning practices and preferences. For example, participants were asked: "*How do you use what you hear in class to study later*?" "*Where do you usually sit in the classroom*?", *"Where do you usually study at home—do you have a dedicated desk or shared space?"*, "*Which subjects do you enjoy studying the most*? *Can you rank them for us*?" "*How do you organize the concepts you learn in social studies*?" and "*Which activities in social studies class do you enjoy the most*, *such as group projects*, *storytelling*, *or presentations*?" The responses, summarized in Table 3, provided valuable insights into the students' metacognitive processes and their approaches to learning.

Details about the data collection tools used to create the dataset under review are presented below.

Data collection

This study employed a variety of data collection tools to qualitatively support the quantitative data obtained from the conceptual understanding test, attitude scale, and metacognitive awareness inventory related to social studies concepts. These tools included open-ended

Table 2 Characteristics of the participants

Class	Participant	Sex	Age	Conceptual understanding test pre-test (Correct/Incorrect Numbers)		Point	Metacognitive awareness inventory	Level	Attitude scale score
A	Ferhat	M	13	12	33	27	207	Middle	114(4,07)
A	Tuba	F	13	19	26	42	167	Bottom	89(3,17)
B	Tuana	F	14	19	26	42	237	Top	122(4,35)
B	Arda	M	13	20	25	44	159	Bottom	110(3,92)

Note: The maximum score for the conceptual understanding test is 100 (Class average: 48.75). The maximum score for the attitude scale related to the concepts learned in social studies is 140(5.00) (Class average: 3.94). The maximum score for the Metacognitive Awareness Inventory is 265

Table 3 Qualifications of participants

Participants	Ferhat	Tuba	Tuana	Arda
Features	Listens to the lessons carefully and uses summaries Front row Studies at his bedroom desk Writes concepts on small papers and sticks them to his wardrobe Prefers writing for mathematics Uses different methods for English Find metaconceptual activities like concept cards and maps helpful	Moderate-level student Third row Shares a room with her sister; studies at her desk Underlines and re-reads material Group projects, especially making posters about Atatürk's sayings	Summaries and regular studying Listens attentively, asks questions, enjoys storytelling Back row Shares a room with her sister Ranks social studies second after mathematics Enjoys social issues, group work, and presentations	Review notes and textbooks Not academically strong; gets distracted in class Second row Values learning history Ranks social studies third (after English and Math) Enjoys concept cartoons and poster-making

questions, semi-structured interviews, documents, and visual materials collected during in-class activities. Various qualitative methods were utilized to analyze students' conceptual understanding and metacognitive processes, such as group and class discussions, interviews, visual data, journaling, poster preparation, concept maps, and observations.

In this section, the use of semi-structured interviews and visual data is discussed in detail. Other qualitative data collection methods, including journaling, poster preparation, concept maps, and observations, are comprehensively explained in the metaconceptual teaching activities section.

Interviews

Interviews are a qualitative tool used to understand participants' experiences and perceptions. Semi-structured interviews include predetermined questions and additional ones based on responses. In this study, we evaluated students' understanding of legal topics and sought to uncover their in-depth thoughts.

Photographs and Videos

Visual data enriches the research context, enabling detailed analyses. This study utilized video recordings to explore students' metaconceptual teaching processes during class activities. The videos were reviewed multiple times, supporting the ethical collection of visual data with permission.

Implementation of metaconceptual teaching activities

The metaconceptual teaching activities implemented in this study were designed to support students' conceptual learning while simultaneously activating their metaconceptual processes, enabling them to think about, monitor, and evaluate their conceptual systems.

The metaconceptual nature of the activities is directly based on Yürük's (2005) metaconceptual teaching framework. This framework states that students must actively engage in three basic metaconceptual teaching activities—metaconceptual awareness, metaconceptual monitoring, and metaconceptual evaluation—to achieve a significant conceptual restructuring in learning. Metaconceptual awareness: The student's awareness of their current (present and previously held) concepts, related beliefs, experiences, and ontological/epistemological presuppositions. Metaconceptual monitoring: This involves understanding the new concept, checking for changes in their ideas and the consistency/inconsistency between the new concept and existing concepts, monitoring changes in their ideas, and providing examples of the monitoring process. Metaconceptual evaluation involves making judgmental decisions by evaluating conflicting concepts in terms of reasonableness and usefulness. It argues that one idea works better than others when explaining a particular concept among different options.

Implementation Details

This research was conducted in one group and two branches. Metaconceptual activities aimed to activate students' metacognitive processes. The process was conducted by the same teacher in both branches. Metaconceptual teaching activities such as poster prepa-

ration, journaling, concept maps, concept cartoons, and cards were used. These activities highlighted students' preconceptions and encouraged active participation and deep conceptual understanding by involving them in various activities.

During the preparation of these activities, the opinions of a language specialist, a subject specialist, two subject education specialists, and two subject teachers were sought. Consultations regarding the activities continued with the class teacher throughout the implementation period. The activities were limited to the time periods specified in the curriculum (four weeks).

Metaconceptual teaching activities

Elements designed to prompt the questioning of metaconceptual knowledge and activities were integrated into the specified tasks. Accordingly, Table 4 is developed to present a consolidated display of the activities conducted during the research process, emphasizing the concepts of Republic, Democracy, and State of Law.

During the research, activities addressing the concepts of the republic, democracy, and the state of law were implemented, with activity sequences intentionally non-linear. The initial activity, "Let's Think About Concepts and Their Features", involved independence, sovereignty, democracy, and constitutionalism. Students were instructed to write paragraphs analyzing at least eight of the sixteen concepts, discuss their work with peers, and collaboratively select the best responses. The teacher facilitated metacognitive reflections by providing prompts for analysis, which students recorded systematically in journals under guided supervision. Journals provided insights into students' thoughts and metacognitive processes, helping introverted students practice these skills, offering reminders, and fostering self-reflection. Examples of journal prompts included: "What did you do in this activity?" and "How does your opinion differ from that of your teacher, textbook, or classmates?". This research analyzed student journals kept during metaconceptual activities to assess their reflections and metacognitive engagement. In this regard, the 'Let's Think About Concepts

Table 4 Information on metaconceptual teaching activities

Name of the event	Concepts included	Metaconceptual activities
Let's Think About Concepts and Their Features	Republic, Democracy, State, and Right	Group discussions Class discussions Writing a journal
What Are the Hidden Concepts in Atatürk's Words?	Republic, Democracy	Group discussions Poster preparation Class discussions Writing a journal
Concept Maps Speak and Let's Pass a Law!	State of law, Legislative proposal	Group discussions Concept maps Newspaper clippings Class discussions Writing a journal
Cartoons Finding Meaning in Concept Cards	Republic, Democracy, Constitutionalism, Monarchy, Oligarchy, and Theocracy	Group discussions Concept cartoons Concept cards Class discussions Writing a journal
Let's Conduct an Interview	Concepts used during the activities	Conducting an interview

and Their Characteristics' activity guided students first to reach metaconceptual awareness of what they knew and then engage in metaconceptual monitoring by comparing this with other sources.

The second activity, "What Are the Hidden Concepts in Atatürk's Words?" involved group preparation of concept posters based on Atatürk's sayings. Conducted in a small meeting room, groups of five to six students defined a chosen concept, highlighted its significance and related ideas, and incorporated visuals, cartoons, acrostics, and slogans. Poster activities enhanced students' conceptual awareness and facilitated collaborative learning. In groups, students created posters on specific concepts and presented them in class, allowing them to observe their conceptual changes and reflect on the rationale behind their revisions. Posters were presented and evaluated using set criteria, and the best was selected by vote. Following a second review, students justified their revisions. Then, students documented metacognitive processes in their journals, reflecting on their evolving understanding of the concepts. The researcher alternated between stabilized and handheld camera shots to capture all groups, while each group used a voice recorder to document purposeful dialogues. This poster activity enabled students to gain metaconceptual awareness by first externalising their concepts, engage in metaconceptual monitoring of their conceptual changes through presentations and journals, and actively utilise the metaconceptual evaluation process by justifying their revisions.

The third activity, combining "Concept Maps Speak" and "Let's Pass a Law!", focused on legislative and executive concepts and the qualities of the state. Students were tasked with identifying relationships between these concepts using concept maps. Concept maps are visual tools that help students understand the relationships between concepts. They enhance conceptual understanding and facilitate comparisons among classmates, enabling better organization of thoughts. Working initially on blank templates, they refined their maps through individual adjustments and discussions, first with seatmates and then in small groups of three to four, fostering collaborative analysis and deeper conceptual understanding. Additionally, a predetermined law was enacted by class vote, simulating a parliamentary process. Students explained the concept maps to their groups, compared them with their classmates, and evaluated differences by examining news clippings from various newspapers. Under the teacher's supervision, an enlarged concept map was filled out with class participation, and the types of metacognitive processes were recorded in the students' journals. This activity enabled students to intensively utilise metaconceptual monitoring processes by continuously comparing their concept maps and understanding with their peers, and metaconceptual evaluation processes by assessing differences through law-making simulations and news clippings.

The fourth activity, "Cartoons Finding Meaning in Concept Cards," included the concepts of republic, democracy, constitutionalism, monarchy, oligarchy, and theocracy. Students were divided into groups of 5–6 and were presented with cartoons related to these concepts. Concept cartoons encourage students to question their understanding and experience cognitive conflict. In this study, students created concept cards based on the cartoons and presented them in class, which deepened their understanding and increased interaction. Each student interpreted their cartoon, assuming roles such as scientist, teacher, or historian. Individual cards were prepared and shared with group mates; then, group cards were created and presented to the class. Ideas were compared, and the best explanations for the cartoons were discussed. This activity enabled students to utilise their metaconceptual evaluation

processes to the fullest extent through the cognitive conflict generated by concept cartoons and role-based discussions. It also deepened their metaconceptual monitoring processes through the sharing of cards and the comparison of ideas.

The fifth activity, "Let's Conduct an Interview", involved students selecting one of the concepts and conducting interviews with their parents or elders. These interviews were shared in class, extending the learning process beyond the school environment. This final activity enabled students to engage in metaconceptual monitoring by comparing the information they obtained from family and social sources with their own conceptual frameworks, and utilise metaconceptual evaluation processes by assessing the plausibility of concepts in different contexts, thereby extending the learning process beyond the school environment.

Common Elements Supporting Metaconceptual Teaching

In this study, all activities incorporated observation, journal writing, group discussions, and class discussions to support metaconceptual teaching. Systematic observations provided in-depth insights into in-class activities and student behaviors.

- **Discussions**: Small groups of two to four people encouraged peer assessment and a deeper understanding of different perspectives by discussing specified situations (Bohnsack, 2004). Classroom discussions revealed prior knowledge (Grant & VanSledright, 2001), encouraged critical thinking, and facilitated conceptual change by addressing gaps in understanding (Sinatra, 2002).
- **Teacher Guidance**: Concept-focused discussions under teacher guidance have enhanced learning outcomes by integrating individual and group activities. Discussion prompts used by the teacher, such as 'Can you explain what you mean by …?', 'Why do you think that?' and 'Do you agree with your group's idea?', encouraged students to express their thoughts clearly, reflect on their learning processes and evaluate different perspectives, thereby supporting deeper conceptual engagement.

Data analysis

This study utilized Creswell's (2012) six-step process for qualitative data analysis to systematically interpret the data collected from various sources. The initial phase involved preparing and organizing the data, including transcribing interviews, coding responses from open-ended tests, and compiling observation notes along with supplementary materials such as journals, documents, and video recordings. This comprehensive preparation ensured the data were ready for a detailed and structured analysis.

The exploration phase began with iterative readings of the data, followed by coding significant text segments based on their meaning. Using Yürük's (2005) classification of metaconceptual processes as a guiding framework, these codes were systematically grouped into broader themes. The themes represented key metaconceptual activities and conceptual changes, categorized as Alternative Concept (AC), Lack of Knowledge (LK), and Scientifically Accurate Understanding (SAU) with different colors. These classifications provided a lens for understanding the participants' learning processes. Accordingly, the data were analyzed using content analysis techniques.

The results were represented through visual aids such as comparative tables, which highlighted the relationships between data sources and the identified themes. These representations clarified how specific metaconceptual processes contributed to shifts in participants' conceptual understanding. By focusing on the dynamics of learning and change, the study provided a nuanced view of the interaction between cognitive processes and educational content.

Finally, the findings were interpreted within the context of social studies, specifically focusing on participants' understanding of the modern state's foundational elements. The study emphasized the importance of metaconceptual processes in driving conceptual change. To ensure the credibility of the study, strategies like data triangulation and member checking were employed.

This process aimed to reveal the changes in participants' conceptual understanding of the foundations of the modern state in social studies and the relationship of these changes with metaconceptual processes. The coding criteria for the nature of conceptual change and metaconceptual activities are shown in Table 5.

Validity and trustworthiness strategies

There are various strategies to ensure the validity and reliability of qualitative research. These strategies require the ethical conduct of the research and aim to ensure the accuracy of findings and interpretations during the data collection and analysis process (Creswell, 2012; Merriam, 1998; Strauss & Corbin, 1998). The efforts made in this research to ensure validity and reliability are summarized in Table 6 below:

These strategies enhance the validity and reliability of the research, thereby ensuring the trustworthiness of the findings. The methods and techniques employed in the study are based on practices that are well-established in the literature.

Table 5 The nature of conceptual change and metaconceptual activities

		The nature of conceptual change		The nature of metaconceptual activities			
		Pre-test/Pre-interview	Post-test/ Final Interview	Awareness		Monitoring	Evaluation
Participant name	MAI			First degree	Second degree		
A	Upper	Scientific Accuracy (SA)	Alternative Concept (AC)	A1	B1	C1	D1
B	Middle	Lack of Knowledge (LK)	Extended Scientific Accuracy (ESA)	A2	B2	C2	D2
C	Upper	Factual error (FE)	Partial Scientific Accuracy (PSA)	A3	B3	C3	
D	Lower			A4	B4	C4	
	Upper			A5	B5	C5	

MAI: Metacognitive Awareness Inventory, Note: Abbreviations used to describe the nature of metaconceptual activities are listed below (see Appendix A:

Findings

This section examines how the students in the study understand the basic concepts of the modern state (republic, democracy, and the state of law) and how they engage in metaconceptual teaching activities. The metaconceptual teaching activities implemented within the scope of this study aimed to deepen the participants' conceptual understanding. The subproblems underlying this examination were combined under a single framework to conduct a comparative analysis.

Conceptual understanding before and after metaconceptual activities related to the concept of the republic

In this section, the participants' understanding of the concept of "Republic" was evaluated. Table 7 presents the conceptual understanding and nature of the metaconceptual activities related to the concept of "Republic" among the study group.

An examination of Table 7 reveals that the conceptual understanding of the term "republic" among the four participants in the group in which metacognitive processes were applied differed before and after the metaconceptual teaching activities. These participants replaced their alternative ideas with scientifically accurate views following the activities. The remaining participant replaced their alternative concepts with scientifically accurate ones. The results, reflecting the students' conceptual understanding of the "republic" concept, are summarized in Table 8, both before and after the activities.

When Table 8 is examined, the participants' statements in the metacognitive processes group demonstrate their conceptual understanding of "republic." After the activities, the group members' metacognitive processes better understood the relationship between the Republic and democracy and indicated that the concept is linked to national sovereignty. These findings suggest that metaconceptual activities are practical in developing students' conceptual understandings. It was observed that students in the group where metaconceptual activities were actively implemented had conceptual meanings of the Republic that were closer to scientific truths. At this stage, various metaconceptual monitoring and evaluation aspects focus on first- and second-degree metaconceptual awareness (see Table 8).

Metaconceptual processes related to the concept of the republic

This section demonstrates the nature of the metaconceptual processes following activities related to the concept of "republic" by students in the study group. Tuana participated in the study by displaying significant metaconceptual processes through various activities. These activities included group discussions, poster creation, reflective journaling, and poster preparation. In the third activity, Tuana and her group created a poster reflecting the concept of the Republic. This task allowed Tuana to compare her ideas with those of her peers and revise her understanding to view it. To delve deeper into the concept,

Researcher: What is a republic?

Tuana: "*I think it's "a form of government where sovereignty belongs to the people*."

Researcher: How did you come to this understanding?

Table 6 Efforts to ensure the validity and reliability of the research

Criteria	Conducted studies
Confirmability	• Prolonged engagement and preliminary observations were conducted to ensure objectivity during the data collection and analysis. • Data triangulation was employed, utilizing diverse data sources, including semi-structured interviews, diaries, activity materials, video recordings, and observation notesto achieve variety. • In this study, the data set was analyzed twice, and 10% of the data were reviewed by field experts as part of the verification strategies. • As a result of expert reviews, the consistency rate for the data reporting process was found to be 98.3%.
Credibility	• To ensure internal validity, the researcher initiated the data collection process with preliminary observations conducted a term in advance and employed data triangulation using information gathered from various sources. • According to Merriam (1998), triangulation involves using multiple researchers, diverse data sources, or different methods to verify findings. • The data types utilized in the study include diaries, semi-structured interviews, activity materials, in-class video recordings, and observation notes. • Detailed descriptions were provided in the research to remain faithful to the raw data, and the member-checking method was employed. • This method allowed participants to express their perspectives, ensuring alignment between what the researcher interpreted and what the participants intended to convey (Merriam, 1998).
Transferability	• To ensure external validity, methodological triangulation was employed in the study. This approach involves examining the same research question using different methods and data types (Fraenkel et al., 2011). • Additionally, environmental and theory triangulation were utilized as other forms of triangulation within the research. • Through detailed descriptions, a comprehensive understanding of the research setting was provided, enabling readers to gain a holistic perspective (Lincoln & Guba, 1985).
Consistency	• To ensure interrater reliability, six experts independently re-coded the data, and the agreement index was calculated to measure the consistency between coders. • In this process, multiple coders analyzed the same data set, and reliability coefficients were computed to assess the level of agreement. • The calculated interrater reliability demonstrated that the results met the acceptable threshold for consistency, indicating robust and dependable findings (Neuendorf, 2002).

Table 7 The nature of conceptual understanding and metaconceptual activities related to the concept of the republic among the study group students

Concept		Nature of Conceptual Change		Nature of Metaconceptual Activities														
Republic				Awareness										Monitoring					Evaluation
		Pre-test/	Post-test/	First Degree					Second Degree										
Name of Participant	MAI	Preliminary Interview	Last Interview	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D
Tuana	Upper	AC	SA	√3	√3	√3 5		√3	√3 5					√3. 5	√3 5	√3		√3	√3 5
Ferhat	Middle	AC	SA	√1.3					√3						√1	√1		√3	√1
Tuba	Bottom	AC	SA	$\sqrt{}^{13.5}$					√3					√1	√3 5	√3		√3	√3
Arda	Bottom	AC	SA	√3 5					√1 3		√1			√1	√1 3			√3	$\sqrt{}^{13.5}$

Table 8 Participants' ideas about the concept of the republic before and after the activities

Student name	Ideas before the events	Ideas after the events
Tuana	The concept of the republic has been evaluated within the framework of democracy. Responses such as "When I think of the republic, the first thing that comes to mind is Atatürk because, after all, it was Atatürk who introduced the republic", and "The republic is the self-governance of the nation" were provided.	The participant has developed the ability to question and differentiate the concepts of republic and democracy. They articulated this by stating: "The republic was the form of government, while democracy was its method of implementation," thereby expanding the conceptual understanding. Additionally, they incorporated the concept of "national sovereignty" into the relationship between the republic and democracy.
Ferhat	The concept of the republic has been assessed through the lens of freedom and rights. Statements such as "The abolition of the sultanate and the clearer recognition of our rights" and "People electing a leader" were expressed.	The participant defined the concept of the republic as a form of government and related it to democracy. They expressed this by saying: "The republic is a form of government, democracy is about everyone having equal rights," and "The republic is the people governing themselves."
Tuba	The concept of the republic has been interpreted as synonymous with democracy. The statement "The people governing themselves" conveyed this view.	The participant has gained a deeper understanding of the concept of the republic and emphasized its relationship with democracy. They expressed this by saying: "The republic is a form of government, democracy is its method of application," and "National sovereignty and democracy are linked to the republic."
Arda	The concept of the republic has been evaluated within the framework of rights and participation. The statement "The republic is about people's participation; democracy is about people's rights" articulated this perspective.	The participant has evaluated the concept of the republic from a broader perspective. They expressed this by saying: "National sovereignty exists both within the republic and in democracy," and "The people governing themselves, and everyone having equal rights."

Tuana: "*I had the chance to revise my ideas after discussing them with my peers*."

This exchange illustrates how mental models in this social learning environment initially engaged with first-level ideas and concepts during the activity. At a metaconceptual level, students demonstrated awareness and made evaluations (A1 and D). Tuana, for example, emphasized the importance of the concept:

Tuana: "*The importance of the concept is that the Republic, above all, is the form of government of our state. The concept of the Republic is important because we, the people, determine it*."

Tuana also tracked changes in her understanding by integrating input from peers and other sources. In her journal, prompted by the question *"Do you think your groupmate's ideas are believable? Explain*," she reflected:

"*When we first raised the question about the republic, our opinions were the same. However, when Tuna and Kutlu prepared the presentation, İrem and Şeyma argued that the answer to our question was democracy, while I maintained that it was the republic*" (A1, B1, C2 and C5).

Throughout this data segment, Tuana tracked the development of her ideas and displayed rich thinking patterns involving first- and second-level categories of metaconceptual awareness. Additionally, Tuana provided data regarding the metaconceptual evaluation dimension. A data segment reflecting this is when Tuana said,

From the journal: Whose opinion of the group members explains the situation better? Can you explain why?

Tuana reflected: "*İrem's. Because we worked very thoroughly on the concept of the republic during this period, emphasizing it repeatedly*" (C2 and D).

This response demonstrates both metaconceptual monitoring and metaconceptual evaluation processes. Following the instructional activities, Tuana replaced her alternative ideas with scientifically accurate ones, integrating them through metaconceptual processes.

Initially, Ferhat exhibited a limited understanding of the concept of the republic. However, through his participation in various activities during the study, he was able to deepen his conceptual knowledge. Evidence of Ferhat's metacognitive progress is seen in his ability to track changes in his understanding by comparing his initial and later interpretations of the Republic. For instance, in his worksheet data, Ferhat articulated:

"*The republic came after the era of the pashas. The pashas were inherited from father to son, but we elect our president. This shows that we have rights. The Republic is a state. Every person has rights. These rights include voting, traveling, buying, and receiving an education*" (A1).

In the dimension of metaconceptual monitoring, Ferhat stated:

"*Whatever I think, my friends agree with me. I also agree with them on the correct concepts. For example, Republic, democracy, rights, responsibilities, duties, censorship, independence, sovereignty, and freedom*" (C2 and C3).

In addition to integrating information and concepts from others or external sources, Ferhat also considered the consistency of new concepts with his existing knowledge. Furthermore,

after the activities, during group and class discussions, he explained his decision to choose a particular concept from among alternatives, stating:

> Ferhat: "*I think the same things. Because we all wrote similar things. But my friend İrem's thought explains the situation better*" (A1, C2, and D).

From a different perspective, while Ferhat was revising his alternative understandings of the concept of the Republic, he also highlighted the nature of the metaconceptual processes involved.

Tuba defined the Republic as "the people governing themselves" and emphasized that individuals have the right to freely choose and be chosen in this form of governance. As a result, like Tuana, Tuba articulated high-level ideas regarding the concept of the republic and created a poster reflecting sophisticated metaconceptual processes. Following this interim evaluation, an examination of the metaconceptual monitoring component reveals that Tuba referenced nearly all stages of this process. For example, she stated:

> Tuba: "*Regarding the concept of the republic, we believe that the republic is the people governing themselves. When we explained our ideas, we thought this was the case, and we made this explanation. There is no difference between our ideas*." (C2 and C3).

Additionally, Tuba explained that she employed a method of tracking the development of her concepts by comparing the participants' initial and final thoughts in a table. In this context, Tuba selected a concept different from that of the group and, within the dimension of metaconceptual evaluation, clearly articulated why she chose it:

> Tuba: "*Nimet explained all our thoughts better*."

From the perspective of metaconceptual processes, Tuba's high-level ideas continued to evolve as she replaced alternative ideas with scientifically accurate ones. This process exemplified both conceptual change and the collaboration of metaconceptual processes.

When examining Arda's thoughts on the concept of the "republic" within the context of metaconceptual processes, it is evident that he demonstrates awareness, monitoring, and evaluation of his understanding. These data suggest that he is conscious of both his previous and current understanding of the "republic." For instance, he stated:

> Arda: "*What it is like management through the republic, voting, equality. Examples: republic, voting, equality, elections. What it is not is a monarchy, i.e., passing from father to son. Examples: Monarchy, non-democratic countries, the Ottoman Empire*." (A1).

A passage from Arda's journal further illustrates his awareness:

> Arda: "*I used to think that republic and democracy were the same thing. Similarly, rights, responsibilities, and duties are different*." (B1).

This demonstrates that Arda was aware of his prior preconceptions at a second-degree level. Furthermore, he actively monitored concepts and conceptual changes from other sources and individuals, indicating that he understood the concept at a metaconceptual monitoring level. A data segment exemplifies this scenario:

> Arda: "*Başak's because her social skills are good and her explanations are clear*." (C2 and D).

In addition to monitoring the changes in his understanding of the concept of the republic, Arda also participated in activities within the metaconceptual evaluation category. Overall, when evaluating the data provided by participants in the metacognitive processes group concerning the concept of the Republic, a linear trend in metaconceptual processes emerges.

Conceptual understanding before and after metaconceptual activities related to the concept of democracy

In this section, the participant's understanding of the concept of "Democracy" was evaluated. Table 9 presents the conceptual understanding of the "Democracy" concept and the nature of the participants' metaconceptual activities.

When Table 9 is examined, it can be seen that after the metaconceptual teaching activities were implemented, all group members replaced their previous alternative understandings of the concept of "democracy" with information based on scientific facts. At this stage, the group members who participated in the metaconceptual teaching activities exhibited the intended characteristics regarding the quality of their conceptual understanding of democracy. The students' conceptual understandings of "democracy" before and after the activities and the conclusions reflecting their ideas are summarized in Table 10.

When Table 10 is examined, the participants' statements from the metacognitive processes group reflect their conceptual understandings of "democracy." The findings show that the participants in the group members' metacognitive processes had significant changes and developments in their understanding of democracy after engaging in upper-level conceptual activities. Notably, the conceptual understandings of Tuana, Ferhat, Tuba, and Arda became more scientific and comprehensive after the activities. These findings emphasize the effects of democracy education on participants and the importance of upper-level conceptual activities in conceptual understanding. More comprehensive upper-level conceptual activities are needed for the participants to deepen their conceptual understandings and reach scientific truths.

Metaconceptual Processes Related to the Concept of Democracy

In this section, the nature of the upper-level conceptual processes of the students in the study group regarding the concept of "democracy" is demonstrated following the activities. Tuana exhibited her upper-level conceptual activities related to the idea of "democracy" in various activities (Activities 1, 3, and 5). These activities indicate that Tuana had high-level thinking, ranging from awareness of her ideas about democracy to evaluation. Tuana developed awareness regarding the differences between her current and past conceptual understandings of democracy. She expressed this awareness in the classroom activity video recordings,

Table 9 The nature of conceptual understanding and metaconceptual activities related to the concept of democracy among the study group students

Concept		Nature of Conceptual Change		Nature of Metaconceptual Activities															
Democracy				Awareness										Monitoring					Evaluation
		Pre-test/	Post-test/	First Degree					Second Degree										
Name of Participant	MAI	Preliminary Interview	Last Interview	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D
Tuana	Upper	AC	SA	√1 3		√ 35			√135					√135	√135			√1 3	√1 3
Ferhat	Middle	AC	SA	√1 5					√5						√1	√1		√5	√1
Tuba	Bottom	AC	SA	√1 3					√1					√1	√1 3	√1			√1
Arda	Bottom	AC	SA	√1					√1		√1			√1 5	√1			√5	√1 3

Table 10 Participants' ideas about the concept of democracy before and after the activities

Student name	Ideas before the events	Ideas after the events
Tuana	Before the activities, Tuana defined democracy as "the equal governance of everyone. They expressed it as "Democracy means justice and equality." Although they could not establish a clear connection between the concepts of republic and democracy, she evaluated the idea of democracy within the framework of justice and equality.	After the activities, Tuana evaluated the concept of democracy from a broader perspective. They emphasized that the concentration of legislative, executive, and judicial powers in one individual is contrary to democracy, while continuing to emphasize justice and equality.
Ferhat	He defined democracy in terms of "freedom." She stated, "Democracy is being able to do everything as we wish." She viewed freedom as the main element of democracy.	He defined democracy as "everyone's right to vote." He evaluated the concept of democracy through the lens of voting rights and participation.
Tuba	She defined democracy as "treating everyone equally." She stated, "Democracy is treating people equally." She evaluated the concept of democracy based on the principle of equality.	She explained democracy with more concrete examples and stated, "It is wrong for legislative, executive, and judicial powers to be concentrated in one person." Additionally, she expressed, "Democracy is based on the will of the people."
Arda	He defined democracy as "the rights of the people." He evaluated the concept of democracy through the axis of rights and freedoms.	He defined democracy as "the separation of legislative, executive, and judicial powers" and stated, "Democracy requires decisions to be made by a majority vote in the parliament." He also expressed, "Democracy is governed through the representatives of the people." The development in her understanding aligns with scientific truths.

group audio recordings, worksheets, and journal entries. When reflecting on her ideas before and after the activities, Tuana stated:

> Tuana: "*I used to struggle quite a bit in distinguishing between 'democracy' and 'republic.' But after this activity, I understood the fine line between them*." (A1, A3, B1, C1, and C5).

Tuana further elaborated on her ability to track changes in her thoughts on democracy, stating:

Tuana: "*I remembered what I knew before. This activity was like a repetition of forms of government. If you ask whether I learned something new, I didn't learn much because I studied these concepts in detail last year. However, I permanently grasped the differences between forms of government (Republic, monarchy, oligarchy, theocracy, constitutional monarchy, democracy)*." (A3, B1, and C1).

By evaluating her thoughts, Tuana remarked:

Tuana: "*My idea explains the situation better. Since the beginning of this activity, I have learned from Tuna and Professor Kutlu that the republic is a form of state and democracy is a form of government.*" (C2 and D).

These statements demonstrate Tuana's ability to justify and articulate the validity of an idea she selected from different alternatives.

Ferhat developed both first- and second-degree upper-level conceptual awareness regarding the concept of "democracy." An example of his tracking activities is reflected in his statement:

Ferhat: "*Whatever I think, my friends agree with me. I also agree with them on the correct concepts. For example, concepts like republic, democracy, rights, responsibility, duty, censorship, independence, sovereignty, and freedom*." (C2 and C3).

This demonstrates that Ferhat was actively monitoring the consistency between ideas from other individuals or sources and integrating them with his existing and new ideas. Additionally, Ferhat attempted to justify his reasoning for selecting the most logical option among different ideas about democracy, stating:

Ferhat: "*I think the same things. Because we all wrote similar things. But İrem's idea explains the situation better in the concept of democracy*." (A1, C2, and D).

This illustrates his ability to select and justify the most appropriate option from various alternatives.

Tuba, through the data she presented within the framework of "democracy," demonstrated engagement with nearly all sub-elements of upper-level conceptual processes. In her pre- and post-application data, she stated:

Tuba: "*I thought democracy was equality*."

This statement provides evidence of her first- and second-degree awareness of upper-level conceptual processes. Tuba compared her ideas on democracy with those of her peers, expressing:

Tuba: "*Some of my friends gave an incorrect explanation of the concept of democracy from my perspective. To me, democracy is equality, while my friends said the opposite*." (C2 and C3).

She also monitored the consistency between her existing ideas and new ones. Reflecting on the credibility and utility of these ideas, Tuba remarked:

> Tuba: "*Since I've thought about democracy, I found İrem's definition to be correct. 'Democracy means treating everyone equally. If there is democracy in a country, it means everyone is treated equally*." (C2 and D).

This demonstrates that she replaced her alternative conceptual structures with ideas that are widely accepted by scholars.

Arda presented data that revealed the nature of his upper-level conceptual processes related to the concept of "democracy" across several activities (Activities 1, 3, and 5). Arda stated:

> Arda: "*Republic and democracy are among the prominent concepts for me. Democracy is independence, state sovereignty, and republic*." (A1).

He also reflected on his previous understanding, noting:

> Arda: "*I used to think that republic and democracy were the same. Similarly, I thought that rights, responsibilities, freedom, and duty were the same.*" (B1).

This demonstrates both dimensions of upper-level conceptual awareness. Arda further acknowledged his learning, stating:

> Arda: "*Yes, I learned the difference between forms of government. For example, republic, democracy, monarchy, oligarchy, theocracy, constitutional monarchy.*" (C1and C5).

Additionally, he engaged in upper-level conceptual evaluation. When evaluated overall, the participants in the group where upper-level conceptual teaching activities were implemented provided various data regarding the concept of democracy throughout the awareness, tracking, and evaluation processes. These participants restructured their alternative ideas about "democracy" with scientifically accepted concepts. Throughout this process, it was observed that the upper-level activities had a positive impact on the participants.

Conceptual understandings before and after metaconceptual activities related to the concept of the state of law (the Rule of Law)

In this section, the participant's understanding of the "State of Law" concept was evaluated. Table 11 presents the conceptual understandings and nature of the upper-level conceptual activities related to the "State of Law" among the study group.

When examining Table 11, it is observed that one of the four participants in the metacognitive processes group maintained and further developed their scientifically accurate understanding. The other three participants transformed their alternative ideas regarding the state of law into scientifically correct concepts. In other words, students in the group exposed to

metaconceptual teaching activities were able to achieve a scientifically precise understanding of the concept of the state of law.

The conceptual understandings of students in the study group regarding the concept of "state of law", both before and after the activities, are summarized in Table 12.

One of the four participants in the metacognitive processes group expanded and continued their scientifically accepted ideas. At the same time, the other three transformed their alternative ideas about the state of law into scientifically accurate concepts. These findings demonstrate that higher-order conceptual teaching activities significantly contribute to accurately understanding abstract and complex concepts like the state of law. Thanks to the higher-order activities, the group members' metaconceptual processes reached scientifically correct definitions. This highlights the importance and impact of higher-order conceptual teaching activities in education. The participants' test results also supported this observation.

Metaconceptual processes related to the concept of the state of law

In this section, the nature of the higher-order conceptual processes of the students in the study group related to the concept of "state of law" is demonstrated following the activities. Tuana showed significant development in her higher-order awareness and tracking processes after the activities related to the concept of the state of law. Tuana's journal and interview data include the following statements:

Researcher: "Explain the difference between the concepts of the rule of law and the social state."

Tuana: *"I accurately identified the concepts of the rule of law and the social state."* (A1).

Researcher: "How would you define the concepts of the legislature, executive, and judiciary?"

Tuana: *"Initially, I encountered some inconsistencies due to the introduction of new terms. However, I was able to complete the second map without difficulty and now comprehend the distinctions between the legislature, executive, and judiciary."* (B1).

Researcher: "Which institutions are responsible for these functions?"

Tuana: *"I made an error regarding which institutions are responsible for these functions. I mistakenly associated the independent courts with the parliament, but I later realized my mistake."* (C1).

Researcher: "What are your thoughts on the concept mapping process?"

Tuana: *"At first, I faced challenges, but by the end of the process, I began to better understand the concepts."* (C5).

Table 11 The nature of conceptual understanding and metaconceptual activities related to the concept of the state of law among students in the study group

Concept		Nature of Conceptual Change		Nature of Metaconceptual Activities														
State of law				Awareness										Monitoring					Evaluation
		Pre-test/	Post-test/	First Degree					Second Degree										
Name of Participant	MAI	Preliminary Interview	Last Interview	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D
Tuana	Upper	SA	GSA	√4					√ 44_4					√ 4				√4	
Ferhat	Middle	AC	SA	√4					√4						√4	√4		√4	
Tuba	Bottom	AC	SA	√4					√4						√4			√4	
Arda	Bottom	AC	SA												√4				√4

Table 12 Participants' ideas about the concept of the state of law before and after activities

Student name	Ideas before the events	Ideas after the events
Tuana	She defined the "state of law" as "a state that distributes rights equally to everyone."	She expanded this definition by stating, "The state of law is the governance of a country by laws." This change indicates that Tuana has developed a scientifically accurate understanding of the concept of the state of law.
Ferhat	He defined the concept of "state of law" as a "secular state," stating, "The state of law is a state where religion and state affairs are separated, and the state operates in harmony with religion."	He redefined this concept as "a state governed by law," thereby achieving a scientifically accurate understanding.
Tuba	She defined the concept of the "state of law" as "the connection between democracy and equality within the state" and described it as a "democratic state."	She defined the "state of law" as "a state with independent courts that respects legal rights."
Arda	He defined the concept of a "state of law" as "laws that people adhere to" and expressed this as a "democratic state."	He defined the "state of law" as "a state where the law is prioritized and emphasized."

These statements indicate that Tuana had inconsistencies in her conceptual understanding before the activities, but after the activities, she grasped these concepts more clearly and accurately. This change in Tuana's conceptual understanding led her to understand the concept of the state of law more correctly and distinguish the differences between the related concepts.

Ferhat also showed significant developments in his higher-order awareness and tracking processes after the activities. Ferhat's journal and interview data include the following statements:

Researcher: "What does equality mean in the context of the rule of law?"

Ferhat: *"Initially, I mentioned equality, but then the concept of the state respecting human rights emerged."* (A1).

Researcher: "How would you define a democratic state and its relationship with the rule of law?"

Ferhat: *"I initially referred to a democratic state, and it evolved into the concept of the rule of law."* (B1).

Researcher: "How would you describe the functions of the legislature and the judiciary?"

Ferhat: *"In my first concept map*, *I mentioned the legislature*, *but it later transformed into the judiciary."* (C2).

Researcher: "What is the role of the state in ensuring the rule of law?"

Ferhat: *"The concept of the state respecting human rights emerged."* (C3).

Researcher: "Reflect on your process of understanding these concepts."

Ferhat: *"Initially*, *I had alternative concepts*, *but they gradually transformed into scientifically accepted realities."* (C5).

These data show that Ferhat had misconceptions in his conceptual understanding before the activities. Still, after the activities, he could correct these misconceptions and reach an accurate conceptual understanding. Ferhat's alternative concepts related to the state of law, as a result of his higher-order processes, transformed into scientific reality.

Tuba provided data by focusing on higher-order awareness and tracking processes following the activities. The statements from Tuba's journal and interview data are as follows:

Researcher: "What happens when you think about concepts differently?"

Tuba: *"When thinking about certain concepts differently*, *changes occurred in the concepts."* (A1).

Researcher: "Can you describe an example of such a change?" (B1).

Tuba: *"For example*, *in the concept map related to the characteristics of the state*, *I initially stated equality*, *but after hearing what my friend Nihal said*, *I revised it to a state respecting human rights."*

Researcher: "Were similar conceptual shifts observed in other areas?"

Tuba: *"Similarly*, *with the concepts of the rule of law and the social state."* (C2 and, C5).

These sentences indicate that Tuba's conceptual understanding initially contained some inaccuracies, but after correcting them, she arrived at a more accurate conceptual understanding. Tuba's higher-order processes enabled her to replace alternative conceptions of the state of law with scientifically accurate ones.

Following the activities, it was determined that Arda's metacognitive monitoring and evaluation processes had significantly developed. This is evidenced by the relevant statements from Arda's journal, as presented below:

Researcher: What observations did you make about other groups' understanding of concepts?

Arda: "*There were similarities and differences in other groups; they made mistakes*." (C2).

Researcher: How did you critically assess the conceptual understanding demonstrated by other groups?

Arda: "*They confused the state of law with a democratic state. They mistakenly associated independent courts with the executive."* (D).

These sentences suggest that, despite initially making errors in his conceptual understanding, Arda later became aware of and corrected them. Through his metacognitive processes, Arda was able to identify the mistakes made by other participants and replace his alternative conceptions of the state of law with scientifically accurate ones.

These findings underscore the substantial role of metacognitive instructional activities in facilitating students' accurate comprehension of abstract and complex concepts, such as the state of law. Activities that incorporated metacognitive elements enabled students in the metacognitive processes group to achieve a scientifically accurate understanding. This example highlights the significance and effectiveness of metacognitive teaching practices in the classroom.

Discussion

This study examined the effects of metaconceptual activities on 7th-grade students' understanding of modern state concepts in social studies classes, compared to traditional curriculum-based teaching. Specifically, it explored students' comprehension of the concepts of republic, democracy, and the state of law. This discussion details the answers to our two fundamental research questions, specifically for each concept and directly relating them to Yürük's (2005) overarching metaconceptual processes.

Discussion of findings on the concept of republic

The Nature of Pre-conceptions (Research Question 1) Participants in the metaconceptual activities group generally defined the concept of a republic using terms like "democracy," "rights," "freedom," "participation," and "national sovereignty." In the interviews conducted before the metaconceptual activities, it was found that students held diverse and heterogeneous preconceptions about the concept of the "republic". When explaining the republic, Tuana and Tuğçe primarily framed their responses in terms of "democracy," using expressions such as "the people governing themselves." Ferhat approached the concept through the lens of "freedom", reinforcing this view with historical and functional examples such as "the abolition of the Sultanate" and "people choosing a leader". Arda, on the other hand, drew on a broader array of notions—including "rights," "participation," and at times "independence"—and even described the republic as a "community of knowledgeable people". Collectively, these findings reveal that students entered the learning process with markedly different conceptual starting points, highlighting the heterogeneity of their initial understandings before engaging in metacognitive processes.

The data clearly showed that students' conceptual understanding of the concept of the republic was fragmented and conflated before they began metaconceptual activities. Observations determined that students frequently tend to associate this abstract concept of a form of government with outputs that are more concrete for them (individual rights, freedoms, political participation) or with structurally different concepts (democracy). This confusion in participants' ideas was clearly visible in the results of the pre- and post-Conceptual Understanding Tests.

In Western languages, republic refers to the notion that the state belongs to "the people" (Karpat, 2012, p. 49). For instance, the fact that Tuana and Tuba directly linked the republic to the phrase "the nation governing itself" proves that they see the concept as synonymous with democracy. This situation has shown that they failed to establish a structural distinction between the two concepts, thereby denying the concept its characteristic form of governance (head of state determined by election). This finding fundamentally contradicts Altan's (2004) emphasis that there is no direct relationship between these two concepts, as he highlighted England, the Netherlands, and Belgium as among the most advanced democracies despite not being republics.

Similarly, the fact that Ferhat and Arda perceive the republic primarily through secondary, qualitative characteristics such as individual rights and freedoms, rather than as a form of government, demonstrates that students tend to understand abstract systems through concrete effects. Furthermore, Tuana's association of the concept with Atatürk showed that it was linked to a historical example (Bal & Gök, 2011; Ulusoy & Yelken, 2009) rather than a deep, abstract definition. These alternative concepts, formed with related notions like democracy, rights, and concrete historical figures, create a significant barrier to the assimilation of new scientific knowledge.

The Character of Metaconceptual Activities and Conceptual Change (Research Question 2) Following the application activities, participants' understanding of the concept of the Republic evolved into a high-level functional and accurate conceptual schema, shedding initial inadequate or alternative ideas and enabling them to logically distinguish, relate, and align concepts with scientific truths. In this qualitative change, Tuana's conceptual understanding gained significance with her distinction between "republicanism was the form of government, democracy was its method of implementation," and Ferhat's alternative ideas, such as "republic = freedom," were replaced with scientific accuracy, leading to a conceptual change. These are important indicators. Tuana, Tuğçe, and Arda gained conceptual proficiency by associating and classifying republic and democracy separately, demonstrating their successful use of the outputs of metacognitive processes. Finally, after the application, Arda expressed the concept of the republic separately from the concepts of rights, participation, and independence. This observed conceptual change indicates that participants effectively benefited from the structured metaconceptual activities implemented during the process.

Participants engaged in metaconceptual awareness activities designed to help them understand and critically question the concept of the 'republic'. These activities required them to assess their own understanding and to evaluate the credibility and validity of the concept. Such processes, which play a vital role in addressing students' misconceptions, align with Vosniadou's (2001) emphasis on the central function of metacognitive processes in con-

ceptual change. In this regard, Hartelt and Martens (2024) demonstrated that conditional metacognitive knowledge can inhibit intuitive yet incorrect conceptions while promoting the use of scientifically grounded ones. This finding parallels the outcomes of our study, where metaconceptual activities effectively regulated participants' alternative conceptions. As observed by the researcher, this systematic progression reflects a linear developmental pattern—beginning with metaconceptual awareness, advancing through monitoring, and culminating in evaluation.

The findings explain how metaconceptual instruction effectively transforms these alternative concepts, directly matching this transformation with the metaconceptual processes in Yürük's (2005) classification. The conceptual change initially commenced with metaconceptual awareness. This transformation was activated as students became aware of their own thoughts. The expression of current thoughts, such as Ferhat comparing the Republic to the "era of the pashas" on his worksheet, created first-order metaconceptual awareness (A1). However, the truly critical step was the second-order metaconceptual awareness (B1) Arda reached with the statement in his daily log: "I used to think republic and democracy were the same thing." This retrospective awareness allowed the student to consciously recognize their old misconception, establishing the dissatisfaction (Posner et al., 1982) that is a prerequisite for conceptual change.

Based on this awareness, metaconceptual monitoring was triggered in a social learning environment. Tuana's meticulous recording of the different arguments of İrem and Şeyma from her group (C2) demonstrates that she was actively monitoring the conceptual landscape between her own ideas and those of her peers. Ferhat and Tuba's checking the consistency of their ideas with their peers (C3, and C5) facilitated conceptual convergence and managed socio-cognitive conflict (Limón, 2001).

Finally, the metaconceptual evaluation process ensured the consolidation of conceptual change. Students not only chose an idea but also judged its validity and quality. Tuana's evaluation of the group ideas as "worked out in great detail" (comprehensiveness) or Arda's evaluation as "explanations are clear" (clarity) (D) indicates a shift in epistemological authority from external (teacher) to internal and logical criteria. This has ensured that the republic is scientifically and correctly distinguished by reclassifying it as a form of governance and separating it from the concept of democracy. In line with this conceptual clarification, the implemented metaconceptual activities (e.g., concept maps and conceptual conflict scenarios) enabled students to overcome their tendency to limit the republic to concrete outputs. Post-test results showed that students began to define the republic as a form of government, taking into account structural elements such as the separation of legislative, executive, and judicial powers, rather than just rights and freedoms. This change indicates that students began to establish the distinction that the republic is a structural element that forms the basis of democracy, even if it is not a necessary and sufficient condition for it, at a structural level.

Discussion of findings on the concept of democracy

The Nature of Pre-conceptions (Research Question 1) Prior knowledge regarding the concept of democracy was determined to be largely based on its intersection with the idea of the republic. This led to the concept often being perceived as a form of governance and being reduced to superficial procedures such as rights, freedoms, and the elections. In its

broadest sense, democracy refers to a system of governance grounded in the consent of the governed (Uslu, 2022). However, this reduction resulted in a shallow understanding of democracy, lacking fundamental principles such as pluralism, minority rights, or the separation of powers.

The initial conceptual ambiguity was evident in the terms used by the group members before the activities, including "equality," "freedom," "rights," "republic," "justice," "law," and "national sovereignty". Students tended to conceptual reduction, associating democracy with a single essential component rather than its full scientific definition. For instance, Tuana and Tuğçe directly explained democracy within the framework of "equality", focusing solely on a core principle. Similarly, Ferhat defined democracy in terms of "freedom," meaning "being able to do everything we want," which reflects a perception of individual action devoid of legal boundaries, despite freedom being a historical cornerstone of Turkish democracy (Karpat, 2012). Arda, on the other hand, perceived the concept through the lens of "rights." Studies conducted by Moswela (2008) revealed that misconceptions about democracy and misinterpretations of rights are widespread among young people.

These initial definitions collectively showed that students tended to reduce democracy to procedural elements (elections, rules) rather than perceiving it as a civic and participatory process. The essence of democracy, however, lies in the ability to make binding laws and regulations regarding any group through elections (Beetham, 1999), with the concept of 'welfare' also being inherently ingrained (Crick & Porter, 1978). This superficial understanding, which reduces democracy to a system of rules, keeps the concept formal, moving away from genuine participation and civic engagement. This finding aligns with observations in various political contexts. For example, Zhuzhelovska and Bayraktar Durgun (2023) noted that in North Macedonia, constitutional frameworks for democracy often remain formal rather than genuinely participatory (pp. 341–343). This lack of deep political understanding contributes to the failure to grasp the differences and similarities between democracy and the republic (İnan, 2021). Democracy, as a contextual term, outlines the establishment and operation of government, whereas a republic is more of a type of government (Sabuncu, 2005). Republic and democracy are two distinct, yet complementary concepts (Nişancı & Güner, 2022). It is an obvious fact that democratic citizens cannot exist without democracy (Parker, 2012). At this point, schools must now clearly show what democracy means and, crucially, expand this instruction by supporting students in transferring democratic values to all areas of life (Apple & Beane, 2007).

This tendency to equate democracy only with procedural elements represents a limiting factor in the assimilation of new scientific knowledge, as Crick (2002) emphasizes, reducing democracy to procedures obscures its deeper civic and participatory foundations. Tilly (2007) states that democracy is not just about electoral processes; it is a multifaceted process that gains meaning through the co-existence of structural dimensions such as breadth, freedom, protection, and structural features. However, metaconceptual activities helped participants gain a broader understanding of democracy, recognizing the importance of individual and societal participation, as well as equality. The participatory nature of democracy ensures that all individuals can contribute to decisions that affect their lives (Aquarone, 2021). According to Eker and İncirci's (2016) research, when students monitor and evaluate their own understanding, they structure knowledge much more effectively. This demonstrates that incorporating metaconceptual teaching activities into democracy-themed lesson units

is necessary to promote active and reflective learning and enable students to understand democratic principles more deeply and authentically.

The Character of Metaconceptual Activities and Conceptual Change (Research Question 2) Following the application activities, students' understanding of the concept of democracy has moved beyond superficial definitions and transformed into a scientific and institutional structure. Tuana clarified the concept through her statements: "I think everyone voting is called democracy" and "I don't think it would be right for legislative, executive, and judicial powers to be concentrated in one person." Ferhat has shown that the change in his ideas is not just on a factual level, but is reduced to the concrete right to life, with examples like "Women can go wherever they want and get things from somewhere." Tuğçe scientifically justified her choice of the concept; Arda, on the other hand, demonstrated her correct understanding of institutional functioning by stating, "Legislative, executive, and judicial powers are not concentrated in one person; they are concentrated in parliament, but they are accepted by a majority vote in parliament," thus distinguishing herself from alternative structures. In short, students' understandings have transformed into a functional schema that integrates legal reasoning, institutional knowledge, and life reflections. This conceptual transformation did not occur spontaneously; rather, it emerged through structured metaconceptual processes embedded in the learning activities.

The transformation in the concept of democracy was largely achieved through the processes of metaconceptual monitoring and evaluation. All participants included both first- and second-order metaconceptual awareness activities, which are a prerequisite for observing understanding of an idea, in the process. The conceptual shift was initiated by the emergence of a strong contextual awareness that allowed students to see the limitations of their old conceptual frameworks. For instance, the second-order metaconceptual awareness (B1) revealed in Arda's diary, "I used to think that republic and democracy were the same thing," exposed the conceptual overlap, including that of democracy. This awareness was crucial as it allowed the student to recognize that the old framework was lacking the structural principles of democracy, such as pluralism, minority rights, and institutional checks, thereby creating the necessary dissatisfaction to trigger conceptual change.

Following awareness, metaconceptual monitoring was activated during social-interactional activities, which refers to structured learning environments like group work and classroom debates, where students discussed and compared their ideas. This reflective monitoring process enabled students to recognize that it was more coherent to position democracy as the method through which the idea of the republic is implemented, while simultaneously observing their own understanding of the concept. This pursuit of conceptual consistency (C3 and C5) led participants such as Tuba and Ferhat to redefine democracy as a process that ensures the legitimacy of governance. In particular, three participants—Tuana, Ferhat, and Arda—systematically traced the evolution of their ideas about democracy over time.

Finally, metaconceptual evaluation ensured the consolidation of conceptual change. Students compared and justified their previous views, which defined democracy merely as a set of rights, with new perspectives positioning it as the operational principle of popular sovereignty (D). This shift reflected an ontological re-categorization, whereby democracy detached from the Republic and integrated the principle of national sovereignty as its common foundation. Through this process, students engaged in metacognitive evaluation—

assessing the feasibility and effectiveness of alternative ideas and selecting those that best fit the context. The saturation observed in Tuana's data segments on metacognitive processes appears linked both to her higher-level categorization of these processes and to her being a year older than her peers.

The participatory nature of democracy allows all individuals, regardless of their social or economic background, to engage in decisions shaping their lives, fostering collective responsibility and equity (Aquarone, 2021). Metaconceptual activities helped participants internalize what democracy entails and redefine it more accurately. While democracy represents the process of governance, the republic denotes its structural form (Sabuncu, 2005). Although conceptually distinct, they complement rather than contradict one another (Nişancı & Güner, 2022). However, the persistent tendency to teach these concepts as synonymous has reduced democracy to procedural aspects like elections. This mirrors the initial perceptions of students in this study, who viewed democracy mainly as a set of rules rather than a civic process, a phenomenon also observed in broader contexts; for instance, in North Macedonia, constitutional frameworks often remain formal rather than participatory (Zhuzhelovska & Bayraktar Durgun, 2023, pp. 341–343). Such alternative conceptions hinder a deeper understanding of the relationship between the two concepts (İnan, 2021). As noted by Eker and İncirci (2016), students who monitor and evaluate their understanding structure knowledge more effectively, underscore the need to embed self-regulation strategies into democracy-related learning foster metaconceptual awareness. This enables students to critically assess such distortions and grasp the genuine meaning of democratic principles.

Discussion of findings on the concept of the state of law

The Nature of Pre-conceptions (Research Question 1) Most participants tended to equate the concept of the state of law (Rule of Law) with related notions or a single fundamental element rather than grasping its comprehensive definition, revealing their failure to recognize its essence as both the supremacy of law and the system that safeguards rights. Before the metacognitive activities, many students associated the state of law with terms such as "secular state," "democracy," "equality," and "democratic state". This tendency was clearly observable through conceptual reduction and synonymy. For instance, Ferhat expressed the concept of the state of law as the "secular state," stating: "a state of law, umm, where there is a separation of religious and state affairs, and then a state compatible with religion." This dataset showed that Ferhat could not structurally distinguish between the concepts of the state of law and the secular state before the intervention. Similarly, Tuğçe explained the state of law in the preliminary interview using the concepts of "democracy" and "equality," subsequently connecting this explanation to the "democratic state," with her dataset reflecting the view that "Democracy and equality are linked to the state. 'Democracy means equality.'" Although Arda mentioned "laws and statutes," he also associated this with the democratic state. This situation suggests that students were unable to establish the necessary structural difference between the state of law and the democratic state. Tuana, on the other hand, maintained her scientifically sound ideas from before the event by making scientific additions. The failure of the state of law to become firmly established, as Velidedeoğlu (1985) argues, stems from the lack of democratic education, which underlies the superficiality observed in students' pre-conceptions. This finding aligns with analyses suggesting that the mere existence of constitutional mechanisms ensuring the separation of powers does not

necessarily guarantee democratic governance; in many cases, the state of law remains more formal than functional. The seeming victory of the democratic ideal has resulted in the same assemblies holding the authority to enact laws and to issue directives from the government (Hayek, 2024). Consequently, Iovcheva (2023) emphasizes that formal political institutions alone cannot sustain the state of law without a corresponding transformation in values. Such alternative conceptions indicate that students tend to interpret abstract systems through their tangible effects, a tendency that hinders the assimilation of new and scientifically grounded knowledge.

The character of metaconceptual activities and conceptual change (Research Question 2)

Discussions held after the events show that students' understanding of the concept of the rule of law has deepened significantly. Tuana maintained the correct scientific ideas she had before the event and, by making structural additions to them, reproduced the scientifically accepted definition of "the state of law is the governance of a state by laws" with the phrase. Ferhat also corrected his previous alternative thoughts, realizing that "the state being governed by law" is a fundamental condition for the rule of law. Tuğçe, on the other hand, defined the concept as "the existence of independent courts" and "a state that respects rights," providing explanations consistent with the scientific literature. It has also successfully established the ontological distinction between the rule of law and the democratic state. Arda's statement during the interview process, "a democratic state is elected by votes; a state of law is governed according to the law," suggests that he recognized the distinction between the concepts and restructured his alternative thoughts in a way that was compatible with scientific knowledge. These findings clearly demonstrate that students' concepts were transformed into scientifically valid structural definitions after the activities. This conceptual transformation became possible, particularly through the effective activation of higher-level metaconceptual processes.

The profound transformation in the concept of the state of law (Rule of Law) occurred particularly with the dominance of the processes of metaconceptual monitoring and metaconceptual evaluation. First and second-order metaconceptual awareness, the two main components of metaconceptual awareness activity, were utilized by Tuana, Ferhat, and Tuğçe during this phase. This stage involved the emergence of a contextual awareness that allowed students to see that their existing superficial definitions were inadequate compared to the structural function of the concept. This awareness prepared the ground for students to understand that the state of law is not merely a collection of rules or procedures, but also a mechanism of limitation that prevents the arbitrariness of the governing power.

During the subsequent metaconceptual monitoring, students, while discussing with their peers, compared the definition of "the existence of rules" with the definition of "limitation," which prevents the arbitrariness of the governing power (C2 and, C3). This comparison made them realize that the scope of the current superficial definition was inadequate compared to the concept's actual structural function (limiting governmental power).

In the final stage, metaconceptual evaluation, students grasped that the state of law is a structural principle that limits the power of government, even in a democratic republic, and guarantees individual freedom against the state; in other words, it is not a mere collection of procedural rules, but an ontological security mechanism. In this process, the students

selected the strongest concept using their own epistemological criteria, just as Arda evaluated an idea based on the clarity criterion (D). The saturation observed in this category, particularly evident in Arda's data segments, suggests that the participants achieved a deeper, internalized understanding, perceiving the state of law as an internalized value rather than solely a formal constitutional mechanism.

This finding supports Zhuzhelovska and Bayraktar Durgun's (2023) analysis that the mere existence of separation-of-powers and checks-and-balances mechanisms does not inherently ensure democratic governance. Their study in North Macedonia shows that the state of law often remains merely formal when legislative and executive powers are held by the same political actors. Metaconceptual activities in this study helped participants develop a deeper, more nuanced understanding of these concepts, which is critical for fostering responsible citizenship, as emphasized in social studies education (Çırak, 2019). Social studies education should therefore prioritize the cultivation of critical thinking and informed citizenship while considering students' challenges in grasping abstract concepts (Burgos Videla et al., 2025; Zhang et al., 2012). Taken together, these insights underscore the value of deep conceptual mastery, supporting the view that metaconceptual instruction serves as an effective tool for guiding conceptual change in the teaching of abstract social studies concepts.

Conclusions

This study has proven that structured metaconceptual teaching activities successfully transform 7th-grade students' alternative conceptions of abstract political concepts. The findings indicate that the change is not random information acquisition, but rather the direct result of the systematic application of metaconceptual awareness, monitoring, and evaluation processes, as stated by Yürük (2005, 2007), Yürük and Eroğlu (2016), Kırbulut (2012), Yürük et al. (2011, 2017), and Ezberci (2014). These observations confirm the categorization's success in activating and sustaining metaconceptual teaching activities related to key political concepts in social learning environments, such as poster creation, journal writing, and group discussions. Students have constructed a relational and scientific conceptual framework that distinguishes the republic as a form of government, democracy as its method of implementation, and the state of law as a principle of guaranty. The key to this conceptual shift lies in the transformation of students from passive recipients to active agents responsible for constructing their own knowledge.

This research revealed a heterogeneity in the ways participants activate their metacognitive processes. For example, while some participants (Tuana, Ferhat, Tuba) implemented the processes in largely similar ways, another (Arda) presented data that focused more on monitoring and evaluation. This finding is consistent with the extensive literature (Duez, 2020; Ezberci, (2014; Hartelt & Martens, (2024; Kırbulut, (2012; Nwankwo et al., (2019; Wendt & Huderson, (2020; Yıldız Feyzioğlu & Ergin, (2012; Yürük, 2005, 2007; Yürük & Eroğlu, (2016); and Yürük et al. (2011, 2017) that emphasizes the need for metacognitive teaching activities to be more sensitive and flexible to individual learning profiles.

For young people who struggle to summarize abstract concepts and transform concrete examples into general principles, it is critically important that education be supported by concrete pedagogical strategies that enhance conceptual richness. In parallel with the research

by Simons et al. (2020), it was determined that further developments may be needed for the large-scale dissemination of child data. Holistic assessment clearly demonstrates the qualitative impact of metacognitive strategies on improving conceptual understanding, showing that students participating in metaconceptual teaching activities successfully replaced alternative concepts in their prior knowledge with scientifically accurate ones. This underscores the qualitative impact of metacognitive strategies in improving comprehension.

Metaconceptual activities facilitate this conceptual change by enabling students to think critically about their existing and past knowledge structures related to concepts, encouraging them to move beyond superficial definitions. These activities provide mechanisms for students to identify inconsistencies (metaconceptual awareness), compare alternative scientific models against their spontaneously generated, scientifically incomplete or incorrect initial thot structures based on their daily experiences, culture, or logical inferences (metaconceptual monitoring), and justify the feasibility and effectiveness of the new, scientifically correct concept (metaconceptual evaluation). This process leads to the abstract concepts of the state of law, republic, or democracy being recategorized into holistic, structural principles, separate from concrete and procedural examples, thus effectively addressing the root causes of students' misconceptions.

Educational Implications

These results necessitate a paradigm shift in the pedagogy of social studies education. In curriculum development, metaconceptual processes should be defined as explicit learning objectives. Instead of content presentation, priority should be given to activities that make thinking visible (journals and posters) and manage cognitive conflict through social-dialogic interaction (discussion and debate). Teacher training programs should equip teacher candidates to build this complex cognitive scaffold and continuously demand justification from students.

Future Directions

The small sample size limits the statistical generalizability of the results to larger populations. Additionally, the fact that the research was conducted only with 7th-grade students and within a specific geographical context (Ankara, Türkiye) highlights the need for further studies to test the validity of the findings across different age groups or cultural/political environments. In addition, longitudinal studies are needed to fully assess the durability of the conceptual change achieved.

Appendix

See Table 13.

Table 13 Overview of Metaconceptual Activities

Category	Sub-activities / indicators	Description	Evidence codes
A. First-Order Metaconceptual Awareness	A1. Awareness of mental models and ideas/ conceptions A2. Awareness of ontological presuppositions A3. Awareness of what you do not know A4. Awareness of contextual differences A5. Awareness of experiences	Reflects initial recognition of one's own conceptual understanding, ontological views, and experiential knowledge	√0 = No Evidence √1–√5 = Activites Levels
B. Second-Order Metaconceptual Awareness	B1. Awareness of initial ideas/ mental models B2. Awareness of ontological presuppositions B3. Awareness of what you did not know B4. Awareness of contextual differences B5. Awareness of experiences	Represents a deeper reflection on previously held knowledge and how it interacts with new conceptual understanding	√0–√5 = Activites Levels
C. Metaconceptual Monitoring	C1. Monitoring understanding of an idea C2. Monitoring ideas/information from other people/Sources C3. Monitoring the consistency between new and existing ideas C4. Monitoring the consistency between initial idea and new experiences C5. Monitoring changes in ideas	Focuses on the process of regulating and adjusting conceptual understanding through self- and peer-reflection	√G = Extended Scientific Accuracy √K = Partial Scientific Correctness
D. Metaconceptual Evaluation	D1. Making comments about the plausibility or fruitfulness of existing or new ideas (explaining why an idea is attractive, believable or useful to them; stating the reason for why an idea is wrong and another is correct). D2. Choosing an idea among different alternatives and defending why that idea works better than the others for the given situation	Involves a critical evaluation of conceptual plausibility and justification for conceptual choices	√0–√5 as Applicable

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Conflict of interest The author or authors did not disclose any potential conflicts of interest.

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