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Dear Readers,

We are delighted to present you the March 2025 issue of the Journal of Limitless Education and Research and published. The Limitless Education and Research Association (LERA) started its publication life in 2016 and it has been continuously published for 11 years. The aim of our journal published by the LERA board members is to contribute to the field of education and research with new current scientific studies. To this end, theoretical and experimental original research, review articles, thesis summaries, and other scientific works are published for free and shared with readers at both nationwide and worldwide.

The Journal of Limitless Education and Research (J-LER) is published three times as of March, July, and November per year in both Turkish and English. Manuscripts submitted to the journal are checked and evaluated by at least two referees, editors, field editors, and also Turkish and English language editors. The members of the Referee and Scientific Committee of the journal consist of academics, researchers, experts, educators and teacher writers from different countries. Therefore, our journal is prepared for publication with the scientific efforts, contributions and support of international experts and academics. As a result of meticulous inquiries, current and new studies are included in each issue.

Journal of Limitless Education and Research (J-LER), which has been published for eleven (11) years without compromising its academic and scientific quality, is indexed in EBSCO, Education Full Text (H.W. Wilson) Database Coverage List, which is accepted as a field index by Inter-University Academic Council (UAK). In addition, it is scanned in various national and international indexes such as ASOS, DRJI, ESJI, OAJI, ROAD, SIS, SOBIAD, WorldCat and receives many citations. According to the SOBIAD impact factor, our journal ranks high among scientific journals in our country. We continue to work to scan the publication network of our journal in wider national and international indexes.

In the March 2026 issue of our journal, ten (10) scientific studies are presented to the readers. We would like to thank to all the authors, editors, referees, scientific committees and translators who contributed to the preparation and publication of this issue. We hope that our journal will contribute to scientists, researchers, educators, teachers and students in the field.

The Editor of Journal of Limitless Education and Research

The Journal of Limitless Education and Research, Volume 11, Issue 1

Sınırsız Eğitim ve Araştırma Dergisi, Cilt 11, Sayı 1

Değerli Okuyucular,

Sizlere Dergimizin Mart 2026 sayısını sunmaktan büyük mutluluk duyuyoruz. Sınırsız Eğitim ve Araştırma Dergisi (SEAD) yayın hayatına 2016 yılında başlamış ve 11 yıldır kesintisiz olarak yayınlanmaktadır. Sınırsız Eğitim ve Araştırma Derneği (SEAD) üyeleri tarafından yayınlanan dergimizin amacı, güncel çalışmalarla eğitim ve araştırma alanına katkı sağlamaktır. Bu amaçla kuramsal ve deneysel özgün araştırmalar, derleme makaleler, tez özetleri ve çeşitli bilimsel çalışmalar ücretsiz yayınlanmakta, ulusal ve uluslararası düzeydeki okuyuculara sunulmaktadır.

Sınırsız Eğitim ve Araştırma Dergisi (SEAD), yılda üç kez Mart, Temmuz ve Kasım aylarında Türkçe ve İngilizce olmak üzere iki dilde yayınlanmaktadır. Dergiye gönderilen çalışmalar en az iki hakem, editör, alan editörü, Türkçe ve İngilizce dil editörleri tarafından kontrol edilerek değerlendirilmektedir. Dergi Hakem ve Bilim Kurulu üyeleri farklı ülkelerdeki akademisyen, araştırmacı, uzman, eğitimci ve öğretmen yazarlardan oluşmaktadır. Böylece Dergimiz uluslararası uzman ve akademisyenlerin bilimsel çabaları, katkı ve destekleriyle yayına hazırlanmaktadır. Titiz incelemeler sonucu her sayıda güncel ve yeni çalışmalara yer verilmektedir.

Akademik ve bilimsel kalitesinden ödün vermeden on bir (11) yıldır yayın hayatını sürdüren Sınırsız Eğitim ve Araştırma Dergisi (SEAD), ÜAK tarafından alan indeksi olarak kabul edilen EBSCO, Education Full Text (H.W. Wilson) Database Covarage List'te dizinlenmektedir. Ayrıca ASOS, DRJI, ESJI, OAJI, ROAD, SIS, SOBİAD, Worldcat WorldCat gibi ulusal ve uluslararası çeşitli indekslerde taranmakta ve çok sayıda atıf almaktadır. SOBİAD etki faktörüne göre Dergimiz, ülkemizdeki bilimsel dergiler içinde üst sıralarda bulunmaktadır. Dergimizin yayın ağı daha geniş ulusal ve uluslararası indekslerde taranması için çalışmalarımız devam etmektedir.

Dergimizin Mart 2026 sayısında okuyuculara on (10) bilimsel çalışma sunulmaktadır. . Bu sayının hazırlanması ve yayınlanmasında emeği geçen bütün yazar, editör, hakem, bilim kurulu ve çevirmenlere teşekkür ediyoruz. Dergimizin alandaki bilim insanı, araştırmacı, eğitimci, öğretmen ve öğrencilere katkı getirmesi dileğiyle, saygılar sunuyoruz.

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An Investigation of Primary School Teachers' Experiences in Teaching Division

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Abstract: Primary school mathematics education places significant emphasis on the teaching of arithmetic operations. Among these, the instruction of division has a structure that requires careful and sensitive handling by classroom teachers. The aim of this study is to examine classroom teachers' experiences regarding the teaching of division. The research was designed using a qualitative approach and employed a phenomenological research method. The study group consisted of 20 experienced classroom teachers working in the provinces of Afyonkarahisar and Kütahya. Criterion sampling and convenience sampling methods were used. Data were collected through a semi-structured interview form consisting of six questions developed by the researchers. Thematic analysis was employed in the data analysis process. The findings indicate that only a limited number of teachers used problem statements and real-life connections in the teaching of division. Although teachers considered the use of models necessary for teaching division, they experienced difficulties in establishing meaningful instructional connections through these models. Furthermore, analysis of teachers' instructional processes and problem constructions related to remainders revealed a predominantly one-dimensional and non-relational structure.

Keywords: Primary school teacher, Mathematics education, Division.

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1. Introduction

In primary education, students typically work individually during mathematics lessons, and solutions to mathematical problems often lack explanatory text or visual representations. Consequently, it is not always easy for classroom teachers to monitor whether students genuinely understand the underlying ideas of their problem-solving processes. For students, such problem situations may sometimes involve mere procedural operations and at other times routine problem contexts. In the teaching of division and division-related problem situations, the use of models and the provision of rich learning experiences are essential for strengthening the instructional process. Joutsenlahti and Kulju (2017) presented students with division-related problem situations and demonstrated that the use of writing and drawing, along with multiple models, can enhance the learning of mathematical concepts by supporting the organization of students' mathematical thinking during problem solving. The use of written explanations in mathematical problem solving has been shown to improve learning in mathematics, enhance mathematical understanding, positively influence students' attitudes toward mathematics, and support teachers' assessment processes (Morgan, 2001).

The use of models is an effective approach in teaching division. In equal-sharing problems, base-ten blocks can be used as meaningful area models, providing opportunities to establish conceptual relationships related to division. Such models allow students to develop mental visualizations concerning division (Richardson et al., 2010). Ping and Hua (2015) emphasized that concrete materials, such as division wheels, can help students master basic division operations and solve a wide variety of division problems. Teachers are encouraged to enrich instructional methods to ensure that students learn actively and with enjoyment. By integrating concrete materials (e.g., division wheels, clocks, play money), simulations (such as real-life problem contexts), assessments, and diverse activities, students may develop increased interest in division and mathematics more broadly. Students' attitudes and interests thus play a significant role in their academic success. Lamberg and Wiest (2012) emphasized that teachers must manage the instructional process effectively by addressing critical questions such as: What does division mean? What do the divisor and dividend represent? Why and how are equal-sized groups formed during division? Which effective strategies can be used to solve division problems? How should remainders be handled? When is it appropriate to express remainders as fractions, round to the nearest whole number, or round down? How can the accuracy of division solutions be verified?

Although division can be conceptualized in multiple structural ways, children often gravitate toward the fair-sharing (partitive) model, either because they find the idea of dividing a set into equal shares more comprehensible or because they have more experience with such contexts. Another important form, measurement (quotative) division, involves distributing a given quantity into an unknown number of groups. For example, if there are twenty-four dice and each child needs four dice to play a particular game, how many children can participate? (Lamberg & Wiest, 2012). Haylock (2006) argued that the sharing approach corresponds to division only under certain conditions rather than always providing a comprehensive foundation for the development of division concepts. In real life, children often share a limited number of objects with peers or family members, for instance, sharing a package of ten candies with a sibling. However, classroom division problems may require distributing large quantities among many participants, which can differ from students' everyday experiences. In measurement or grouping approaches, students may be accustomed to distributing objects into known numbers of groups, whereas certain problems require placing a fixed quantity of items (e.g., cakes) into each group and determining the number of groups. In multiplication and division problems, multiplicative relationships are typically established between two quantities. The informational part of the problem provides one example of the relationship, while the question requires applying the same relationship in a new context. For example, in 12 ÷ 4, when the value of the second quantity is 4, the value of the first quantity is 12. The relationship between quantities is structured through quantitative value and multiplicative meaning, enabling students to determine unknown quantities by recognizing multiplicative relationships among known quantities (Rizvi & Lawson, 2007).

Effective division instruction requires bridging children's intuitive models with formal processes that represent conceptual understanding. Students must be provided with opportunities to develop reasoning skills through carefully designed instructional experiences. Teacher feedback is crucial in analyzing students' reasoning, supporting their interpretation of division-related situations, and advancing their mathematical thinking (Lamberg & Wiest, 2012). Rowland (2008) noted that teachers may struggle to select appropriate examples for teaching division and related problem situations; inappropriate examples may obscure the intended concepts and confuse students. Insufficient content knowledge may hinder teachers' ability to select effective examples, thereby negatively affecting students' learning experiences. Consequently, teachers' comprehensive pedagogical and content knowledge of division is essential. Garet, Porter, Desimone, Birman, and Yoon (2001) demonstrated that content-focused activities that do not enhance teachers' knowledge and skills may negatively influence instructional practices, emphasizing the need for deep conceptual and pedagogical development. Ball, Et al (2008) described Mathematical Knowledge for Teaching as consisting of subject matter knowledge and pedagogical content knowledge. Subject matter knowledge includes common content knowledge, mathematical knowledge, and specialized content knowledge, whereas pedagogical content knowledge includes knowledge of content and students, content and teaching, and curriculum knowledge. Accordingly, classroom teachers must possess comprehensive procedural, curricular, and instructional knowledge when teaching division. Hill and Ball (2009) found that teachers' mathematical knowledge for teaching is strongly associated with instructional quality, particularly in their use of mathematical explanations and representations, responsiveness to students' ideas, and avoidance of mathematical ambiguities and errors. Supporting instruction with models that emphasize both procedural and contextual structures while fostering students' mathematical reasoning strengthens the teaching process.

Kinach (2002) examined teachers' instructional explanations across five levels: content, conceptual, problem-solving, inquiry, and epistemic. At the content level, explanations remain superficial and rely on rule-based procedures without meaningful interpretation. At the conceptual level, individuals effectively explain concepts and their properties. At the epistemic level, individuals articulate the logical foundations underlying definitions. At the problem-solving level, individuals demonstrate proficiency in analytical strategies such as deductive reasoning and mathematical modeling. At the inquiry level, individuals generate new problems or construct new knowledge.

Within the hierarchy of mathematical operations, multiplication and division are considered inverse operations. However, due to the concept of remainder, division is cognitively more complex and demanding than multiplication (Pope, 2012). Fox and Surtees (2010) emphasized that students' full understanding of the commutative structure of multiplication (e.g., $5 \times 4 = 4 \times 5$) is essential for grounding division concepts, as students continuously relate division to the inverse structure of multiplication. Accordingly, Troutman and Lichtenberg (2003) recommended that division instruction be structured gradually, parallel to the development of multiplication concepts, rather than being rushed. The connection between multiplication and division is essential not only for procedural fluency but also for conceptual understanding. Students may experience difficulties with place value, procedural execution, and prerequisite skills in division. Establishing connections between division problems and familiar multiplication or repeated subtraction strategies enables students to transition from concrete representations to numerical reasoning, allowing for faster and more efficient problem solving (Samuel, 2010). Ryan and Williams (2007) noted that students may overgeneralize rules from other operations or misinterpret procedural rules when modeling division, leading to errors in connecting processes with objects. This study aims to clarify issues related to the complex structure of division, its relationships with other operations, classroom teachers' instructional approaches, and the role of teachers' pedagogical knowledge within their professional experiences. Ultimately, identifying classroom teachers' instructional needs may contribute to improvements in primary mathematics education. Accordingly, the purpose of this study is to examine and evaluate classroom teachers' knowledge and experiences regarding the instructional process of teaching division in depth. The study seeks to address the following research questions:

1. How do classroom teachers teach division?
2. How do classroom teachers apply division teaching approaches during instruction?
3. What are classroom teachers' experiences with modeling in division instruction?
4. How do classroom teachers construct problem situations related to remainders, and which instructional strategies do they employ?

2. Method

2.1. Research Design

In this study, a phenomenological research design was employed to examine classroom teachers' experiences regarding the teaching of division. Phenomenology is a qualitative approach that aims to explore how individuals experience a particular phenomenon, how they construct meaning from these experiences, and how such experiences are situated within their lived worlds. The fundamental assumption underlying this approach is that knowledge originates from individuals' subjective lived experiences. Within this framework, the researcher seeks to describe and interpret participants' experiences and to reveal the essential structure of these experiences (Hammersley, 2013). In other words, phenomenological research aims to understand how experiences emerge in similar ways across individuals' lives, what meanings they hold for participants, and how they are perceived and lived, as experience is considered the primary source of knowledge (Husserl, 2012). Accordingly, a phenomenological design was preferred in this study to enable an in-depth exploration of teachers' experiences. The data obtained within the phenomenological framework was subjected to a systematic analysis process in order to identify shared meanings that emerged across participants' lived experiences.

2.2. Research Group

The study group consisted of 20 experienced classroom teachers working in the provinces of Afyonkarahisar and Kütahya. In this study, criterion sampling and convenience sampling methods were used in combination. These methods were preferred to ensure that participants possessed specific professional experience and were selected from among teachers who were accessible to and known by the researchers. Convenience sampling involves selecting individuals who are accessible and willing to participate voluntarily in the research process (Christensen et al., 2015). In criterion sampling, the primary consideration is the inclusion of voluntary participants who have experience and knowledge related to the phenomenon under investigation (Creswell & Plano Clark, 2011). In determining the criterion for experienced teachers, Berliner's (2004) classification was taken into account. According to Berliner, teachers with at least 5–7 years of professional experience are considered "experienced." Accordingly, only teachers with a minimum of eight years of professional experience were included in the study.

The study group comprised a total of 20 elementary school teachers, including 7 females and 13 males. Table 1 presents detailed information about the teachers' gender, age, educational background, years of professional experience, grade level taught, and place of employment. The detailed demographic characteristics of the participants are presented in Table 1 below.

Table 1
Demographic Information of Participants

Participant No	Gender	Age	Education Level	Year of Service	Place of Duty	Grade Level
Ö1	Male	39	Bachelor's Degree	15	Afyonkarahisar	2. grade
Ö2	Female	32	Bachelor's Degree	9	Afyonkarahisar	3. grade
Ö3	Male	37	Bachelor's Degree	15	Afyonkarahisar	3. grade
Ö4	Male	37	Bachelor's Degree	15	Afyonkarahisar	1. grade
Ö5	Female	36	Bachelor's Degree	16	Afyonkarahisar	3. grade
Ö6	Female	39	Bachelor's Degree	16	Afyonkarahisar	3. grade
Ö7	Female	33	Bachelor's Degree	8	Afyonkarahisar	4. grade
Ö8	Female	40	Master's Degree	17	Afyonkarahisar	2. grade
Ö9	Female	36	Bachelor's Degree	15	Afyonkarahisar	4. grade
Ö10	Male	32	Master's Degree	10	Afyonkarahisar	3. grade
Ö11	Female	39	Bachelor's Degree	17	Kütahya	4. grade
Ö12	Male	44	Bachelor's Degree	21	Kütahya	4. grade
Ö13	Male	43	Bachelor's Degree	20	Kütahya	4. grade
Ö14	Male	42	Bachelor's Degree	19	Kütahya	2. grade
Ö15	Male	43	Bachelor's Degree	20	Kütahya	3. grade

Ö16	Male	40	Bachelor’s Degree	18	Kütahya	4. grade
Ö17	Male	43	Bachelor’s Degree	21	Kütahya	3. grade
Ö18	Male	42	Bachelor’s Degree	19	Kütahya	1. grade
Ö19	Male	43	Bachelor’s Degree	20	Kütahya	3. grade
Ö20	Male	59	Bachelor’s Degree	32	Kütahya	1. grade

2.3. Data Collection Instrument

Phenomenological research focuses on how individuals evaluate a phenomenon, what they think about it, how they remember it, how they describe it, and the meanings they attribute to it. In this type of research, in-depth interviews are conducted with individuals who have directly experienced the phenomenon, rather than those who have experienced it indirectly (Patton, 2018). Therefore, a semi-structured interview form prepared by the researchers was used. Semi-structured interviews are a qualitative data collection method that aims at gaining an in-depth understanding of an individual's experiences, perceptions, and thoughts. Although this method relies on questions prepared in advance by the researcher, it also allows for flexibility during the interview based on the participants' responses (Cohen et al., 2002). This enables the researcher to uncover participants' diverse perspectives and obtain exploratory data (Polat, 2022). In this regard, semi-structured interview forms are considered an effective and valuable method for the qualitative data collection process.

A six-question interview form was prepared through a literature review and contributions from researchers. The draft interview form was reviewed by experts in mathematics education, and the interview questions were revised according to their feedback and suggestions. To test the validity and reliability of the form, a sample interview was conducted with two target participants. Based on the data obtained from these interviews, the form was reviewed and revised again. For example, the question “Using the two problems below, what aspects of division would we emphasize in teaching?

Problem 1: I want to make 2 cakes with 6 eggs. How many eggs should I use for each cake?

Problem 2: With 6 eggs, if I use 3 eggs for each cake, how many cakes can I make?” was revised because participants tended to give short answers without allowing for in-depth discussion. Another revised question was “Can you write a division problem where the remainder represents the outcome of the problem?” which required rephrasing because participants did not fully understand it. Additionally, a probing question such as “What should the student know about the remainder?” was added to encourage deeper insights.

As a result of these processes, the final version of the interview form was created. Audio recordings were taken during the interviews, which lasted approximately 45 minutes each.

2.4. Data Analysis

In this study, the analysis of the data obtained to gain an in-depth understanding of classroom teachers' experiences regarding the teaching of division was conducted in line with the nature of the phenomenological design. Since the phenomenological approach aims to reveal the essence and structures of participants' experiences, a methodology focusing on sense-making processes was required to analyze these rich narratives. Accordingly, thematic analysis, which holds a central position among qualitative data analysis approaches due to its ability to uncover the subjective layers of meaning in participants' experiences, was preferred. This method is a flexible approach that aims to systematically identify recurring patterns of meaning (themes) in the data. It provides an in-depth understanding by focusing particularly on the meanings participants attribute to their experiences, perceptions, and social phenomena (Boyatzis, 1998; Aronson, 1995). The depth provided by thematic analysis has significantly contributed to the method's widespread adoption in a broad range of fields, primarily in social sciences, education, psychology, and health. Thanks to its flexibility, the method can be used compatibly with different theoretical and epistemological paradigms (Braun & Clarke, 2006).

The core analytic process of the method is generally conducted in accordance with a six-phase framework: familiarization with the data, generation of initial codes, identification of themes, review of themes, definition and naming of themes, and reporting (Braun & Clarke, 2006). In phenomenological studies, the process of segmenting data into meaning units and organizing these units under shared codes and themes closely aligns with the stages of thematic analysis proposed by Braun and Clarke (2006). In this respect, both the phenomenological approach and thematic analysis share a common aim: to reveal the essence of participants' lived experiences and the meanings they attribute to these experiences. In line with this aim, the data obtained were systematically coded, similar meaning units were clustered together under overarching themes, and a coherent structure reflecting the essence of participants' experiences was constructed.

In this process, the researcher may adopt an inductive strategy, moving from the data toward themes, while also at times employing a deductive approach based on pre-established theoretical frameworks (Patton, 2015). Thematic analysis, which has been recognized in the qualitative research literature as an independent analytical method—particularly through the pioneering and systematic guides of Braun and Clarke (2006, 2019)—requires not only the categorization of data but also a continuous and interpretive engagement with the data to capture patterns of meaning. This systematic interaction maximizes the method's potential to offer rich and contextualized interpretations that contribute both to theory-building and applied research. Within this framework, before starting data analysis, the necessary preparations were made to test the functionality of the data collection tool and its comprehensibility to participants. In the preliminary stage of the study, pilot interviews were conducted with two classroom teachers. The interviews were audio-recorded and subsequently transcribed. The obtained data were examined in terms of the clarity and applicability of the semi-structured interview form, and no semantic confusion or expressions requiring correction were found in the questions. Accordingly, the data collection tool was deemed suitable for final use.

After the pilot implementation, interviews were conducted with 20 classroom teachers within the scope of the study. All interviews were audio-recorded, as in the previous stage, and transcribed into written format as soon as possible. The resulting written transcripts were examined in detail by the researchers; based on phenomenological research, the data were systematically coded and categorized according to thematic similarities.

During this coding process, themes such as the challenges teachers faced while teaching division, the methods they used, students' reactions, their use of materials, and their emotional experiences were highlighted. Similar codes were grouped together to form higher-level themes, and the relationships among these themes were explored.

The data analysis was carried out using the Stevick-Colaizzi-Keen method adapted by Moustakas (1994). First, each participant's experience was examined in detail, and meaningful units within the statements were identified. These meaningful units were coded, and then the codes were organized under thematic clusters.

In line with the Moustakas approach, each meaningful unit was evaluated from an unbiased perspective based on the principle of phenomenological reduction (epoché). The researchers strived to maintain a neutral stance, carefully approaching the participants' experiences without prejudice.

The identified themes were combined to create individual structural descriptions and textural descriptions that capture the essence of each participant's experience. In the final stage, a comprehensive "composite description" was produced, encompassing the experiences of all participants.

2.5. Reliability

According to Bloomberg and Volpe (2008), ensuring the validity, reliability, and consistency of qualitative research is highly important. In this study, to ensure the reliability of the research, a data collection tool was developed by reviewing literature related to the research questions and obtaining expert opinions in the field. After informing the participants and obtaining participant consent forms, interviews were conducted using the developed data collection tool. The collected data were analyzed using phenomenological analysis. Codes were extracted by three coders, and irrelevant codes were filtered out. The researchers discussed the codes and reached a consensus to finalize the codes and categories. Consistency on the codes and categories was ensured through researcher triangulation. The codes and categories created were presented in tables to be clear and more understandable. When necessary, quotations from participants' statements were included. No changes were made to the wording of statements to preserve the nature of the quotations. In the study, code names were used to ensure participant confidentiality (e.g., Ö1, Ö2, Ö3).

3. Results

This section presents the findings regarding the experiences of classroom teachers in the teaching division. Five tables examine how classroom teachers teach division, how they use division approaches during the teaching process, and how they perform modeling in division.

Table 2

Division Operation Teaching Strategies and Teacher Approaches

Category	Example Phrases	Definition Of The Category
Preliminary Information (2, 3, 4, 15, 20)	First of all, I pay attention to prior learning, meaning that previous topics must be fully learned. That is, children should have no gaps in rhythmic counting and multiplication (2) make sure that they have no gaps in subtraction. I believe that if they make mistakes in subtraction, they will not be able to learn division (4) First, I check their readiness. I see if they are ready, and if they are, I can move on to the division operation (20)	Concepts and operations that need to be taught before division.
Concretization Concretization (1, 2, 7, 14)	No, I don't give it directly. First, I bring materials to the classroom (7) First of all, we show it by drawing fewer items on the board or modeling in front of them using objects, items, fruits, and vegetables that children are familiar with (14)	Modeling the division operation using concrete materials.
Concepts (2, 5, 7, 8, 14, 17)	That is, sometimes there is a remainder. I want to point out what it is used for—that when we talk	Introducing the terms related to division.

	about division, it does not mean that everything is fully distributed and finished; sometimes a remainder can remain (5) I have the students distribute according to the number I write on the board. I ask questions like "How many did each get?" (7) Children who have siblings, especially those from large families, are much more interested in division when we talk about sharing and distributing (8)	
Sharing (1, 5, 7, 9, 13, 14, 16, 17)	I take 20 apples from home. Into how many can we share them? (1) First, I emphasize that division has the meaning of sharing and grouping (7) Division for Sharing. I state that division operations are used for the purpose of sharing (16) Division means equal sharing. My key concept is Equal sharing. Division equals equal sharing (17)	Teaching the division process in the context of equal sharing
Grouping (1, 7, 9, 11)	While performing division, um, first with the children—since my class is 3rd grade—we try to do more operations through grouping (1) First, I emphasize that division means sharing and grouping (7) First, I explain to the children that division means "grouping," "distributing," and "sharing" (9) In later grades, when dividing 8 by 2, I tell them to hold up 8 fingers and group them in twos. However, many groups are formed, that is our answer (11)	Teaching the concept of division by grouping objects into a specific number of sets.
Daily Life Association (1, 8)	For example, let's say we have a class of 10 students. Hmm, I bring 20 apples from home (1) grab their attention with daily life examples, such as 5 children sharing 5 chocolates or 5 children sharing 10 chocolates (8)	Connecting division operations to real-life problems
Repetition (12, 15)	After a few months have passed, the topic needs to be reminded again. Unfortunately, whether in this division or in our other activities, children forget. That is why repetition is necessary. (12) We move from concrete to abstract. We reinforce with simple examples and repeated exercises. (15)	Exercises and repetition activities to reinforce the division process.
From Easy to Hard (10, 12, 19)	Another point I pay attention to is making sure that the digits line up properly when writing numbers. Of course, when creating problems for these questions, I ensure that they can be solved without remainders. In later grade levels, I continue with division problems that include remainders (10)	The division process is taught step by step, from easy to difficult.
Relationship with Other Operations (3, 4, 16, 19)	I pay attention to ensure there are no deficiencies in subtraction. I believe that if they make mistakes in subtraction, division cannot be learned either, since the foundation of division is also subtraction (4) First, division. Just like the opposite of addition: subtraction. Similarly, we should indicate that division is the opposite of multiplication (16)	Establishing the connection between the division operation and multiplication and subtraction.

Problem (7, 10)	When teaching division, the point I pay the most attention to is creating a problem based on the current situation of the students and starting to teach the division operation through that problem (10) Have them distribute as many as the number I write on the board. I ask questions like, "How many did each get?" In this way, I establish the concept before moving on to the operation (7)	Creating verbal problems from real-life situations that require division.
Analogy (2, 8)	First, I make them imagine. I tell the children to imagine that I am an ice cream seller, that I have ice cream in various colors, how I can distribute these ice creams into cones, and how I can group them according to the number of people, all by making them visualize (8)	Explaining division through analogies

When examining the responses of classroom teachers to the question, "What do you pay attention to when teaching division?", categories such as prior knowledge, concretization, concepts, sharing, grouping, real-life connections, successive subtraction, repetition, simple-to-complex progression, relation with other operations, problem-solving, and analogy can be observed. When the categories are reviewed, it can be seen that few teachers stated they use problems and questions in the teaching of division. Similarly, only a small number of teachers mentioned real-life connections, concretization, and analogy. Teacher statements emphasize the importance of highlighting the relationship of division with operations such as multiplication and subtraction, as well as checking children's prior knowledge, which also stands out.

Table 3

Classroom Teachers' Approaches to Sharing and Grouping Approaches Used in Teaching Division

Category	Example Phrases	Definition Of The Category
Meaning of the operation (1,3,7,8,10,11,14,16,18)	If I give these two problems to the students, I will actually be emphasizing the two different meanings of division, namely grouping and sharing (1) In the first problem, if I want to make 2 cakes with 6 eggs, we are using division in the sense of sharing. We emphasize sharing by distributing eggs to the cakes one by one. In the second problem, we emphasize grouping 6 eggs into groups of 3. (7)	Definition of the two strategies used.
Learning (1)	These meanings make the logic of division clearer. 1)	Conditions necessary for meaningful learning of the process.
Strategy error (2, 5,6,12,13,19)	Well, teacher, there is actually grouping in both cases here. Yes, here, you know, first by grouping in pairs, then by grouping in threes,	Not knowing or confusing the meanings of

	we could show the children that there are two different results here.2) This is again a distribution. From 6 eggs, cakes are made 3 by 3; again, it is distribution. (5) Our children generally, in such a situation, immediately do the classic approach of dividing 6 by 2, or in the second problem, dividing 6 by 3. 12)	grouping and distribution.
Operational meaning (4, 6,9,15,17,20)	They need to perform subtraction in pairs with 6 eggs. Since they will do consecutive subtractions, I emphasize that they need to subtract 2 by 2 from 6 until they reach zero. The number of subtractions they do equals the quotient in this section, and I try to draw attention to this.4) In other words, in these two problems, switching the divisor and the quotient shows that the result does not change. (9) In the first problem, in the division operation, I think the dividend is emphasized there. That is, it emphasizes the dividend there, while in the second question, I think it emphasizes the divisor. (17) Subtraction operation, vertically… (20)	An approach to the problem: Teaching the operation.

"What do we emphasize in teaching division by using two problems? Problem 1: I want to make 2 cakes with 6 eggs. How many eggs should I use for each cake? Problem 2: With 6 eggs, using 3 eggs for each, how many cakes can I make?" When examining the responses of classroom teachers to this question, categories such as operational meaning, learning, strategy error, and procedural meaning can be observed. Nine teachers stated that they could see the meanings of the division operation when examining the problems, while six teachers' statements indicated either that they did not know the approach or that they chose the wrong approach for the problem statement. Six teachers expressed that they viewed the problem only as the mechanical teaching of the operation. One teacher stated that these problem situations would be effective in teaching the operation meaningfully.

Table 4

Classroom Teachers' Approaches to the Use of Models in Division

Category	Example Phrases	Definition Of The Category
Teaching approach (1,2, 4,7,8,11,12,13,14,15,18,19)	We grouped them in fours. We can also see this as a distribution or as a grouping (1) Use it to show that they can make groupings in different numbers. (4)	Relating the given model to distribution and grouping approaches.

Operation relationship 1,3,7,12)	Since division is already, umm, the opposite, the inverse of multiplication (1) He also points to the commutative property of multiplication. Like 3x4 = 12 and 4x3 = 12. We can use this model by relating it to multiplication. (3)	Associating it with subtraction and multiplication operations based on the model.
Rhythmic counting (1, 12)	We can do this in two ways. Like 2, 3, 6, 9, 12, we say we have 12 eggs or 12 candies.12.	Defining the model as rhythmic counting.
Concretization (1)	I use it to concretize multiplication, uhh, and thus they grasp the logic of division as well. (1)	Concretizing the division operation.
Introducing the model (5, 16,18)	For example, if there are 12 dots, we can show them in groups of 3 or 4. (5) In this model, 12 objects are divided into 4 groups of 3 each. It can also be seen by looking at the rows. (6) We can show the modeled form of 12 divided by 4 equals 3. (16)	Visual introduction of the model.
Relationship between the terms of the operation (6,7,9,10,13, 17)	Even if the divisor and the quotient switch places, the dividend remains the same. It can be used to demonstrate this property. 6) I explain that the total number of objects is the dividend, the unshared, ungrouped state is the dividend, if there are 3 vases, this is the divisor, and the quotient is how many are placed in each vase. (7) The elements of the division operation are the dividend, divisor, and quotient. (13)	Emphasizing the terms of the division operation and the relationships between the terms.

In questions 3 and 4, the model presented as four columns and three rows is accompanied by the questions: "How would you use the given model for the division operation? What would you emphasize when using the model in the division operation?" Upon analyzing the responses of classroom teachers, the following categories emerged: "Teaching approach, operation relationship, rhythmic counting, introducing the model, relationship among the terms of the operation." Most teachers stated that the model would be used to emphasize and teach the approaches to the division process. Only one teacher mentioned that the model could be used for concretization, while some teachers emphasized that students could recognize the relationship among the terms of division — "divisor, dividend, and quotient." In another noteworthy category, teachers only introduced the model but failed to establish a connection with meaning or instruction. The statements of teachers who noticed the relationship among division, multiplication, and subtraction operations in the model are also noteworthy.

Table 5

Analysis of Problems Posed by Classroom Teachers Regarding the Concept of Remainder in Division

Category	Example Phrases	Definition Of The Category
Sharing (1, 2, 5, 6, 8, 11, 12, 13, 14, 16, 17, 19, 20)	21 apples. How can we share these apples equally? (1) If 3 friends share 20 walnuts, how many walnuts are left? (2) If I share 21 candies equally among 4 students (5) When we distribute 87 eggs into boxes of five (17) I had 20 candies. If I share them equally among 3 children (19) I’m sharing my 21 walnuts with 4 friends (20)	Expression used in the question in the sense of sharing
Directly asking about the remainder (2, 5, 7, 11, 12, 13, 14, 15, 16, 18, 19)	If I share 21 candies equally among 4 students, how many candies will I have left? (5) How many pencils are left? (7) I have 25 candies. If I share them equally among 4 children, how many candies will be left? (11) might have 10 marbles. When I divide them among three friends, they might ask me how many marbles I have left (18) had 20 candies. If I share them equally among 3 children, how many candies will be left? (19) We have a 98 cm fabric. We divided it into 6, sorry, we will distribute to 5 people. How many cm will remain? (6)	Expression used in the question in the sense of "how many are left."
The remainder is what’s left (17)	When we distribute 87 eggs into boxes of five, how many eggs are left in the basket? (17)	Expression used in the question in the sense of "how many are left over."

When primary school teachers were asked to create a question where the remainder would be the result of the problem, teachers generally tried to construct sharing-type problems. Examples of such problems include: “If 20 walnuts are shared among three friends, how many walnuts will be left? (2)” and “If I divide 21 candies equally among 4 students (5).” These are two types of sharing problems. The problems used are generally very similar to each other. Upon examination, it is noticeable that the problems are single-step and directly ask for the remainder. Only one of the primary school teachers used the concept of ‘increasing’ while asking about the remainder, still within the context of sharing. The selected problems focus on sharing existing quantities. It is thought that this is influenced by the primary education level at which the teachers teach, and it can be said that the teachers prefer routine problems.

Table 6

Classroom Teachers' Teaching Strategies for the Concept of Remainder

Category	Example Phrases	Definition Of The Category
Remainder-Divisor Relationship (1, 2, 3, 5, 6, 7, 9, 11, 12, 19)	The remainder must not be greater than the divisor, and primary school students must know this. (1) It is sufficient for them to know that in a division operation, the remainder cannot be greater than the divisor; it can be one less than the divisor. (2) Whatever our divisor is—let's say our divisor is 4—if the remainder is less than 4 and the reason for this is explained clearly, and if this is taught to students through problems, they learn it after a while. (12)	The remainder must be smaller than the divisor
Sharing (2, 5, 7, 13, 17, 19)	The remainder expresses what is left in hand, the part we could not fully distribute. (5) They should know that the remainder cannot be shared and that it is the leftover. If there is a non-zero value left, this means it can no longer be shared. (7) I always emphasize to children that division is about equal sharing, so that there is no unfairness. I tell the children: Look, when something is shared, all of it must be distributed equally. (19)	Understanding that the remainder is the part that cannot be shared equally
Classification (3)	We teach division as division with a remainder and division without a remainder. (3)	Types of division operations
Misconceptions (4)	The students should not think that the remainder is the result. They should not mark the option according to that. I explain this: I say the remainder is unimportant for us, but that they will use it to reach the quotient. They need to know this. (4)	Misunderstandings such as thinking the remainder is the result
Division Terms (5, 14)	Children should not confuse… they must know all the mathematical terms completely in the term instruction. What is the divisor? What is the dividend? (14)	Definitions of dividend, divisor, quotient, and remainder
Relating to Daily Life (8)	They should notice that the things we use in life cannot always be divided evenly. That is enough. (8)	Real-life applications of the remainder
Divisibility (8, 18)	They should know that not every number can be divided evenly by every other number, and that there can be a remainder. (8) Although teaching divisibility rules to primary school students is a bit difficult, we can teach some simple divisibility rules, like divisibility by 2, 3, and 4. They must certainly learn that the remainder also needs to be added later. (18)	Property of divisibility without a remainder
Concretization (14)	I use something like a squirrel toy or have them draw a squirrel picture and put 2 nuts in front of it, or place the squirrel and let it take them, and so on. The children enjoy it very much and really understand it well. (14)	Representing the remainder with objects
Division-Multiplication Relationship (19)	Of course, there is also a great relationship between division and multiplication. We didn't mention the multiplication table, but if the child does not know how to multiply or the	Explaining the remainder through the division-multiplication relationship

	multiplication table well, they also have difficulty understanding and performing division. (19)	
Remaining Element (4, 7, 8, 20)	The remainder is the number left over from the operation.4) They should know that the remainder cannot be shared and is the leftover. (7) They should know that not every number can be divided exactly by every other number, and that there can be leftovers. (8) The remainder is what is left in hand and later needs to be separated. (20)	Understanding the remainder as the part left over after the operation

When examining the responses of classroom teachers to the question, "What do you think primary school students should know about the remainder in division?", the following categories can be identified: the relationship between the remainder and the divisor, sharing, classification, misconceptions, division terminology, real-life connections, divisibility, concretization, the relationship between division and multiplication, and the concept of the increasing element. Ten teachers stated that students should understand that the remainder must be smaller than the divisor. Six teachers particularly emphasized the relationship between the remainder and sharing, while four teachers highlighted that the remainder is an increasing element. One teacher focused on teaching both divisions with and without remainders, another teacher stressed that the remainder should not be confused with the quotient, one teacher emphasized linking the concept to real life, one teacher pointed to the importance of concretization, and one teacher stressed the relationship between division and multiplication. Two teachers highlighted the importance of understanding division terminology, and two teachers emphasized the importance of teaching divisibility rules. Four teachers stated that the remainder should be identified as an increasing element.

4. Discussion and Conclusion

This study, which aims to examine in detail the knowledge and experiences of classroom teachers regarding the teaching of division, reveals how classroom teachers teach division, how they use division approaches in their teaching, and how they model division. The classroom teachers stated that when teaching division, they pay attention to assessing students' prior knowledge, concretizing it, applying division and grouping approaches, incorporating daily life connections, demonstrating the relationship between consecutive subtraction and division, and using repetition exercises to ensure the process is more persistent. They also stated that they adopt an approach from simple to more complex operations in the teaching division, emphasizing the relationship between division and other operations such as multiplication and subtraction. The results indicate that few teachers reported using problem and question statements in teaching division, and that the few teachers who mentioned daily life connections, concretization, and analogy were superficial. Korkmaz (2021) states that classroom teachers are reluctant to perform operations based on place values in division, that instructional explanations are inadequate, and that their operational knowledge is superficial.

In order to examine the sharing and grouping approaches used in teaching division, two problem situations representing each approach (grouping–sharing) were presented to the elementary school teachers. While some teachers stated that they were able to recognize the meanings of division when examining the problems, the statements of others indicated that they either did not know the approach or incorrectly identified the approach represented in the problem. Fischbein et al. (1985) describe two approaches to teaching division. In the sharing approach, the number of items is known, but the number of groups is unknown; in the grouping approach, the number of items per group is unknown, but the number of groups is known, and the quotient represents the number of groups. Correct understanding and use of these approaches by teachers can enable stronger learning outcomes. Roche and Clarke (2013), in their study, reported that teachers were familiar with the sharing approach; however, even after participating in a professional development program, they continued to struggle with the grouping approach and found it difficult to construct appropriate story problems for each meaning. In light of the findings of this study and previous research, it can be suggested that division approaches should be emphasized more carefully during teacher education programs.

In addition to teachers who state that they use a mechanical process rather than meaningful instruction in division, classroom teachers can be found stating that using problems is effective in teaching division meaningfully. Shulman (1986), while emphasizing the teacher's knowledge of the content they teach, also emphasized that this knowledge is meaningless unless it is integrated with pedagogical understanding. The importance of classroom teachers focusing on the meaningful teaching of division, in addition to rules and algorithms, is noteworthy here.

When examining elementary school teachers' approaches to the use of models in teaching division, it was found that while some teachers stated that models could be used to emphasize the approaches to division and to teach the operation itself, only one teacher indicated that models could be used for concretization. Some teachers noted that models could help students recognize the relationships among the terms of division, whereas others merely described the model without establishing a connection between its meaning and instructional use.

The use of schematic models can help students notice the multiplicative relationship among the divisor, dividend, and quotient, thereby facilitating subsequent learning, such as understanding fractions (Rizvi & Lawson, 2007). Statements by teachers who recognized the relationships among division, multiplication, and subtraction as represented in the given model were also noteworthy. Children may struggle to learn division when instructional processes fail to establish strong connections between models and the standard mechanical procedures (Fischbein et al., 1985).

Since division is a more complex operation compared to others and carries heavier relational meanings among its components, the use of models and the way these models are integrated into instruction requires professional consideration. Even the teaching of the procedural aspect of division can be made easier through the use of effective models. Sitrava et al. (2020) found in their study with pre-service teachers that the lack of exposure to division in different contexts might prevent them from using varied representations. These contexts should differ in terms of the relationships between the terms of division, the approaches to the operation, and their connection with other operations. In this way, the use of models and related contexts can contribute to a more meaningful instructional process for teaching division.

In this study, when teachers were asked to pose problems related to the remainder in division, it is noteworthy that teachers generally attempted to pose problems of the sharing (partitive) type, the problems used were very similar to each other, and they were single-step problems where the remainder was directly asked. When the primary school teachers' teaching processes and the problems they posed regarding the remainder are examined, it can be considered that they have a one-sided and non-relational structure. Problem situations that emphasize the remainder, such as the relationships between the terms of the operation and operational relationships, are not included among the problem situations posed by the teachers. Again, the problems posed have a very simple structure. Thompson et al. (2007) state that when teachers gain insight into the effects of their own teaching activities on their students' learning, they can reason about the meaning of what they teach and coordinate what they teach with a relational thinking approach. When the primary school teachers' teaching strategies regarding the concept of remainder are examined, it is striking that they specifically emphasize the need to help students grasp the necessity that the remainder must be smaller than the divisor, providing the sharing relationship, and emphasizing that the remainder is the leftover element. Statements from primary school teachers are also observed, indicating that the remainder should not be confused with the quotient, the concept of remainder should be related to daily life in teaching, and the terms of division and the rules of exact divisibility should be grasped. This study was conducted to reveal primary school teachers' experiences regarding the teaching of division operations. In new studies to be conducted, taking the emerging results into account, detailed survey studies on large groups regarding the teaching of the division operation can be carried out. Furthermore, in-service training programs for primary school teachers can be implemented.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest in this study.

RESEARCH AND PUBLICATION ETHICS STATEMENT

The authors declare that research and publication ethics are followed in this study.

The necessary permission to conduct the study was obtained from Social and Human Sciences Research and Publication Ethics Committee of Kütahya Dumlupınar University (April 28, 2025-2025/04)

AUTHOR LIABILITY STATEMENT

The authors declare that they have done every step of this work themselves.

GENERATIVE AI USE DECLARATION

The authors declare that GenAI tools were not used in this study.

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