Participatory Educational Research (PER)
Vol.13(6), pp. 1-24, November 2026
Available online at http://www.perjournal.com
ISSN: 2148-6123
http://dx.doi.org/10.17275/per.26.76.13.6

Id: 1860761

Scenario Writing Practice with Pre-service Teachers on the Conflict between a Traditional School Principal and an Innovative Mathematics Teacher

Rabia SARICA*
Faculty of Education, Department of Educational Sciences Curriculum & Instruction, Kırşehir Ahi Evran University, Kırşehir, Türkiye
ORCID: 0000-0002-8725-3646

Article history
Received:
10.01.2026

Received in revised form:
15.04.2026

Accepted:
20.07.2026

Key words:
Conflict-based pedagogy, scenario-writing, mathematics teacher education, professional identity, teacher reflection

Although scenario-writing is often associated with creative fields can serve as a reflective tool in teacher education. This study examines a scenario-writing task conducted with 30 pre-service mathematics teachers in the course "Communication in Mathematics Classrooms." The task was based on a fictional conflict between a traditional school principal and an innovative mathematics teacher to encourage critical reflection on educational realities. Using a case study design, qualitative data obtained from the written scenarios were analyzed via content analysis. Five main themes emerged: school principal, teacher, teaching-learning process, assessment-evaluation, and parents. Participants portrayed school principals as authoritarian and exam-driven school culture, while portraying teachers as idealistic, student-centered, and innovative. The teaching-learning process reflected concerns about rote learning, while assessment practices highlighted exam pressure. Parental influence was characterized by expectations and dissatisfaction. The findings show that conflict-based scenario-writing fosters critical reflection, reveals pedagogical beliefs, and supports professional identity development, offering a valuable strategy for preparing future mathematics teachers.

Introduction

Despite growing discussions about the potential of intelligent tutoring systems and robots to replace teachers, the indispensable role of teachers became particularly evident during the suspension of face-to-face education caused by the COVID-19 pandemic, which, as Velásquez-Rojas et al. (2022) emphasized, has clearly highlighted the interactive nature of teacher-supported learning. In this context, teacher education has once again become a major topic of discussion, both in Türkiye and internationally. Like other levels of education, undergraduate teacher education is undergoing substantial reform and transformation. In Türkiye, various reforms and revision efforts are underway in this regard. Teachers preparing 21st-century learners must be equipped with the necessary knowledge, skills, attitudes, and professional dispositions.

In Türkiye, particularly after the 2000s, curricula across all levels—from primary to higher education—have been revised in line with changing needs and contemporary educational

* Correspondency: rabiasarica@gmail.com

paradigms (Sarıca, 2018). Since the 2000s, various programs developed for different disciplines have incorporated a range of theories, strategies, methods, and approaches, including field trips and observation, student-centered learning (Aykaç et al., 2011), constructivism, inquiry-based learning (Karatay, Timur & Timur, 2013), active learning and activity-based learning (Demiralp, 2017), multiple intelligence theory (Albuz & Demirci, 2018), and interdisciplinary approach (Öztürk & Kafadar, 2020). In the latest programs developed, teachers are expected to be willing to use different methods and techniques, various assessment tools, be open to innovation, adapt instruction to students' needs and developmental levels, and successfully manage processes in which students are active (MoNE, 2024). As a result, pre-service teachers are expected to employ a wide repertoire of instructional strategies upon entering the profession.

Despite the inclusion of modern teaching and learning approaches in undergraduate teacher education programs, traditional methods remain dominant in practice. This highlights the need for innovative perspectives in teacher education. Zeichner (2010) emphasizes that university-based teacher education is often disconnected from school practice, with much of the coursework lacking direct relevance to primary and secondary school contexts. Similarly, Duatepe-Paksu and Akkuş (2007) found that mathematics teachers predominantly relied on lecturing and question-answer techniques, rarely used instructional materials beyond the textbook, and rarely engaged students in interactive activities. Revisions in undergraduate teacher education programs have primarily focused on course-level adjustments, such as the introduction of new courses and the diversification of elective offerings. Accordingly, the lecture "Communication in Mathematics Classrooms" has been introduced as an elective course in mathematics teacher education programs. However, a study by Kabael and Ata Baran (2016) revealed that pre-service mathematics teachers generally demonstrated limited awareness of mathematical communication skills. This finding underscores the importance of such a course in teacher education. Because the participants in this study were pre-service mathematics teachers, it is important to briefly outline the latest developments in teacher education in Türkiye.

Recent Developments in Teacher Education in Türkiye

Teacher education in Türkiye has a long history, dating back to the Ottoman era. Throughout history, this system has undergone many changes. This section focuses on recent developments rather than a comprehensive historical overview. The teacher education system prior to the implementation of the Teaching Profession Law, which came into effect in 2024, can be summarized as follows: Teachers are educated in faculties of education at universities, and admission is based on a nationwide standardized exam—the Higher Education Institutions Examination (YKS). Candidates are admitted to teacher education programs based on their exam scores and preferences. Primary and secondary education teachers are trained through distinct programs, typically lasting four and five years, respectively. These programs comprise 240 ECTS credits, including professional knowledge, subject-area pedagogy, and general education courses. Teacher candidates graduating from faculties of education take a public personnel selection exam (KPSS) consisting of three sections: General Aptitude-General Culture, Educational Sciences, and Teaching Field Knowledge. Appointments are made based on candidates' examination scores. Furthermore, the much-debated pedagogical training program has continued in recent years. According to this program, graduates of non-education faculties also complete a pedagogical formation program and follow the same recruitment and appointment process as teacher candidates graduating from faculties of education.

With the enactment of the Teaching Profession Law No. 7528 in 2024, the National Education Academy was established, marking a new phase in teacher education and recruitment. Güneş (2025) summarizes this new process and path as follows: The National Education Academy has made pre-service training for prospective teachers mandatory from 2025 onwards. The program consists of theoretical and practical courses determined in line with the competencies of the teaching profession (National Education Academy Presidency Regulation, 2025; MEB, 2025b). In this context, the Academy Entrance Exam (AGS) and the Teacher Field Knowledge Test (ÖABT) have replaced the KPSS exam for entry into the teaching profession. Candidates selected on the basis of these examination scores are admitted to preparatory training by the National Education Academy. The teacher preparatory training conducted by the National Education Academy encompasses theoretical and practical courses structured based on the competencies of the teaching profession (knowledge, skills, attitudes, and values) determined by the Ministry. The standard duration of preparatory education is set at four semesters, but this period can be reduced to three semesters depending on the higher education program from which the candidate graduated. At the end of preparatory education, the final appointment score is calculated by taking the sum of 40% of the average grade of theoretical courses and 60% of the average grade of practical courses (Teaching Profession Law, 2024, as cited in Güneş, 2025).

Despite these structural adjustments, several ongoing challenges in teacher training remain. These include problems in assessment and evaluation during the teacher recruitment process, the lack of practical application in the courses given to pre-service teachers, the ineffectiveness of in-service training for teachers already in the profession, and the fact that teachers' economic and social conditions remain unsatisfactory (Baş & Nural, 2023). Furthermore, there are issues such as out-of-field appointments, the appointment of graduates from various higher education departments as teachers after short-term training, and the absence of a fundamental policy in teacher training (Bulut & Akagündüz, 2025). Moreover, many pre-service teachers enter the profession not out of personal interest but due to placement scores, and field-specific instruction is often delivered in isolation from authentic school settings. Similar issues exist in mathematics teacher education. Nacar, Akarsu, and İler (2026) addressed the problems in training mathematics teachers under three main headings: technological infrastructure problems, lack of knowledge, and lack of experience. Another study on mathematics education and teacher training in Türkiye Akbayır and Taş (2009) indicates that some pre-service teachers do not choose the teaching profession willingly, and while cognitive qualities are prioritized in the selection process, physical and psycho-social characteristics are neglected. Furthermore, pre-service mathematics teachers lack sufficient knowledge about the curricula implemented in schools, their teaching internships are relatively short, and that as a result, they are unable to adequately familiarize themselves with the classroom environment, students and the school environment (Akbayır & Taş, 2009). In summary, the main problems related to teacher training and employment processes can be grouped into four categories: input (student selection), process (training and practice), output (qualification, employment), and system (Güneş, 2025).

Scenario-based learning activities in teacher training

Scenarios are descriptive tools that have gained increasing attention across disciplines due to their potential to clarify complex situations and facilitate stakeholder communication. While traditionally used in domains such as defense, health, and climate change, they have increasingly been adopted in fields like education and information systems because of their explanatory value (Do Prado Leite et al., 2000; Saussois, 2006; Van Notten, 2006). In

educational contexts, scenarios often serve as predictive models or are employed in scenario-based learning approaches. Scenarios are defined as consistent and coherent narratives based on alternative assumptions, scenarios allow for multiple perspectives on past, present, and future developments (Van Notten, 2005, cited in Van Notten, 2006). Their value lies in capturing dynamic situations and making hidden variables or assumptions explicit. Çiçek Aydoğdu and Ayaz (2025) argue that scenario-based learning is grounded in constructivist and cognitive learning theories and suggest that this method should become an integral part of school education.

Sorin (2013) describes scenario-based learning as an important tool in the transformation of learning and teaching in higher education, arguing that scenarios expose students to situations derived from real classroom environments. She notes that this approach enables students to play a more active role in their own learning and offers opportunities to develop real-life skills beyond the classroom. She further emphasizes that students participating in scenarios addressing global teaching problems gain knowledge and experience that can be transferred to different international contexts.

In teacher education, fostering the ability to "think and act like a teacher" is considered essential (Akkoyunlu et al., 2016). Scenario-writing can serve as an effective tool for promoting reflective thinking among pre-service teachers. Glaser-Zikuda et al. (2024), argue that reflection integrates theoretical knowledge with practical experience and is essential for the professional development of teachers, argue that developing the reflective abilities of pre-service teachers is one of the most important challenges in teacher education. They further note that cognitive and linguistic features of reflective writing are important indicators; their research revealed that pre-service teachers generally exhibited low levels of reflection. In teacher education, scenario-based activities can support the reflective skills of pre-service teachers.

Rushby et al. (2025) noted that teacher education programs can prepare pre-service teachers for their first teaching internships by providing activities that offer realistic and challenging classroom scenarios that encourage pedagogical reasoning. They conducted research involving an online "scenario-based learning" (SBL) intervention that offered pre-service teachers a series of short video and text-based teaching scenarios, opportunities for self-reflection, and personalized feedback from experienced teachers. The research results highlighted that reflection on the scenarios, together with expert feedback, resulted in a positive increase in pre-service teachers' self-efficacy, and that providing pre-service teachers with realistic classroom experiences supported by expert feedback and reflection opportunities is beneficial. Hilton (2003) conducted a scenario-writing study in teacher training; she reported that new curricula were designed to meet the needs arising from the scenarios written by students for the future, and these were discussed with peers. She also noted that many students found the scenario-based learning process challenging but nevertheless embraced it, that the use of scenarios improved their understanding of the subject matter, and that they took more responsibility in their own learning processes.

Near-real-world scenarios presented and examined with appropriate support, can provide an excellent tool to help students— future professionals —acquire the kind of contextual knowledge employers seek in the professional workplace, thereby providing rich practical experience beyond traditional lectures or seminars (Errington, 2011). Della Volpe (2024) proposes scenario-based learning as one of the most promising methods for promoting genuine inclusion. Della Volpe (2024) argues that this innovative approach, which involves

creating real or simulated contexts to confront students with real problems, can foster problem-solving, creativity, and critical thinking skills, and points out that learning through scenarios offers an inclusive approach for creating a truly accessible and equitable learning environment for everyone. Bardach et al. (2021), who describe scenario-based learning activities as a promising approach for preparing pre-service teachers for classroom practice and teaching internships and increasing their self-efficacy, state that using this method in online environments would be particularly advantageous. However, the authors note the limited number of systematic studies examining the use of complex classroom scenarios (scenario-based learning activities) in online settings. In their study, Alsaeed and Mohammed (2023) investigated how a scenario-based (SB) one-term professional development program affected the teaching practices of pre-school mathematics pre-service teachers. Their findings showed that scenario-based activities improved pre-service teachers' perceived teaching competence and their motivation to use student-centered instruction when teaching early mathematics concepts.

Significance and Purpose of the Study

Pre-service teachers are introduced to school environments in the final year of their undergraduate education (Council of Higher Education-CoHE, 2017). This limited exposure may hinder their ability to apply theoretical knowledge, become familiar with real classroom dynamics, and understand the teaching-learning process and student diversity. It is widely acknowledged that early and authentic school-based experiences are essential for enhancing professional competence. Therefore, accessing school settings only in the fourth year may be considered too late for meaningful practice.

To address this limitation, this study implemented a scenario-writing activity as a pedagogical intervention within the course "Communication in Mathematics Classrooms." The study examined the educational perspectives and pedagogical components reflected in the scenarios developed by pre-service teachers. Scenario-writing activities offers a reflective and practice-oriented alternative, yet research on its application in teacher education remains limited. The literature recommends incorporating scenario-based activities into the preparation of pre-service mathematics teachers during their undergraduate education, and it is stated that scenario-writing exercises on how to teach concepts in the mathematics curriculum are important (Ercan & Patan, 2022).

Such activities are expected to contribute to pre-service teachers' skills in written communication, creativity, imagination, research, and mathematical discourse. In scenario-building studies conducted with pre-service science teachers, the findings indicated that participants demonstrated a significant improvement in their teaching methods and techniques compared with the period before the intervention (Erduran Avcı & Bayrak, 2013). Moreover, these activities provide opportunities for self-assessment and preparation for future classroom environments.

Research on the use of scenario-based learning interventions in teacher education remains limited (Alsaeed & Mohammad, 2023; Bardach et al., 2021). Accordingly, this study aims to explore the educational elements reflected in the scenarios written by pre-service mathematics teachers and to evaluate the use of scenario-writing as an instructional tool in teacher education. In this context, the study is important for revealing how pre-service teachers construct pedagogical thinking, instructional design, and stakeholder relationships. In the teacher education literature, there are relatively few qualitative studies that comprehensively

address how pre-service teachers structure educational components, learning processes, and relationships with stakeholders through written scenarios. This highlights an important research gap in understanding how pre-service teachers address all these issues. In this context, the study aims to fill this gap by providing in-depth insights into pre-service teachers' perspectives on such topics. The findings are expected to inform the development of teacher education programs and support the more effective integration of scenario-based learning approaches into teacher education.

Method

Research Design

This study adopted a case study design, one of the qualitative research methodologies commonly used in educational research, particularly when the researcher has limited control over the variables under investigation (Ozan Leymun et al., 2017). Yin (2014) describes case study research as "a distinctive form of empirical inquiry." Beyond their research function, case studies are also widely used as instructional tools, offering opportunities for learners to engage with real-life situations, reflect on their learning, analyze problems, and discuss possible solutions (Pollock, 2013). Case studies can adopt various forms, including holistic single-case, embedded (nested) single-case, and multiple-case designs (Yıldırım & Şimşek, 2008). The holistic single-case design is particularly recommended for underexplored topics or difficult-to-access phenomena. Given the limited number of studies investigating the use of scenario-writing in teacher education, this study employed a holistic single-case design. The scenario-writing activity was treated as a single holistic case and analyzed accordingly.

Working Group

The participants in this study consisted of 30 second-year pre-service mathematics teachers enrolled in the Department of Elementary Mathematics Education at Kırşehir Ahi Evran University during the 2019–2020 academic year. The scenario-writing activity was implemented as part of the elective course "Communication in Mathematics Classrooms," which was introduced into the teacher education curriculum following the Council of Higher Education's (CoHE) 2018–2019 curriculum revisions. The participants were coded as P1, P2, P3, ... , and P30. These codes are used throughout the tables and presentation of the findings.

Data Collection and Experimental Process

The content of the Communication in Mathematics Classrooms course was designed in alignment with the Higher Education Council's (CoHE, 2021) updated recommendations and included the following key topics: mathematical language and its unique symbols, correct and effective use of terms and notations, the relationship between mathematics and daily life or other disciplines, and expressing mathematical thinking through verbal, written, and visual representations. Additionally, the course emphasized interpreting mathematical ideas and connecting everyday language and mathematical language. As part of the course, pre-service teachers received targeted training on scenario-writing. This included instruction on scenario elements (such as characters, setting, time, and events), dialogue construction, pedagogical context, semantic clarity, audience awareness, creativity, and effective storytelling. Sample activities, video screenings, and selected readings supported the instruction. Scenario-writing tasks were completed collaboratively, with the themes jointly determined by the instructor and the participants. These themes were selected from both the mathematics curriculum and current educational issues.

Throughout the semester, the pre-service mathematics teachers engaged in a series of scenario-writing activities. These scenarios were reviewed and discussed in class by peers and the instructor, focusing on cultural relevance, language, student-level appropriateness, pedagogical value, and mathematical clarity. In the scenario-writing activity, which is the subject of this article, the pre-service teachers addressed a conflict between a traditional school principal and an innovative mathematics teacher. Pre-service teachers were asked to envision themselves as newly appointed teachers and to write a scenario based on an imagined or realistic encounter with a principal.

In this study, a large dataset was generated through scenario-writing activities conducted with pre-service teachers across six distinct and independent thematic units. From this dataset, one thematic unit was selected for in-depth analysis based on its direct relevance to the research questions and its potential as the most information-rich (i.e., analytically rich) case, following a preliminary cross-thematic review and comparison of the entire dataset. This selection was guided by purposive sampling principles and aligns with information-rich case selection strategies commonly used in qualitative research (Creswell & Poth, 2018; Patton, 2002).

Data Analysis

The data were analyzed using the content analysis technique. This method enables in-depth examination of qualitative data and facilitates the identification of concepts and themes that best represent the dataset (Yıldırım & Şimşek, 2008). According to Hsieh and Shannon (2005), content analysis can be conducted through three distinct approaches: traditional, directed, and summative. While all aim to interpret meaning from textual content, their primary differences lie in coding strategies, the source of the codes, and credibility threats. In traditional content analysis—adopted in this study—coding categories emerge directly from the raw data without the influence of prior theories or frameworks.

In the data analysis process, first, the scenarios written by the pre-service teachers were organized into electronic files by the researcher. Then, the dataset was repeatedly reviewed by the researcher to generate initial codes. To enhance credibility, the preliminary coding scheme was created by the researcher and submitted to an expert for evaluation. The expert involved is a professor of education and is experienced in statistical and qualitative methodologies. Later, the researcher made some adjustments to the coding scheme based on the expert's feedback. The codes were then grouped into overarching themes based on conceptual similarities. Subsequently, the researcher and the expert worked collaboratively to reach consensus on the final coding structure and theme categorization. Following this, the researcher and the expert independently re-analyzed the dataset within the framework of the agreed-upon and finalized codes and related themes. Intercoder reliability was calculated using Miles and Huberman's (1994) formula Reliability = Consensus / (Consensus + Disagreement) × 100, resulting in a coefficient of .87, indicating a high level of agreement between coders (the researcher and the expert). Finally, owing to the comprehensive and multi-stage nature of the data analysis process, the reporting of the study required an extended period of time. This may be considered a limitation of the study.

The findings are organized into five themes. These are school principal, teaching-learning process, teacher, assessment and evaluation, and parents. The codes, frequencies, percentages, and corresponding participants under each theme are presented in tables. Illustrative quotations from the participants' scenarios are given right after the tables. However, the number of quotations is limited because of space constraints. Some of the pre-service teachers

used fictitious names for the principal and mathematics teacher in their scenarios. These names are retained in the excerpts exactly as they appear in the participants' scenarios.

Results

Results Related to First Theme

The findings regarding the first theme, school principal, are presented in Table 1.

Table 1. Findings for the School Principal Theme

Theme	Codes	Participants	F	%
School Principal	Exam success/ grade/ net focused	P1,P2,P3,P4,P6,P7,P8,P9,P10,P11,P12,P13,P14,P15, P16,P17, P18,P19, P20,P21, P22, P23, P24, P25, P26, P27, P28, P29	28	29,17
	Cares about school advertising	P2,P3,P4,P5, P7,P8,P9,P11,P13,P14,P15,P16, P17, P18, P21, P23, P24, P27, P28	19	19,79
	Against different methods and techniques (advocating traditional methods)	P1,P3, P4,P7,P8,P10, P13,P14, P19, P20, P22	11	11,46
	Has the wrong style	P1,P2,P4,P6,P8, P14,P16, P17, P18, P20, P22,P23, P24, P25, P26	15	15,63
	Putting pressure on teachers	P2,P7,P8,P9,P11, P16, P21,P25, P26	9	9,37
	Office and armchair lover	P1, P2, P7, P8,P16,P17, P21,P23, P26	9	9,37
	Ambitious	P1, P23, P25, P26	4	4,17
	Moneyman	P1	1	1,04
		Total	96	100

The findings indicate that the pre-service teachers highlighted several issues related to the school principal. The participants predominantly portrayed the school principal in negative terms in their scenarios, describing principals as money-oriented, power-oriented, and resistant to innovation. This portrayal may reflect either the pre-service teachers' perceptions and imagination or their previous experiences with school administrators during their own schooling. Illustrative excerpts from the participants' scenarios are presented below:

P2: "*Principal: …You didn't solve enough questions in class. You weren't giving the students enough test assignments for the weekend. ……. Last year, three students went to science high school. I want to see at least five students this year*"

P3: "*Teacher: I want to take a trip with my students and take them to the planet house to teach them about the connections between mathematics and space so that they can see the information about mathematics live and notice it in the way we use it in our daily life.*

Principal: Sir, why is there a need for such a job now, these are things that will make them very busy when you say permission, documents or something.

P7: "*Our school principal is in a structure that wants to reach higher positions in national education and cares about advertising. Have an idea that the way to do this is to raise the net average of the school. For this purpose, he puts pressure on the mathematics teacher to solve more tests in the classroom*".

P6: *"The manager starts talking a little nervously. Manager: Sir, what are you doing!! Did you read that regulation? He nervously puts the regulations on the principal's desk."*

Results Related to Second Theme

The findings regarding the second theme, the teaching-learning process, are presented in Table 2.

Table 2. Findings for the Teaching-Learning Process Theme

Theme	Codes		Participants	F	%
Teaching-learning Process	Test-question solving and formula-oriented mathematics teaching		P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, P22, P21, P23, P25, P26,P27, P28, P29	28	12,7
	Traditional understanding of education		P2, P4, P5, P6, P8, P9, P10, P13, P14, P15, P17, P19, P20, P21, P22, P24, P27, P30	18	8,1
	Mathematics teaching related with reel/daily life		P1,P2,P3,P4,P5,P7,P8,P9,P11,P12, P13,P16,P17,P21, P22, P24, P26, P27, P28, P29	20	9,0
	Strategy/Method/ Technique	Meaningful Learning	P2, P4, P5, P6, P7, P8, P9, P10, P11, P15, P17, P20, P22, P26, P27, P28	16	7,2
		Activity/Practice-based teaching	P11, P12, P20, P21, P22, P23, P28, P29	8	3,6
		Learning by doing	P4, P7, P16, P20, P22, P23, P28, P29	8	3,6
		Discovery learning	P2, P4, P6,P10, P23, P28	6	2,7
		Experiment, observation and proof	P1, P2, P4, P6, P10, P14, P18	7	3,2
		Discussion	P2, P10, P22	3	1,4
	Thinking skills	Mathematical questioning and reasoning	P8, P10, P19, P24, P27	5	2,3
		Interpratation	P20, P24, P28	3	1,4
		Problem solving	P8, P13	1	0,45
	Retention		P1, P2, P3, P4, P6, P7,P8, P13, P14, P16, P19, P20, P23, P28	14	6,3
	Out-of-class teaching activities		P1, P2, P3, P4, P6,P7,P12,P14, P26, P29	10	4,5
	Student-teacher and student-student communication		P3, Ö4, P13, P18, P22, P23, P24, P25	8	3,6
	Interest, desire and motivation		P1, P2, P14, P18, P19, P24	6	2,7
	Non-boring, fun learning		P2, P12, P20, P22, P24, P29	6	2,7
	Active participation		P2, P12, P13,P14, P18, P26	6	2,7
	Use of materials and tools in mathematics teaching		P2,P14, P22, P27	4	1,8

Concretization	P1, P3, P17, P26	4	1,8
Exhausting for students	P2, P8, P12	3	1,4
Guidance and orientation	P1, P3,P5, P25	4	1,8
Intensive use of examples in mathematics	P2, P5, P11	3	1,4
Multifaceted development of students	P1, P4, P11	3	1,4
Pre-learning	P17, P20, P26	3	1,4
Additional/Support teaching	P20, P23, P30	3	1,4
Mathematics is a difficult subject	P5, P20, P23	3	1,4
Curiosity	P5,P8,P13	3	1,4
Exam stress and anxiety, students' psychology	P19, P26	2	0,9
Reinforcement	P4,P7	2	0,9
Curriculum	P17, P18	2	0,9
Games in learning	P20, P22	2	0,9
Homework	P2,P26	2	0,9
Lab	P2, P30	2	0,9
Transfer	P10	1	0,45
Sports, social and artistic activities	P2	1	0,45
Technology use	P2	1	0,45
	Total	221	100

The findings indicate that the pre-service teachers addressed a wide range of issues related to the teaching-learning process. The findings suggest that the participants demonstrated a strong pedagogical understanding of the teaching-learning process in mathematics. The pre-service teachers criticized formula-driven mathematics instruction, rote learning and traditional educational approaches, while emphasizing realistic mathematics education, the use of concrete representations, retention, active participation, gamification, mathematical inquiry, and reasoning. They also highlighted affective factors such as interest and motivation. Overall, the findings suggest that the pre-service teachers embraced a student-centered, contemporary teaching-learning process. This perspective may reflect the teacher education they received during their undergraduate studies. Illustrative excerpts from the participants' scenarios are presented below:

P21: "*Mr. Principal: The way you teach caught my attention. You teach by using real life. I don't think it will be useful that way. … For the success of our school, we should prefer test solutions and rote method*".

P4: "*Principal: Solve many tests in the classroom. I would like to see everyone in the classroom. Children just have to study and take tests. No, no trip, no picnic, no lesson in the garden, I do not want to hear such things. School nets are very important to me. …*

Teacher Mehmet: I do not understand. If the teacher wants, he can take them on a tour or take to the garden, no one has the right to interfere in this. Actually, students learn a subject by doing and observing themselves. … Does the future of children depend only on the nets they make?

Principal: Exactly, sir. How will these children prepare for the high school exam without studying and leaving the classroom for hours and solving the test? Can you tell me how they will reinforce what they know?"
P10: "*Principal Omar: ... but these students are exam students, they do not have proofs; you cannot carry them to a place with experiments. At the same time, think about our school success; teach lessons with formula, shortcuts, and many test solutions. This is not a public school; parents bring their children to this school so that they can work for the exam in a short way. Therefore, they complained that it gives you unnecessary information and confuses the children*.
İpek Teacher: Sir, I am aware of these, but things like the formula, test solution you mentioned weaken the thinking ability of children. However, I am trying to gain the habit of mathematical thinking here, which is more valuable than any other belief and may be needed more in their future lives, because an individual who has acquired the habit of mathematical thinking can make connections between events and transfer information between them. This habit is only possible by applying a teaching method that will enable them to find the rules themselves, instead of giving them and memorizing them. ...
P2: "*Principal: (thinks) There is a lot of noise in your classes, teacher.*
Hakan Teacher: It's not noise, teacher. Everyone has their own opinion on the subject. A discussion environment is created in the classroom and a more efficient learning is provided.
Principal: You do not make kids memorize formulas.
Hakan Teacher: Yes, I do not memorize it. I make them find the formula. For example, how many formulas have you memorized in total in your student life? Let me tell. Around 1000. So how many do you remember now? ... Memorization is nothing but a burden of knowledge, it is forgotten.
Principal: (surprised, pauses to say something) ...
Hakan Teacher: Sir, these children are bored and overwhelmed by this burden. All these test books are of no use to them anyway. They are longing to laugh and have fun in the lesson. If you could only see the sparkle in their eyes when they think for themselves, find something, and raise those fingers… Their motivation has increased, my teacher, they do whatever they do willingly. ... It is a shame and a sin to put such a burden on those young minds."
P14: "*... When necessary, they make experiments outside visually, he tries to show it with materials when necessary. As time passes, Yunus Teacher begins to gain efficiency. Students are always active in his lessons and the smiles on their faces make him even happier*."
P1: "*…The teacher is the person whose ideals are that students should find themselves first and direct them to the professions they can do. The teacher is an honest, hardworking teacher who cares about success in life as well as success in the exam and transfers it to his/her students*."

Results Related to Third Theme

The findings regarding the third theme, the teacher, are presented in Table 3.

Table 3. Findings for the Teacher Theme

Theme	Codes	Participants	F	%
Teacher	Commitment to Effective Teaching Practices	P3, P4, P6, P8, P10,P11, P13, P14, P15, P16, P17,P18, P19, P20, P21, P22, P23, P25, P29	19	24,35
	Effective Undergraduate Teacher Education	P3, P5, P7, P9, P12, P13, P15, P16, P21, P22, P23	11	14,10
	Preparing Students for Life	P1, P3, P4, P8, P9, P10, P11, P27	8	10,26
	Idealism	P1, P2, P3, P4, P7, P14, P23, P24	8	10,26

Innovativeness and Progressive Thinking	P2, P3, P4, P14, P23, P25	6	7,70
Enthusiasm and Motivation	P2, P5, P4, P14, P23, P30	6	7,70
Modern Educational Approach	P1, P3, P4, P2, P19	5	6,41
Professional Solidarity and Collegial Support	P4, P7, P12, P18, P26	5	6,41
Professional Competition and Negative Collegial Attitudes	P2, P7, P17,P26	4	5,13
Use of Supplementary Resources	P2, P11	2	2,56
Positive Personal Characteristics	P4, P22	2	2,56
Professional Frustration	P4	1	1,28
Professional development	P5	1	1,28
	Total	78	100

The findings indicate that the pre-service teachers highlighted several issues related to the teacher. The participants generally portrayed the teacher characters in their scenarios in positive terms. The teacher characters were described as idealistic, young, enthusiastic, well-educated, innovative, and committed to effective teaching practices. This portrayal may reflect the participants' identification with the teacher characters or their aspirations regarding the kind of teachers they hope to become. Illustrative excerpts from the participants' scenarios are presented below:

P22: "*Teacher: Principal, what you call a game is a hands-on explanation of the subjects, a discussion on what you call noise. I believe that discussing the definitions by putting the theorems into practice would be more useful instead of processing the math in a quiet way…"*

P23: *"… Because the professors I met at the university taught his students that they should be a teacher beyond the line rather than being an ordinary teacher…"*

"*… Teacher Nursel was halfway through, of course, this would not end, but she had no intention of giving up."*

P27: *"Tuğrul teacher: As long as our aim is to shed light on the student's life and prepare them for the future, we can even set an example for other schools …"*

P4: *"Teacher Mehmet; he is an idealist, open to innovations, newly graduated and appointed, respectful, honest, 6th grade mathematics teacher…"*

P14: *"Teacher Yunus is a young middle school mathematics teacher in the prime of his youth. He has been assigned to a new school. He is very excited to be appointed. He has many goals he wants to achieve and new thoughts."*

P17: *"… There was a rivalry between everyone at his new school. There was even a rivalry among the teachers…"*

Results Related to Fourth Theme

The findings regarding the fourth theme, the assessment and evaluation, are presented in Table 4.

Table 4. Findings for the Assessment and Evaluation Theme

Theme	Codes	Participants	F	%
Assessment and Evaluation	High School Entrance Examination Scores	P2, P4, P7, P8, P9, P10, P17, P22	8	42,10
	Science High Schools as Indicators of Success	P2, P11, P19, P20	4	21,05
	Competitive Education System	P12, P24, P26	3	15,79
	Fair Assessment and Grading	P11, P14, P19	3	15,79
	Lecture notes	P11	1	5,27
		Total	19	100

The findings indicate that the pre-service teachers highlighted several issues related to assessment and evaluation. Since the participants were pre-service middle school mathematics teachers, they focused primarily on issues such as the high school entrance examination and students' examination scores, science high schools, and fair grading. They emphasized that admission to a science high school is often perceived by educational stakeholders as the primary indicator of academic success. Their scenarios reflected the impact of a competitive, examination-oriented education system on students. Illustrative excerpts from the participants' scenarios are presented below:

P9: "*Principal: Nobody knows our school in the city. The ministry wouldn't care if we asked for an allowance. The net scores in the pilot exam and the number of students who go to good high schools are very few. We need to increase these nets."*

P11: *"Manager Mr. Ali: Sir, I understand you. But you know, we need to keep the grade point average high for the success of our school. Let's put out more science high schools in the high school entrance exam so that our school's name will be heard more and we will be preferred more."*

P26: *"Teacher Meva: "You also have children… How would you feel if such an oppressive system was applied to them, if your children's psychology were broken, if their only goal was to get ahead of two or three people? Does that feel fair?" she said and wiped her eyes full of tears"*

P19: *"Teacher: Students will start to get good grades in the course concept that I have planned. The grade they get will be the grade they deserve. And it will not be empty…"*

Results Related to Fifth Theme

The findings regarding the fifth theme, the parents, are presented in Table 5.

Table 5. Findings for the Parents Theme

Theme	Codes	Participants	N	%
Parents	Perceived Pressure	P1, P10, P11, P14, P17, P18	6	40
	Exam-Oriented Conceptions of Success	P1, P14, P17	3	20
	Complaints	P1, P10, P11	3	20
	Positive Feedback and Support	P14, P18	2	13,3
	Valuing Mathematics Education	P5	1	6,7
		Total	15	100

The findings indicate that the pre-service teachers highlighted several issues related to parents. The participants highlighted the pressures and concerns expressed by parents regarding the education system, their examination-oriented perceptions of success, and their emphasis on the importance of mathematics. They also noted that a small number of parents expressed positive feedback and support toward teachers. Overall, the findings suggest that the pre-service teachers generally portrayed parents from a more critical than positive perspective. Illustrative excerpts from the participants' scenarios are presented below:

P11: "*Principal Mr. Ali: Sir, 2 days ago, a parent came to me. ... He complains that his child has few questions to be solved in the math class, that other classes take additional resources and solve them, that his written grades are always 100, but that the written grades in the 6/A class you attend are low, and that you do not care about additional resources and that you solve few questions."*

P14: *"Principal Mr. Hamdi also starts to receive positive feedbacks from the parents all the time. Parents say that their children love mathematics more, that they go to school with enthusiasm and convey it to their teachers...*

Principal Mr. Hamdi: Mr. Yunus, I called you here today to thank you. You were right, very nice statements came from the parents. I request you to make our school very successful. Our name is heard more.

P5: *"Principal: ...As you know mathematics is a subject that both parents care about and students have difficulty with. ..."*

Discussion and Conclusion

In this section, each theme and its sub-codes will be discussed generally within the context of the relevant literature, rather than individually. Notably, the scenarios written by the pre-service teachers frequently portrayed school principals in a negative light. The portrayals included exam- and grade-oriented conceptions of success, pressure on teachers, resistance to innovation, status-seeking, authoritarianism, and material ambition. These perceptions resonate with earlier findings; for instance, Yirci and Berk (2021) emphasize that school leadership is a key element of effective schooling. Similarly, Örücü (2014) found that pre-service teachers predominantly used negative metaphors for school administrators, indicating unfavourable perceptions. In another study, Ağaoğlu et al. (2012) observed that school principals assessed themselves more positively than teachers did, particularly regarding interpersonal communication, organizational management, and educational leadership.

The participants also addressed multiple dimensions of the teaching-learning process, including rote learning, formula-based instruction, the integration of real-world contexts, engagement strategies, thinking skills, student participation, classroom atmosphere, and game-based learning. Despite the adoption of modern pedagogical paradigms in Türkiye after the 2000s, traditional practices still dominate at many levels. This persistence was reflected in the participants' scenarios, which aligns with earlier research identifying the long-standing influence of rote-based education (Hareket, Erdoğan, & Dündar, 2016; Sekin, 2008; Yılmaz & Altınkurt, 2011). Nevertheless, the participants also demonstrated awareness of connecting mathematics to real-life contexts, consistent with Özgeldi and Osmanoğlu's (2017) findings that pre-service teachers value real-world applications of mathematics for enhancing student understanding and motivation.

Under the theme of the teaching-learning process, the participants highlighted the use of various contemporary strategies, methods, and techniques such as meaningful learning, activity-based instruction, learning-by-doing, discovery learning, experimentation, observation, proof, and discussion. These practices align with current literature emphasizing the importance of contextualized and active learning experiences in mathematics education. For instance, Polman, Hornstra, and Volman (2021) note that meaningful learning is supported when mathematics instruction connects with students' prior knowledge, personal experiences, and future goals, and reflects the teacher's own professional identity. Similarly, incorporating meaningful learning opportunities into teacher education programs allows pre-service teachers to develop authentic and transferable teaching experiences (Sailin & Mahmor, 2018).

Research also shows that students who engage in activity-based mathematics learning outperform those taught through traditional approaches (Noreen & Rana, 2019). In the context of teaching research methodology, learning-by-doing enhances students' engagement, satisfaction, and comprehension (Mekonnen, 2020). Additionally, proof—central to mathematical thinking—is valued by educators for revealing students' reasoning and logical structures (Davies, Alcock, & Jones, 2020). Experimentation and observation are likewise essential methods for constructing scientific knowledge.

These findings suggest that the participants' use of innovative instructional approaches in their scenarios reflects not only their familiarity with modern pedagogy but also their appreciation for the quality of their undergraduate teacher education. The emphasis on active and meaningful strategies indicates a positive alignment between their training and contemporary educational expectations. The participants' awareness of the place and importance of contemporary pedagogy in mathematics education is a positive development. This suggests their potential to apply these modern approaches in their future teaching careers, which is a desirable outcome.

Under the teaching-learning process theme, the participants frequently emphasized high-level cognitive skills such as mathematical questioning, reasoning, problem solving, and interpretation. The development of these skills requires exposure to appropriate problems, familiarity with instructional strategies, and a supportive classroom culture (Tanudjaya & Noorman, 2020). Teachers play a vital role in developing students' mathematical reasoning skills, which are crucial at all grade levels, including pre-school (Livy et al., 2026). However, many primary teachers have already developed considerable skill in good questioning techniques in curriculum areas such as literacy and social studies, but do not transfer these skills to mathematics (Way, 2008). Regarding this situation, Way (2008) argues that two

major barriers are students' inexperience with such approaches and teachers' limited ability to structure questioning without diminishing student responsibility. The participants also emphasized the importance of retention in learning. To enhance retention and reflection, it is recommended that learners engage in purposeful reflection and abstract conceptualization prior to active experiences (Coleman et al., 2020). This scenario-writing exercise undertaken by the participants can also be a valuable learning experience for them in the context of purposeful reflection.

The participants also emphasized the value of out-of-class learning experiences as a way to reduce the monotony of conventional classroom settings. Such activities positively influence students' attitudes and improve their problem-solving abilities (Akçadağ Karakaya & Çobanoğlu, 2018; Avcı & Gümüş, 2020). Nevertheless, the inclusion of extracurricular learning remains limited due to intense curricula, lack of resources, and insufficient awareness among stakeholders (Köse, 2013). The participants' awareness of the importance of extracurricular activities is encouraging in terms of their ability to incorporate such events.

The participants also highlighted affective factors, including interest, motivation, enjoyment, and self-efficacy. These emotional and value-laden elements are central to the learning process, particularly in fostering creativity and persistence in mathematics (Gelmez & Bağlı, 2018; In'am & Sutrisno, 2021). Three participants stated in their scenarios that students generally hold negative beliefs about their mathematical abilities. Furthermore, under this theme, pre-service teachers also drew attention to teacher-student and student-student communication for effective teaching. While digital communication tools are increasingly prominent (Hershkovzt & Forkosh-Baruch, 2017), traditional in-class interactions still play a major role in shaping the classroom environment.

The participants emphasized the importance of active participation in the teaching-learning process. In line with constructivist perspectives, student engagement is considered central to meaningful learning, requiring the use of stimulating materials and collaborative activities (Hsu, 2021). However, active participation extends beyond physical involvement; it includes deep cognitive engagement with content and processes that promote higher-order thinking. Another view frequently mentioned by the participants was the need for concretization in mathematics instruction. Given the abstract nature of mathematics, especially for middle school students—the target group of these pre-service teachers—transforming abstract concepts into tangible experiences was seen as crucial. Bozkurt (2012) found that while primary school mathematics teachers prioritize concretization and visualization, secondary school mathematics teachers tend to focus more on discovery and practice. In addition, the participants also addressed various pedagogical elements such as the use of materials and tools, guidance, integration of technology, fostering curiosity, curriculum alignment, reinforcement, prior knowledge, transfer of learning, and the holistic development of students.

The codes under the third theme indicate that, when looking at teacher profiles constructed by the pre-service teachers, the participants predominantly described teachers in a positive light. The teacher characters were described as idealistic, innovative, enthusiastic, modern, professionally collaborative, student-centered, and committed to lifelong learning. This positive portrayal may reflect the participants' identification with these characters, as they are pre-service teachers themselves. While such idealism is common in the early years of teaching, it is well-documented that teachers often face professional challenges over time, including stress, fatigue, and burnout (Zeichner, 2010).

The participants generally perceived their undergraduate teacher education program as effective. For example, participant P15 recalled a university professor's emphasis on fostering conceptual understanding rather than rote memorization, highlighting the long-term impact of such instructional philosophies on future generations. This reflection illustrates the influence of teacher educators in shaping pedagogical beliefs during pre-service education. In recent years, undergraduate teacher education programs in Türkiye have undergone updates, including the expansion of elective courses and increased attention to contemporary educational issues. However, it cannot be claimed that traditional instructional models have been entirely replaced. Collaborative efforts between universities and the Ministry of National Education aim to support teachers' continuous professional development, which is viewed as a positive step for the future of teacher education. Despite these advancements, certain structural limitations persist. For instance, Dağtekin and Zorluoğlu (2019) report that while updates in general culture, educational sciences, and elective courses offer promise, some program components—such as those in science education—remain insufficient in content and scope. Similarly, Kızılkaya-Namlı and Temel (2019) highlight significant deficiencies in programs like physical education and sports teaching, including a lack of applied coursework in content areas, weak integration of pedagogical knowledge with field-specific instruction, and inadequacies in teaching practicum design. In conclusion, while the participants held generally positive views of their undergraduate teacher education, findings also suggest that various challenges remain in ensuring the coherence, applicability, and effectiveness of teacher training programs in Türkiye. Furthermore, with the Teaching Profession Law enacted in 2024, national education academies were established, and pre-service teachers will be admitted to these academies for preparatory training based on an examination after completing their education at faculties of education (Teaching Profession Law, 2024). Preparatory training courses at the national education academies began in April 2026 (MoNE, 2026). Therefore, as of the date of this article, it is not yet possible to examine this process with concrete data, but it can be said that teacher education has entered a new phase.

The participants emphasized relationships among teachers, particularly competition and professional attitudes, as recurrent elements in their scenarios. These dynamics are often influenced by the broader school climate and the administrative leadership style. One contributing factor to such competition is the emphasis placed on student performance in nationwide exams and how this performance reflects on teachers (Buyruk, 2014). In their scenarios, two pre-service teachers indicated that teachers asked students and parents to provide additional resources. Although the Ministry of National Education (MoNE, 2021) now distributes textbooks, workbooks, and teacher guides free of charge, the historical practice of teachers recommending or requiring students to purchase supplementary resource books may continue in some schools, despite being officially prohibited. Moreover, MoNE's digital platforms, EBA (www.eba.gov.tr) and MEBİ (https://mebi.eba.gov.tr/) provides comprehensive learning materials, including textbooks in PDF format, video lessons, and problem-solving content.

Under the measurement and evaluation theme, the participant scenarios revealed concerns regarding central exams, academic grading, and the prevailing competitive structure of the education system. Türkiye administers national standardized tests at the end of primary (High School Entrance Exam-LGS) and secondary education (Higher Education Institutions Exam-YKS). Science High Schools, which emphasize mathematics and science, are seen as prestigious institutions and attract students with higher academic achievement. Admission is based solely on exam performance, making these tests high-stakes for students, parents, and educators alike. As noted by Suna, Gür, Gelbal, and Özer (2020), students attending these

schools often come from families with socio-economic advantages and go on to succeed in university entrance exams, particularly in fields such as engineering and medicine. This reinforces systemic inequalities and places intense pressure on all stakeholders. The findings suggest that the participants also recognized this fact, which is known by all stakeholders in the education system and by society at large.

The participants reported that parental expectations around exam success often manifest as pressure on teachers and administrators. The perception of success is frequently reduced to net scores or grades, prompting a result-oriented rather than learning-oriented culture. For example, since diploma grades contribute to placement scores, both students and parents tend to prioritize numerical grades over actual learning. This emphasis contributes to the ongoing tension between educational equity and performance-based accountability in Turkish schools. Yılmaz and Karadeniz (2026) reported that parents generally prefer a comprehensive educational approach that supports academic, moral, emotional, and social development. However, the authors state that this preference often clashes with the exam-focused national system, creating a gap between parental expectations and institutional constraints. This finding parallels the view expressed in the participants' scenarios that teachers have a learning-focused approach while parents have a grade/exam-focused approach.

In conclusion, in this study, pre-service mathematics teachers were asked to write instructional scenarios based on a collaboratively determined theme, and their perspectives were analyzed in relation to educational components. The findings offer important theoretical implications for understanding pre-service teachers' pedagogical thinking and instructional design processes. The findings revealed that the participants addressed a wide range of issues—from dimensions of the teaching-learning process to the measurement and evaluation system—offering rich reflections on school culture and instructional practices. Based on the findings of this study, the following recommendations can be made. As the participants pointed out, issues such as rote/formula-based mathematics teaching, a one-sided understanding of success based on academic achievement or exam results, the educational approaches, attitudes, and behaviours of school administrators, pressures on teachers, and a competitive education system are crucial issues that need to be addressed within the education system. These issues warrant attention in a multi-dimensional way that encompasses all stakeholders. Professional development should be provided to parents and school administrators on contemporary pedagogical developments. These important issues raised regarding the education system should be thoroughly addressed for pre-service teachers before their in-service training, work should be done on potential crisis resolution strategies with parents and administrators, and courses addressing these issues should be incorporated to the curriculum. Similar training should be provided for in-service teachers. In addition, support mechanisms and support lines should be established for teachers in such situations. The optimistic, innovative, and idealistic teacher type mentioned in the participants' scenarios should be supported to ensure the continued professional development of teachers.

Another significant outcome of the study is the recognition of scenario-writing as a potentially functional pedagogical tool in teacher education. One of the most commonly cited limitations of teacher education in Türkiye is the insufficient amount of practice-based experiences. While practicum courses exist, they are often limited in scope and time. Scenario-writing, as demonstrated in this study, offers an alternative form of reflective practice that can compensate for these limitations. By designing instructional scenarios, pre-service teachers may enhance their subject-matter knowledge and pedagogical reasoning. Moreover, teaching-based scenarios can be reviewed by instructors, discussed with peers, and

refined through feedback, enabling candidates to gain authentic, practice-oriented insights without being physically present in classrooms. The weaknesses identified in the scenarios can guide targeted interventions and professional support.

It is hoped that this study will inspire further research into the application of scenario-writing across diverse subject areas and educational levels. Future research could comparatively examine pre-service teachers' scenario-writing activities across different teaching levels, disciplines, and pedagogical approaches. Future studies could implement scenario-based learning activities and intervention programs in digital environments and with online tools in teacher education.

Declarations:

Funding: *The author declares that this study received no funding from any organization.*

Ethics Statements: *All ethical standards in accordance with the Declaration of Helsinki were strictly followed. Participation was voluntary, and informed consent was obtained from all the participants.*

Conflict of Interest: *The author declares no conflict of interest.*

Data availability: *Data are available upon reasonable requests.*

References

Ağaoğlu, E., Altınkurt, Y., Yılmaz, K., & Karaköse, T. (2012). Opinions of school administrators and teachers about proficiency of school administrators (in Kütahya). *Education and Science*, *37*(164), 159-175.

Akbayır, K., & Taş, Z. (2009). Preservice teacher's views about mathematic education and teacher training. *Journal of Qafqaz University*, 26, 190-197.

Akçadağ Karakaya, Ç., & Çobanoğlu, E. O. (2018). Implementation for "human and environment" unit on environmental literacy. *Journal of Research in Informal Environments*, *3*(2), 1-23.

Akkoyunlu, B., Telli, E., Menzi Çetin, N., & Dağhan, G. (2016). Views of prospective teachers about reflective journals on teacher education. *Turkish Online Journal of Qualitative Inquiry (TOJQI)*, *7*(4), 312-330.

Albuz, A., & Demirci, B. (2018). A comparative theoretical framework analysis on the Music course 2006 teaching program in primary education and 2018 teaching program in primary and secondary education. *Journal of the Fine Arts Institute*, (41), 86-95. https://doi.org/10.32547/ataunigsed.463634

Alsaeed, M. S., & Mohammad, A. D. A. (2023). Early childhood student teachers engaging in a scenario-based professional program: The case of early mathematics. *Cogent Education, 10*(2), Article 2281747. https://doi.org/10.1080/2331186X.2023.2281747

Avcı, G., & Gümüş, N. (2020). Investigation of primary school students' attitudes for the social studies course based on outdoor education activities. *Western Anatolia Journal of Educational* Sciences, *11*(1), 89-106.

Aykaç, N., Küçük, H., Kartal, M., Tilkibaş, Ş., & Keskin, G. (2011). The evaluation of 4th and 5th grade science curricula according to the components of curriculum from the foundation of Turkish Republic to the present day. *Elementary Education Online, 10*(3), 824–835. https://dergipark.org.tr/tr/pub/ilkonline/article/106778

Bardach, L., Klassen, R. M., Durksen, T. L., Rushby, J. V., Bostwick, K. C. P., & Sheridan, L. (2021). The power of feedback and reflection: Testing an online scenario-based learning intervention for student teachers. *Computers & Education, 169*, Article 104194. https://doi.org/10.1016/j.compedu.2021.104194

Baş, H., & Nural, E. (2023). Determining problems of teacher training in Türkiye and evaluating teachers' views on solution suggestions. *Eğitim Bilim ve Araştırma Dergisi (EBAD) [The Educational Science and Research Journal], 4*(1), 16–46. https://doi.org/10.54637/ebad.1222046

Bozkurt, A. (2012). Mathematics teachers' perceptions of mathematical activities. *Education and Science*, *37*(166), 101-115.

Bulut, H., & Akagündüz, G. (2025). Motivation, challenges, and professional experiences of non-education faculty graduates whose first assignment was elementary school teaching. *UPUES Journal, 2*(2), 172–190. https://doi.org/10.64087/Upues.2025.14

Buyruk, H. (2014). Standardized examinations as a teacher performance indicator and performance evaluation in education. *Trakya University Journal of Education*, *4*(2), 28-42.

Coleman, B. M., Bunch, J., Thoron, A. C., & Roberts, T. G. (2020). Examining the effects of reflection type and abstraction order on content knowledge and content knowledge retention during experiential learning. *Journal of Agricultural Education, 61*(3), 308–320. https://doi.org/10.5032/jae.2020.03308.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: SAGE.

Çiçek Aydoğdu, Z., & Ayaz, E. (2025). The effect of scenario based learning method on students' problem solving and decision making skills. *Journal of Research in Elementary Education- JREE*, *5*(2), 184–204. https://doi.org/10.55008/te-ad.1755623

Dağtekin, A., & Zorluoğlu, S. L. (2019). The opinions of academicians on the updated science education undergraduate program. *SDU International Journal of Educational Studies*, *6*(1), 36-53. doi: 10.33710/sduijes.538114.

Davies, B., Alcock, L., & Jones, I. (2020). Comparative judgement, proof summaries and proof comprehension. *Educational Studies in Mathematics*, *105*(2), 181-197.

Della Volpe, V. (2024). Scenario-based learning: An inclusive methodology. *IOSR Journal of Research & Method in Education, 14*(6), 1–5. https://doi.org/10.9790/7388-1406060105

Demiralp, N. (2017). Examination of programs in Geography teaching in terms of design and program elements and 2017 Curriculum. *Education and Society in the 21st Century*, 6(17), 521-545.

Do Prado Leite, J., Hadad, G., Doorn, J., & Kaplan, G. (2000). A scenario construction process. *Requirements Eng*, 5, 38–61. https://doi.org/10.1007/PL00010342

Duatepe-Paksu, A., & Akkuş, O. (2007). An observational study in elementary mathematics classrooms. *Education and Science*, *32*(145), 16-22.

Ercan, S., & Patan, Ö. (2022). Opinions of secondary school mathematics pre-service teachers on scenario based learning. *Milli Eğitim [Journal of National Education]*, *51*(235), 1961-1982. https://doi.org/10.37669/milliegitim.896605

Erduran Avcı, D., & Bayrak, E. B. (2013). Investigating teacher candidates' opinions related to scenario-based learning: An action research. *Elementary Education Online*, *12*(2), 528–549. https://dergipark.org.tr/tr/pub/ilkonline/article/106658

Errington, E. P. (2011). Mission possible: Using near-world scenarios to prepare graduates for the professions. *International Journal of Teaching and Learning in Higher Education, 23*(1), 84–91.

Gelmez, K., & Bagli, H. (2018). Tracing design students' affective journeys through reflective writing. *International Journal of Technology and Design Education*, *28*(4), 1061-1081.

Gläser-Zikuda, M., Zhang, C., Hofmann, F., Plößl, L., Pösse, L., & Artmann, M. (2024). Mixed methods research on reflective writing in teacher education. *Frontiers in Psychology,* 15:1394641. doi:10.3389/fpsyg.2024.1394641

Güneş, G. (2025). The Turkish Century Education Model and teacher training process: A comparative evaluation. *IBAD Journal of Social Sciences*, *19,* 168–194. https://doi.org/10.21733/ibad.1762302

Hareket, E., Erdoğan, E., & Dündar, H. (2016). A case study related to Turkish education system. *Journal of Research in Education and Teaching*, *5*(1), 287-299.

Hershkovzt, A., & Forkosh-Baruch, A. (2017). Teacher-student relationship and Facebook-mediated communication: student perceptions. *Comunicar: Media Education Research Journal*, *25*(53), 91-100.

Hilton, G. L. S. (2003). Using scenarios as a learning and teaching strategy with students. *European Journal of Teacher Education, 26*(1), 143-153. https://doi.org/10.1080/0261976032000065599b

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288.

Hsu, S. (2021). Active participation: reflection on lectures in Chinese heritage culture classrooms. *Schools: Studies in Education*, *18*(1), 86-106.

In'am, A., & Sutrisno, E. S. (2021). Strengthening students' self-efficacy and motivation in learning mathematics through the cooperative learning model. *International Journal of Instruction*, *14*(1), 395-410. https://doi.org/10.29333/iji.2021.14123a.

Kabael, T., & Ata Baran, A. (2016). Investigation of mathematics teachers' awareness of developing mathematical communication skills. *Elementary Education Online*, *15*(3), 868-881. http://dx.doi.org/10.17051/io.2016.78518.

Karatay, R., Timur, S., & Timur, B. (2013). Comparison of 2005 and 2013 science course curricula. *Adıyaman University Journal of Social Sciences*, (15), 233-264. https://doi.org/10.14520/adyusbd.709

Kızılkaya-Namlı, A., & Temel, C. (2019). Evaluation of physical education and sport teacher license program and program proposal. *The Journal of National Education*, *48*(Special Issue/ 1), 321-351.

Köse, E. (2013). Eğitim kurumlarında gerçekleştirilen ders dışı etkinliklerin sınıflandırılmasına yönelik bir öneri [A proposal for the classification of extracurricular activities carried out in educational institutions]. *International Journal of Turkish Literature Culture Education, 2*(2), 336-353.

Livy, S., Bobis, J., Downton, A., Russo, J., & Sullivan, P. (2026). Supporting mathematical reasoning: exploring questioning moves in a Year 1 classroom using student work samples. *Mathematics Education Research Journal*, *38*, 241–269. https://doi.org/10.1007/s13394-025-00527-2

Mekonnen, F. D. (2020). Evaluating the effectiveness of 'learning by doing' teaching strategy in a research methodology course, Hargeisa, Somaliland. *African Educational Research Journal*, *8*(1), 13-19.

Miles, M, B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded Sourcebook* (2nd Ed.). Thousand Oaks, CA: Sage.

Ministry of National Education. (2021, December 22). *23 milyon yardımcı kaynak, öğrencilere ücretsiz ulaştırıldı* [*23 million supplementary learning resources distributed to students free of charge*]. Retrieved from https://www.meb.gov.tr/23-milyon-yardimci-kaynak-ogrencilere-ucretsiz-ulastirildi/haber/24888/tr, 15.04.2026.

Ministry of National Education. (2024). Türkiye *Century Education Model Curriculum Literacy Teacher's Guidebook*. Retrieved from https://tymm.meb.gov.tr/program-okuryazarligi-kilavuzlari, 15.04.2026 .

Ministry of National Education. (2026, February 13). *Millî Eğitim Akademisi Hazirlik Eğitimi Takvimi Açıklandı* [*Preparatory training schedule for the National Education Academy announced*]. Retrieved from https://www.meb.gov.tr/milli-egitim-akademisi-hazirlik-egitimi-takvimi-aciklandi/haber/39824/tr, 15.04.2026.

Nacar, S., Akarsu, M., & İler, K. (2026). A meta-synthesis study on preservice mathematics teacher education programs and teaching practicum through the lenses of TPACK and MKT frameworks. *Pamukkale University Journal of Education*, (66), 209–234. http://doi.org/10.9779/pauefd.1596549

Noreen, R., & Rana, A. M. K. (2019). Activity-based teaching versus traditional method of teaching in mathematics at elementary level. *Bulletin of Education and Research*, *41*(2), 145-159.

Ozan Leymun, Ş., Odabaşı, H. F., & Kabakçı Yurdakul, I. (2017). The importance of case study research in educational settings. *Journal of Qualitative Research in Education*, *5*(3), 369-385.

Öğretmenlik Mesleği Kanunu [Teaching Profession Law], Law No. 7528, Official Gazette of The Republic of Türkiye, No. 32696 (2024, October 18). Retrieved from https://www.resmigazete.gov.tr/eskiler/2024/10/20241018-1.htm, 24.04.2026.

Örücü, D. (2014). Pre-Service teachers' metaphors towards school, school administrators and Turkish education system. *Educational Administration: Theory and Practice*, *20*(3), 327-358.

Özgeldi, M., & Osmanoğlu, A. (2017). Connecting mathematics to real life: an investigation on how prospective secondary mathematics teachers build real life connections. *Turkish Journal of Computer and Mathematics Education*, *8*(3), 438 – 458.

Öztürk, C., & Kafadar, T. (2020). Evaluation of the 2018 social studies curriculum. *Trakya Journal of Education, 10*(1), 112–126. https://doi.org/10.24315/tred.550508

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd Ed.). Thousand Oaks, CA: Sage Publications.

Pollock, K. (2013). Problems of practice: Canadian cases in leadership and policy. *Canadian Journal of Educational Administration and Policy*, *142*(8), 1-6.

Polman, J., Hornstra, L., & Volman, M. (2021). The meaning of meaningful learning in mathematics in upper-primary education. *Learning Environments Research*, *24*(3), 469-486.

Rushby, J. V., Klassen, R. M., Durksen, T. L., Pfaffel, A., & Bardach, L. (2025). Longitudinal effects of a scenario-based learning intervention on preservice teacher self-efficacy.

Teaching and Teacher Education, 154, Article 104859. doi:10.1016/j.tate.2024.104859

Sailin, S. N., & Mahmor, N. A. (2018). Improving student teachers' digital pedagogy through meaningful learning activities. *Malaysian Journal of Learning and Instruction*, *15*(2), 143-173.

Sarıca, R. (2018). Yenilenen ortaöğretim beden eğitimi ve spor dersi öğretim programlarının değerler eğitimi bağlamında incelenmesi [An examination of the revised secondary school physical education and sports curricula in the context of values education]. *Ahi Evran University Journal of Kırşehir Education Faculty (KEFAD)*, *19*(3), 2068-2091. https://doi.org/10.29299/kefad.2018.19.03.008

Saussois, J.-M. (2006). Scenarios, international comparisons, and key variables for educational scenario analysis. In OECD, *Think scenarios, Rethink Education* (pp. 53–67). Paris, France: OECD Publishing. doi:10.1787/9789264023642-5-en

Sekin, S. (2008). Reasons of rote learning in Türkiye. *International Journal of Geography and Geography Education*, 18, 211 – 221.

Sorin, R. (2013, November). *Scenario-based learning: Transforming tertiary teaching and learning*. Paper presented at the 8th QS Asia Pacific Professional Leaders in Education Conference, Bali, Indonesia. Abstract retrieved from https://researchonline.jcu.edu.au/30512/

Suna, H. E., Gür, B. S., Gelbal, S. & Özer, M. (2020). Science high school students' socioeconomic background and their preferences regarding their transition into higher education. *Journal of Higher Education (Türkiye*), *10*(3), 356–370.

Tanudjaya, C. P. & Doorman, M. (2020). Examining higher order thinking in Indonesian lower secondary mathematics classrooms. *Journal on Mathematics Education*, *11*(2), 277-300.

Van Notten, P. (2006). Scenario development: a typology of approaches. In *Think Scenarios, Rethink Education*, (69-92). Paris, France: OECD Publishing.

Velásquez-Rojas, F., Fajardo, J. E., Zacharías, D., & Laguna, M. F. (2022). Effects of the COVID-19 pandemic in higher education: A data driven analysis for the knowledge acquisition process. *Plos One*, *17*(9), e0274039. https://doi.org/10.1371/journal.pone.0274039

Way, J. (2008). Using questioning to stimulate mathematical thinking. *Australian Primary Mathematics Classroom*, *13*(3), 22-27.

Yıldırım, A., & Şimşek, H. (2008). *Nitel Araştırma Yöntemleri* [*Qualitative research methods in social sciences].* Ankara: Seçkin Publishing.

Yılmaz, E., & Karadeniz, S. (2026). Analyzing Turkish parents' educational expectations through the lens of curriculum elements. *Journal of Ahmet Kelesoglu Education Faculty, 8*(1), 30-55. doi:10.38151/akef.2026.161

Yılmaz, K., & Altınkurt, Y. (2011). Prospective teachers' views about the problems of Turkish educational system. *International Journal of Human Sciences*, *8*(1), 942-973.

Yin R. K. (2014). *Case study research: Design and methods* (5th Ed.). Thousand Oaks, CA: Sage.

Yirci, R., & Berk, B. (2021). Effective school principal according to the views of school administrators and teachers: a qualitative research. *Journal of History School*, 50, 570-598.

YÖK [CoHE], (2017). *Öğretmen Yetiştirme Lisans Programları [Teacher Training Undergraduate Programs]*. Retrieved from https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Yeni-Ogretmen-Yetistirme-Lisans-Programlari/AA_Sunus_%20Onsoz_Uygulama_Yonergesi.pdf, 22.12.2021.

YÖK [CoHE], (2021). *Öğretmen Yetiştirme Lisans Programları [Teacher Training Undergraduate Programs]*. Retrieved from https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Yeni-Ogretmen-Yetistirme-Lisans-Programlari/Ilkogretim_Matematik_Lisans_Programi.pdf, 27.12.2021.

Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college-and university-based teacher education. Journal of Teacher Education, 61(1-2), 89-99.