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FROM THE EDITOR

Dear Colleagues,

The *Journal of Theoretical Educational Science* is happy to publish the second issue of 2024! In this issue, you will find ten research articles by 21 authors. We are glad that these articles represent the different disciplines of education.

We should also express our sincere thanks to the Editorial Board, reviewers, and authors for their invaluable contributions. We look forward to receiving submissions from different parts of the world for the following issues!

Kindest regards,

Fatih GÜNGÖR, PhD
Afyon Kocatepe University
Faculty of Education

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Revisiting Flavell's Metacognition Theory for Metacognitive Responsiveness

Flavell'in Üstbiliş Kuramının Üstbilişsel Duyarlılık Açısından Yeniden Gözden Geçirilmesi

Nesrin OZTURK*

Received: 10 January 2023 **Review Article** **Accepted:** 21 February 2024

ABSTRACT: Flavell's theory of metacognition was innovative at the time for its promising practicality. However, research findings that report inconsistencies in metacognitive trainings' outcomes and insufficiencies of translating the theory into mainstream classrooms have accumulated since then. In this sense, there may be a need to revisit metacognition theory for its practicality and credentiality. From a phenomenological perspective, this paper first describes the fundamental tenant of theory; thinking, and whether metacognition theory recognizes the nature of thinking. To manage thinking, it should be stimulated first. In other words, a sensitivity towards a stimulus that is metacognitive responsiveness needs to be raised to initiate the attendance of higher order thinking. Thinking and metacognitive responsiveness pertain to personal relevance, attentiveness, interest, previous experiences, tools for thinking, features of tasks, and the nature of social interactions. Therefore, it is important to present the stimulus designed or adapted to initiate individuals' thinking or metacognitive responsiveness. In this paper, Flavell's theory of metacognition was revised to embrace metacognitive responsiveness explicitly, and it is highlighted that practical implications need to focus on materials to initiate metacognitive responsiveness.

Keywords: Metacognition, metacognitive responsiveness, thinking, phenomenology.

ÖZ: Flavell'in üstbiliş teorisi, umut vaadeden biçimde uygulanabilir olması sebebiyle dönemi için yenilikçiydi. Ancak, üstbilişsel eğitimlerin sonuçlarındaki tutarsızlıkları gösteren ve üstbiliş uygulamalarının sınıflarda etkin olmamasına dair araştırma bulguları zamanla artmıştır. Bu bulgular, üstbiliş kuramının uygulamadaki tutarsızlık ve pratikliğini açıklayabilme yeterliliğinin gözden geçirilmesi ihtiyacını doğmuştur. Bu çalışma, kuramın temel öğesi olan düşünme kavramı tanımlayıp, üstbiliş kuramının düşünmenin doğasını yansıtıp yansıtmadığını fenomenolojik bir bakış açısıyla ele almaktadır. Çünkü düşünmek için öncelikle düşünmenin teşvik edilmesi yani bir uyarana karşı bilinçli bir duyarlılığın olması gerekir. Düşünme ve üstbilişsel duyarlılık dikkat, ilgi, önceki deneyimler, düşünme araçları gibi kişisel özellikler ile görevlerin özellikleri ve sosyal etkileşimlerin doğası ile ilgilidir. Bu anlamda, uyaranın bireylerin düşünmesini veya üstbilişsel duyarlılığını aktive edecek şekilde olması beklenir. Bu çalışmada, Flavell'in üstbiliş teorisi, üstbilişsel duyarlılığı açık bir şekilde yansıtır şekilde sunulmuş ve uygulamaların üstbilişsel duyarlılığı sağlayabilecek materyaller kullanılması gerekliliğini vurgulanmıştır.

Anahtar kelimeler: Üstbiliş, üstbilişsel duyarlılık, düşünme, fenomenoloji.

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Flavell's (1979) theory of metacognition was innovative at the time, and it has been studied extensively in many disciplines including education. As Flavell (1979) argued that metacognition plays a significant role on "reading comprehension, writing, language acquisition, attention, memory, problem solving" (p. 906), research studies examined Flavell's (1979) question: "how much good does cognitive monitoring actually do us in various types of cognitive enterprise?" (p. 910). In this realm, most studies confirmed favorable findings. Research found that metacognition is a tool for learning more efficiently (Kerndl & Aberšek, 2012), and it may be the most important predictor of learning (Veenman, 2016; Wang et al., 1990). As individuals can perform their cognition more strategically and efficiently (Gourgey, 1998), metacognition can be a significant factor for the distinction between low and high achievers (Paris & Jacobs, 1984; Pogrow, 2004). It may also impact achievement (Pimvichai et al., 2019) or help develop other desirable outcomes such as critical thinking, problem solving, and decision making (Pimvichai et al., 2019).

There is also evidence that metacognition can be taught (Cross & Paris, 1988; Takallou, 2011; Tanner, 2012; Zhang & Seepho, 2013), and following such trainings, individuals' awareness, responsibility-taking, and performances improve (Boulware-Gooden et al., 2007; Curwen et al., 2010; Veenman et al., 2006). However, not all individuals can benefit from metacognition training in the same manner for several reasons, for example, proficiency (Ozturk & Senaydın, 2019), extant metacognitive competencies, or personality (Ozturk, 2021). It may also be because metacognitive training where designers impose their judgements about audience's competencies or needs disregard audience's characteristics, or they may lack or ignore a crucial element, the input. While the potential reasons of insufficiencies are open to exploration, such trainings may continue running the risk of being unproductive for metacognition development (Efklides, 2008).

Problem Statement and Rationale to the Study

Research studies on metacognition training keep accumulating; however, they bear some problems. First, such initiatives mostly focus on cognitive or metacognitive strategies (Efklides, 2014); however, they may ignore that metacognitive growth might not necessarily accompany strategy execution (Efklides, 2009; Melot, 1998). Also, although a component of metacognition bears metacognitive experiences, it is not explained well (Efklides, 2009). Indeed, how and why individuals engage in such concurrent higher order thinking is the least explored domain (Efklides, 2008; Meijer et al., 2013).

Flavell (1979) defined metacognitive experiences as instances where highly conscious thinking is activated. They are self-initiated (Aşık & Erktin, 2019) cognitions where individuals test and modify metacognitive knowledge as well as practice metacognitive skills for goals (Flavell, 1979). Constituting an exclusive domain in the theory, metacognitive experiences may not be subsumed under either metacognitive knowledge or strategies; however, they can be related to both (Flavell, 1979). In theory, when individuals are exposed to or meet metacognitive experiences, metacognitive knowledge and metacognitive strategies relate, and regulatory cognitions are executed (Efklides, 2009). This assumption, however, cannot explain how and why exposure to

or meeting a metacognitive experience necessarily activates individuals' higher order thinking, if at all. Moreover, if being exposed to or meeting metacognitive experiences would be sufficient to practice metacognitive knowledge and regulation, then there would not be variations in metacognitive adequacy. That is, there must be another variable that motivates individuals' recognition and responsiveness to a metacognitive experience.

Each metacognitive experience holds distinctive characteristics, contextual cues, or task features (Efklides, 2014) and similarly, each agent displays distinctive characteristics such as competence in a domain, goals, interest, as well as mood (Efklides, 2006a, 2006b). The mis/match between any elements of these, therefore, may create distinctive outcomes. In this sense, although a group of individuals is exposed to the same stimulus which is assumed to potentially initiate higher order thinking, some may be indifferent to it because the stimulus is for example, dull for few. As Branigan and Donaldson (2020) found although the classroom teacher presented opportunities for metacognitive experiences, their learners were poorly motivated to engage in those because they were not interested in the topic. Also, some individuals may think that metacognitive acts are tiresome or time-consuming, and they may restrain from them (Ozturk, 2019). Moreover, as Washburn et al. (2005) found, individuals may respond to uncertainty differently depending on their confidence and/or personality. Therefore, even though exposed to the same stimulus or experience, some individuals may experience faulty monitoring or control over their cognitions, or they may even fail it (Efklides, 2014; Garner & Alexander, 1989). In such cases, metacognitive sensitivity and in relation, responsiveness might be one of the factors that ensure monitoring or produce action slips and cognitive failures (Washburn et al., 2005). In the following, the propositions of revisiting Flavell's (1979) metacognition theory will be discussed in relation to metacognitive responsiveness.

Methodological and Philosophical Orientations

This paper approaches Flavell's metacognition theory from a phenomenological perspective to describe its nature, again. As Madison (2009) stated, phenomenology may be a descriptive enterprise that pertains to perceiving and thinking as well as willing and doing. Phenomenology, to Husserl, is a reflective act, and it cuts across the flow of consciousness to define its essential structures: "its intentional nature, as the subjective condition for the possibility of all thinking" (Marinay, n.d., p.1).

Regarding the nature of metacognition, transcendental phenomenology was employed to understand the phenomenon. Transcendental phenomenology relates to the Kantian philosophy and emphasizes that all objects are accessible to the consciousness. Indeed, "consciousness is always consciousness of" (Edie, 1964, p.58) something, and individuals may direct their awareness towards physical or mental objects (Yee, 2019). However, consciousness may relate to the objects differently as it is intentional; individuals "think of the things… specially those significant to us" (Marinay, n.d., p.2). While Flavell (1979) defined metacognition as thinking about thinking, one's consciousness first needs to focus on the object of thinking intentionally and personally.

Phenomenology also pertains to involving into a world of experiences within reach and investigating it into a deeper subjective reality. As Husserl (1975) argued, reality becomes reality when the individual can present it to himself and confirm it. That

is, the intentional content has a meaning, and the object, thereby, has a meaning for the individual. Thus, "the intentional content transcends the conscious act … that has this intentional content" (Yee, 2019, p.3). Intentional act deals with perception and several ways of thinking or reasoning about it because as Yee (2019) stated, the "intentional act, intentional object and intentional content are correlated" (p.3). However, each person may objectify the same object "differently with different clarity, manner of apprehension and so on" (Yee, 2019, p.9). Thereby, one may think or reason about thinking differently, yet intentionally.

From the phenomenological perspective, the author's intuition was the first step in understanding metacognition and her consciousness is a process of fulfilling meaning and knowing the object (Yee, 2019). Phenomenology analyzes the object via self-insights, subjective perceptions of the object, and self-reflection (Yee, 2019). In this sense, I leaned on my own experiences, awareness, readings, discussions, as well as research experiences, and engaged in reasoning to describe *what it is like to think about thinking*. During this process, I also embraced Epoche to free my understandings from the captivity of my familiarity and unquestioned acceptance of the theory and a-priori clarifications. I could, therefore, approach it with practical reasoning.

Theoretical Framework

Nature of Thinking

Metacognition is a unique phenomenon for every individual who experiences a thinking-self. Regarding the problem of this study, metacognition theory may benefit from a description and discussion of the nature of thinking, first. In this section, philosophers' definitions of thinking with a phenomenological, rationalist, or existentialist stance are presented as their focus is on experiencing thinking for the self just as metacognition does.

One may not be aware of thinking and how it happens unless he thinks (Aydoğan, 2019). When one starts to think about himself, they learn thinking (Aydoğan, 2019; Yurt, 2018). As Heidegger proclaimed, thinking is a response to a stimulating potential to think (Yurt, 2018), and individuals do tend to think about something when it has a personal meaning or relevance to its essence. In this sense, attentiveness, interest (Schopenhauer, n.d. as cited in Aydoğan, 2019), and selectivity may be important pillars of thinking (Aydoğan, 2019). Moreover, Vygotsky (1987) similarly argued that isolating affective and volitional aspects of consciousness from thinking may diminish an opportunity for a causal explanation of thinking as well as ignore a dynamic system of affective and intellectual processes (Vygotsky, 1987). That is, when thinking is eliminated from the "full vitality of life, from the motives, interests, and inclinations of the thinking individuals" (Vygotsky, 1987, p.50), it transforms into "a useless epiphenomenon" (Vygotsky, 1987, p.50).

Thinking may also be acting in harmony with the essence. Zöller (1992) stated that self-awareness is a consciousness "in actu" (p.436) and may collapse the distinction between the subject of thinking and the self as object. Self-consciousness, on the other hand, is "the consciousness of the mind's own activity of thinking" (Zöller, 1992, p.436). To manage an autonomous, organized, and systematic set of cognitions for *I*

think (Aydoğan, 2019; Başerer & Duman, 2019), one needs to orient themselves to rational thinking (Kant, n.d. as cited in Aydoğan, 2019), or the tools of thinking.

Guitton (2011) who echoed Kant years later stated that thinking emerges when one does put aside their predispositions of comprehension, presuppositions, prejudices, habits, or expectations aside as well as answer questions using logic. For Guitton (2011), thinking may not be separated from reasoning and conflicting ideas. Indeed, both conflicting ideas to some extend are true and confrontation initiates thinking. At this point, he refers to Comte and states that "one represents systematization, two always represents an agreement, and three always records a progression" (Guitton, 2011, p.87). That is, when individuals experience an intellectual conflict in themselves or with others, they engage in reasoning and comprehend the rationale for their choice over another in relation to one's essence.

These insights on thinking propose that thinking can pertain to the following factors: the stimulus and the tools for thinking. The stimuli (e.g., problems, challenges, or goals) should relate to personal relevance (i.e., meaning, essence, individuality), attentiveness (i.e., attention, willingness, enthusiasm, responsiveness), or interest (i.e., choice, motives, inclinations); therefore, they create a need to engage in thinking. However, the stimulus may not always necessarily help individuals think properly unless they possess the tools for thinking (i.e., comprehension, reasoning, cognitive skills, and language). For example, language itself may present intellectual stimuli and provide "the words and concepts with which thought evaluates and regulates itself" (Tishman & Perkins, 1997, p.371). Helping individuals describe cognitions via a specific set of vocabulary, the language of thinking requires one to reason, develop an idea, solve a problem, reject an idea, probe an assumption, look for evidence, and identify reasons (Tishman & Perkins, 1997). Still, those two factors may become significant once individuals perceive the stimulus *worthy* of thinking or utilizing time and effort to think about it. That is, without *a legitime reason*, thinking may not emerge. In the following section, dissemination of metacognitive responsiveness which embraces sensitivity to metacognitive experiences will be provided regarding the nature of thinking after a brief description of metacognition theory is presented.

Metacognition Theory

Flavell (1979) stated that cognitive regulation depends on metacognitive knowledge, experiences, goals, tasks, and strategies. In his theory, metacognitive knowledge pertains to declarative (what), procedural (how), and conditional (when and why) knowledge about variables that influence thinking. While declarative knowledge pertains to an awareness of self, task, and strategies to manage cognitive acts, procedural knowledge pertains to knowing how skills operate in the phase of task completion. Conditional knowledge, on the other hand, pertains to knowing when and why to use strategies (Flavell, 1979; Jacobs & Paris, 1987; Pintrich et al., 2000; Veenman et al., 2006). Metacognitive strategies pertain to regulation of cognitions. These include planning, monitoring, regulation, as well as evaluation of cognitive processes and performances (Schraw, 1998).

Since the introduction of metacognition theory, focus has been mostly on metacognitive knowledge and strategies (Efklides, 2014). While even metacognitive experiences get little attention (Efklides, 2008, 2009; Meijer et al., 2013), metacognitive

responsiveness has not been theorized and examined adequately. However, metacognitive responsiveness might be an important domain for metacognitive engagement in the sense that it initiates thinking. In the following metacognitive adequacy and metacognitive experiences will be discussed to path metacognitive responsiveness.

Metacognitive Adequacy

Veenman et al. (2006) argued that individuals might show variations in metacognitive adequacy for several reasons including social interactions, opportunities of acquiring metacognition, and attitudes to obtain such a repertoire. Some individuals might be metacognitively competent, some might lack sufficient adequacy to perform metacognition, or they may lack it, at all. Some individuals who are competent with metacognition may "spontaneously pick up metacognitive knowledge and skills to a certain extent" (Veenman et al., 2006, p.9) from individuals around them. There might also be others who develop such competencies on their own although the opportunities are scarce (Veenman et al., 2006).

Moreover, there might be individuals who suffer from a deficiency of metacognition (Veenman et al., 2006). Individuals with availability deficiency do not possess enough metacognitive knowledge and cannot exercise regulatory strategies effectively whereas individuals with production deficiency may have some amount of metacognitive knowledge or skills. Production deficiency may emerge because of for example anxiety, task-difficulty, lack of motivation, or individuals' inability to see the relevance of metacognition in different situations (Veenman et al., 2006).

Regarding Veenman et al.'s (2006) categorization of metacognitive adequacy, it is important to elaborate on how variations in metacognition emerge, and answer the following questions, e.g., What makes novices attend to an intellectual stimulus in the environment and handle it strategically? What kind of stimuli are individuals attentive to? Why and how do they interact with such stimulus? Why do some individuals observe metacognitive models and help themselves develop metacognition while some may suffer from either form of deficiency? For these questions, it is important to elaborate on metacognitive responsiveness and experiences.

Metacognitive Experiences

Metacognitive experiences are "the interface between the person and the task" (Efklides, 2008, p.279) where highly conscious thinking occurs (Flavell, 1979). They are concurrent metacognition working in memory, specific in scope, and cognitively as well as affectively charged (Efklides, 2006a). Metacognitive experiences pertain to one's (a) awareness of task demands, fluency of cognitive processing, and the progress towards the goal, (b) feelings of knowing, familiarity, confidence, difficulty, and satisfaction, (c) judgements of learning and estimate of time, effort, and solution correctness, as well as online task specific knowledge (Efklides, 2008; Pimvichai et al., 2019).

Metacognitive Responsiveness

While metacognitive experiences drew little attention and effort of investigation (Efklides, 2008, 2009; Meijer et al., 2013), metacognitive responsiveness lacks

theoretical understandings. To understand the nature of metacognitive experiences, it may be effective to first describe metacognitive responsiveness. Meijer et al. (2013) recently defined metacognitive responsiveness as individual's sensitivity to metacognitive experiences, general awareness of metacognition and its importance, and curiosity to learn about it. Meijer et al. (2013) related metacognitive responsiveness to thinking agent, help coming others, and the task's features (Figure 1).

The agent domain pertains to different dynamics. It may be individuals' recognizing and responding to personally meaningful intellectual stimuli (i.e., I.S.). Such stimuli may appeal to individuals' goals or plans; therefore, it may be worth investing effort and time. Most of the time, such stimuli are interesting and motivating for individuals to pay attention to and interact with it (Meijer et al., 2013). In this regard, research that emphasizes the role of personality, confidence ratings, or approaches to metacognitive experiences may help understand the dynamics of the agent domain in studying metacognitive responsiveness.

Others may pertain to the help that individuals may turn to for their metacognitive acts. Such help may be in the form of feedback from experts or peers, cooperation with others for goal attainment, or coregulation or shared regulation of the cognitive process (Meijer et al., 2013). Depending on the availability or lack of help, one might get attentive to the stimuli and engage in metacognitive experiences or restrain from it. That is, although individuals may be attentive to the intellectual stimuli, they may not engage in metacognitive acts or ultimately, stop their acts when they cannot find sufficient help for the task completion. It may be that classroom metacognitive research produced favorable outcomes as they utilized the benefits of others indirectly. That is, when people know that they can turn to a social agent for help, they feel secure and engage in metacognitive experiences. However, research may not be as organic as the scenarios in mainstream classrooms. Especially, when the classroom instruction lacks pedagogies of metacognition and teachers do not teach for it, students might suppress their metacognitive attitudes.

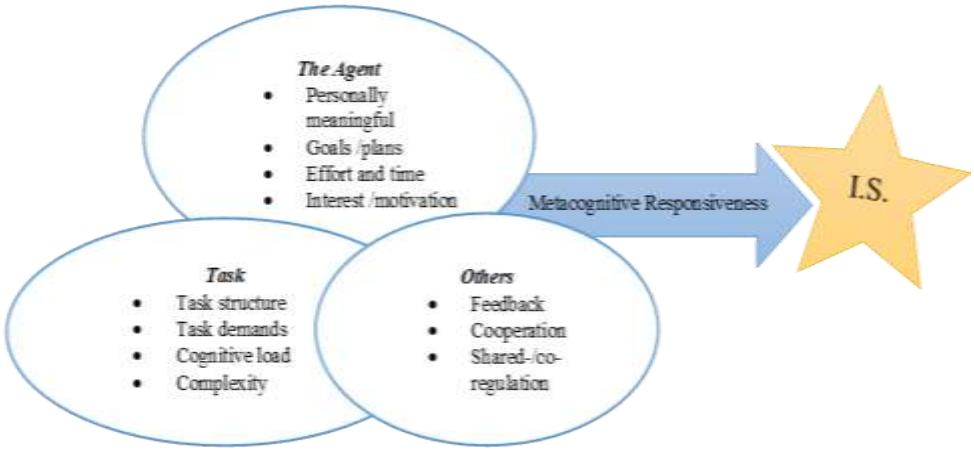
The final category -task features- may also determine individuals' responsiveness to the stimulus of a metacognitive experience. Task features may pertain to task demands, structure, cognitive load, and complexity. These factors may filter individuals' recognition and responsiveness to a metacognitive experience (Meijer et al., 2013). It may be only after individuals engage in highly conscious thinking when they decide that they can deal with the task demands on their own or with help. That is, they may confirm that they have skills to manage task complexity or demands or the cognitive load is manageable for them. Although exposed to the same stimulus, not all individuals may react to it in the same way; that is, they may not get attentive to and/or think about it strategically as the cognitive load might be beyond their levels or they may not possess cognitive tools to manage task's complexity.

To elaborate on the components of metacognitive responsiveness and its functions, Figure 1 may be interpreted. When the intellectual stimulus is for example, personally meaningful, interesting, and appeals to one's goals, one might get sensitive towards and respond to it; that is, they may engage in a metacognitive experience where the stimulus is the object of thinking. However, another individual who is also attentive, interested, and motivated for the same stimulus might not engage in higher order thinking because s/he might think that they cannot manage the task demands without

help. On the other hand, when one is presented with two tasks, e.g., A and B, s/he can get responsive to the less cognitively demanding one (B) although s/he is interested in A and can work with others because s/he does not want to put time and effort into such a cognitively demanding one at the time.

Figure 1

Metacognitive Responsiveness



Moreover, one might seem engaged in the stimulus; still, it might not be a metacognitive process, yet a habitual one due to, for example, the routine task demands or memory-based functions. It is also possible for some individuals to ignore the stimulus of metacognitive experiences although the task is easy. Or else, although there is help because individuals are not motivated to engage in such an experience at the time, they may be indifferent to engage in higher order thinking.

Recognizing metacognitive responsiveness exclusively is important to identify what kind of stimuli initiate thinking and how they lead to a metacognitive experience, if at all. While Meijer et al. (2013) relate metacognitive responsiveness to the sensitivity towards metacognitive experiences, it may also be a sensitivity towards the stimulus that may initiate metacognitive experiences, still not necessarily. Theorizing metacognitive responsiveness is important to understand how the theory works and more importantly to transmit its promising proposals to practitioners.

Discussions and Conclusion

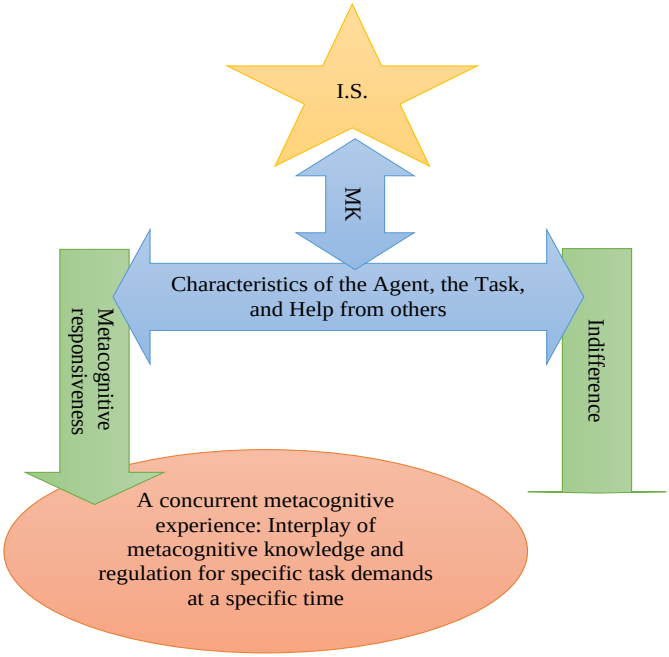
This paper argues that Flavell's (1979) metacognition theory needs a revision for its inclusion of metacognitive responsiveness regarding the variations of individuals' metacognitive adequacies and distinctions in metacognitive trainings' outcomes. In Flavell's (1979) seminal paper, metacognition is defined as thinking about thinking, and its components pertain to metacognitive knowledge, metacognitive strategies, metacognitive experiences, as well as task demands and goals. However, it may lack some locus regarding thinking. In this model, while the theory proposed that thinking is a meta-level act, how individuals' first level thinking is activated may be ignored or taken for granted, easily. When individuals do not recognize the stimulus in the environment or when they do not hold a valid reason to utilize their cognitive tools (i.e., when they are not metacognitively responsive), a meta-level of thinking may not emerge.

Metacognitive responsiveness, as Meijer et al. (2013) defined, pertains to the individual's sensitivity to metacognitive experiences. To ensure that individuals engage in a metacognitive experience, they need to think, or their thinking is to be stimulated by at least one of the features of the stimuli. That is, the stimulus should relate to personal relevance (e.g., attentiveness, interest, previous experiences), tools (e.g., skills or language), task features (e.g., structure, demands, cognitive load, and complexity), and others' helps (e.g., social interactions, feedback, cooperation, coregulation or shared regulation); therefore, individuals may become sensitive towards it. When exposed to or meet intellectual stimulus, individuals may first filter it through their metacognitive knowledge (MK on Figure 2) and their metacognitive responsiveness may direct them to utilize metacognitive regulatory strategies for a concurrent experience or to stay indifferent. In this sense, metacognitive responsiveness may mimic a gatekeeper where the evaluation of the stimulus is already done and intentionality for a metacognitive experience is already created.

On the other hand, there may be also cases where individuals may be pushed to engage in cognitive acts for several reasons such as placement test, grades, or class-participation. Without individuals' autonomous responsiveness, externally initiated metacognitive acts may not help with the metacognitive competencies, efficient regulation, or habituation. At such instances individuals may not recognize the necessity or relevance of employing metacognition (Veenman et al., 2006) and end up faulty control or monitoring.

Figure 2

A Model for Metacognition



Instructional Implications

A ground-breaking theory, metacognition, has been studied in education, extensively. Its benefits and methods of teaching were reported soon after the theory was proposed. However, a revisit to Flavell's (1979) theory of metacognition for

metacognitive responsiveness can help eliminate its inconsistencies and impracticality especially in mainstream classrooms. As Baker (2017) stated metacognitive competencies in research and mainstream classrooms are not similar; students in mainstream classrooms may not have or execute metacognitive competencies as students in research classrooms. It may be because while instruction in research classrooms is designed to the optimal for metacognitive development, mainstream classrooms may lack such a drive or some of its elements.

To manage inconsistencies among metacognition trainings' outcomes or minimize metacognitive inadequacies among the individuals, it is important to implement instruction that embraces metacognitive responsiveness explicitly beyond other components of metacognition. As Seel et al. (2017) emphasized, "instruction is the 'stimulus' and learning is the 'response' (p.3). For instructional designs aiming at an optimal learning environment with specific arrangements of teaching, learning can be personalized. To Molenda et al. (2003), instructional design pertains to the execution of some principles and practices; therefore, instructional materials, implementation, and evaluation can be developed "in a consistent and reliable fashion" (p.574). However, each learning environment may be different (Seel et al., 2017), and the accuracy of implementation for goals, empirical evidence for goal mastery, and the accuracy of execution of the interventions (Seel et al., 2017) should be ensured. For teaching metacognition, previous research identified some teaching methods. They may include explicit teaching of metacognition (Book et al., 1985; Duffy, 2002; Veenman et al., 2006), modelling metacognitive acts (Duffy, 1993; Duke & Pearson, 2008; Veenman et al., 2006), holding metacognitive discussions (McDevitt & Ormrod, 2016), sharing responsibilities with students for metacognitive acts (Perry et al., 2002), providing students with instruction aids for metacognitive acts (Kolencik & Hillwig, 2011), having students think aloud their metacognitive acts, having students collaborate for metacognitive acts (Klingner & Vaughn, 1998), encouraging and assessing students' independent metacognitive acts (Papleontiou-louca, 2003; Pressley & Afflerbach, 1995), as well as having students do self-assessment (Afflerbach & Meuwissen, 2005; Kolencik & Hillwig, 2011). Although these practices exist, there is still a lack of evidence of how the instructional design is contextualized to initiate participant's metacognition development.

Designing or selecting materials constitute a key component of numerous instructional designs (e.g., Dick-Carey model, ASSURE, CASCADE, Smith-Ragan model, or the Bates model) and they may help with the contextualized instruction. To McAlpine and Weston (1994), components of a typical instructional model include instructional design, content, presentation of the materials, and language. In their categorization, content pertains to the knowledge structure of the domain including "value of content, content accuracy, comprehensiveness, integration, objective presentation/bias, and recency" while language pertains to semantic and syntactic structures including "choice of vocabulary, complexity of sentence structures, verbs, redundancy, transitions, consistency, clarity, conciseness, and appropriateness for audience" (McAlpine & Weston, 1994, p. 22). In this sense, as Seel and colleagues (2017) also argued, the accuracy of implementation may be limited to some factors including complexity of the intervention, materials and resources, and participants'

characteristics; however, research studies do not explicate materials' selection criteria and use for participants' metacognitive reactions or responsiveness. Therefore, identifying instructional practices for metacognition trainings may not guarantee presentation and stimulating characteristics of the materials. Practically, lack of elaboration on this aspect may induce partial success of such trainings for a limited audience, if not teachers' pedagogies of metacognition.

It is important to recognize and evaluate the attributes of instructional materials for metacognition instruction. As McAlpine and Weston (1994) highlighted, it is important to identify whether the material meets a definite need and understand the audience's extant competencies, readiness, attitudes, as well as culture, and the same notion applies for metacognition instruction. First, teachers need to do an assessment of students' extant metacognitive (Ozturk, 2017), cognitive, and language competencies, as well as potentials of social interactions to set a system for metacognition development. Because of individual differences in these domains, standardized materials might not be effective to initiate a sensitivity towards thinking and responsiveness to higher order thinking, at all. In this sense, teachers also need to assess students' interest, motives, drives, and inclinations to choose more personalized materials because variations in these personal variables may cause variations in metacognitive sensitivity and responsiveness; thereby, metacognitive competencies. It may be that different iterations of the materials or intellectual stimuli should be available for different students' use to help them develop competencies sufficiently.

Designing or choosing the materials or using the language that holds intellectual potential is important to initiate metacognitive responsiveness. Unless metacognitive responsiveness is taken for granted, instructional techniques that research highlights may not support metacognition development, or social environments and agents' influences may be limited in students' metacognitive intake. Still, metacognition is a personal bearing with unique features, and practitioners should seek ways to individualize metacognition practices even in groups.

Conflicts of Interest

I have no conflict of interest to disclose

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Predictors of Global Scientific Literacy of Pre-Service Teachers: A Structural Equation Modeling Study*

Öğretmen Adaylarının Evrensel Fen Okuryazarlığının Yordayıcıları: Bir Yapısal Eşitlik Modellemesi Çalışması

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ABSTRACT: The purpose of this study was to examine the relationship among pre-service science teachers' global scientific literacy and various variables within the scope of the structural equation model. Since the relations among the variables were investigated in the structural model established for this study, correlational research methodology was applied. The application was carried out with 294 pre-service teachers studying in the departments of chemistry, physics, biology and elementary science education of a state university. The data of the study were obtained with the scales of global scientific literacy, the perception of science process skills, the inquiry skills, the self-directed learning readiness in laboratory, the attitude scale towards the laboratory and the personal information questionnaire. Within the framework of structural equation modeling, the causal and relational analyses of the data were examined. The results showed that the proposed model of the relationship among global scientific literacy and the variables predicting global scientific literacy was also found to be compatible with the data, and the entire model was confirmed except for the attitude towards the laboratory. In this context, it can be claimed that these variables play an essential role in pre-service teachers' being global scientifically literate.

Keywords: Global scientific literacy, inquiry skills, perception of science process skills, self-directed learning readiness in laboratory, pre-service science teachers.

ÖZ: Bu araştırmanın amacı fen alanları öğretmen adaylarının evrensel fen okuryazarlıklarının çeşitli değişkenlerle olan ilişkisini yapısal eşitlik modeli kapsamında incelemektir. Çalışmanın amacı kapsamında ortaya konan yapısal modelde ele alınan değişkenler arasındaki ilişkiler incelendiği için araştırmada korelasyonel araştırma yöntemi kullanılmıştır. Uygulama bir devlet üniversitesinin kimya, fizik, biyoloji ve fen bilgisi eğitimi anabilim dallarında öğrenimine devam eden 294 öğretmen adayı ile gerçekleştirilmiştir. Araştırmada veriler evrensel fen okuryazarlık ölçeği, bilimsel süreç becerileri algı ölçeği, sorgulama becerileri ölçeği, laboratuvarda kendi kendine öğrenme hazırbulunuşluk ölçeği, laboratuvara yönelik tutum ölçeği ve kişisel bilgi anketi ile elde edilmiştir. Toplanan verilere ilişkin nedensel ve ilişkisel analizler yapısal eşitlik modellemesi kapsamında incelenmiştir. Araştırma sonuçlarına göre evrensel fen okuryazarlığı ile evrensel fen okuryazarlığını yordayıcı değişkenler arasındaki ilişkiye ait önerilen modelin veri ile uyumlu olduğu belirlenmiş ve tüm model laboratuvara yönelik tutum değişkeni dışında doğrulanmıştır. Bu bağlamda öğretmen adaylarının evrensel fen okuryazarı olmalarında söz konusu değişkenlerin önemli bir role sahip olduğu söylenebilir.

Anahtar kelimeler: Evrensel fen okuryazarlığı, sorgulama becerileri, bilimsel süreç becerileri algısı, laboratuvarda kendi kendine öğrenme hazırbulunuşluğu, fen alanları öğretmen adayları.

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The fact that the world is in constant development and change brings along technological innovations, and these innovations reshape the world we live in. While globalization and competition between countries continue unceasingly, they aim to keep up with economic, scientific and technological developments. It is crucial for accomplishing this goal that the individuals who make up the society are educated, creative, well-equipped, capable of solving problems, able to adjust to advances in science and technology, and able to assimilate scientific knowledge, use and transfer it effectively. It is possible for individuals to acquire these qualities if they get reach scientific literacy (Lieskovský & Sunyík, 2022; Putra et al., 2016). Accordingly, it is essential for civilizations to be scientifically literate so that they can follow the ever-increasing developments and be involved in the innovation process (Zainuri et al., 2020).

People who are scientifically literate conduct research, ask probing questions, offer constructive criticism, are curious about the world they live in, have values, attitudes, understanding and skills related to science, are equipped with knowledge, and consider lifelong learning (Ministry of National Education [MoNE], 2018). Considering the revised curriculum, individuals who are scientifically literate have science process skills, life skills, inquiry skills, engineering and design abilities, and a positive attitude towards science (MoNE, 2018). The process of educating individuals to be scientifically literate begins in the primary school period, when the individual learns to read and write, and experiences science lessons for the first time, and continues throughout their lives. It is feasible to raise these people through science education so that they have embraced modern scientific ideas and are capable of approaching challenges from a variety of disciplinary perspectives (Derman, 2014). Science education aims to know the basic concepts, theories, laws and principles of science, to use scientific process skills and scientific concepts, to produce knowledge by questioning (Chin & Osborne, 2008; Karapınar, 2016). In addition, it seeks to develop scientifically literate people who are aware of their scientific life and employ their minds (Oliver & Adkins, 2020). In this context, one of the primary objectives of science education is to promote scientific literacy.

In addition to the universality of science, education systems also have a global character. Regardless of the society they are a part of, each person acquires a universal quality. From this point of view, Choi et al. (2011) renamed the concept of scientific literacy and introduced it to the literature as global scientific literacy. The reason for the renewal of the concept in this way is that the individuals who make up the societies are seen as global citizens (Choi et al., 2011). When we look at the characteristics of individuals who are global scientifically literate, they can be described as those who understand scientific ideas, appreciate diversity of cultures and values, feel responsible for global issues related to science, and develop character and values as a member of a global society (Choi et al., 2011). In summary, global scientific literacy encompasses the definition of scientific literacy, and the only distinction between this idea and scientific literacy is the view of people as global citizens. Due to this, the study's definition of "global scientific literacy"—which includes concepts like "scientific literacy"—indicates that everyone is aware of how their environment is changing as well as how much of a degree they have in terms of scientific knowledge, abilities, attitudes, and values (Choi et al., 2011; Čipková et al., 2018).

The Laboratory's Contribution to the Development of Global Scientific Literacy

The ability to retrieve information rather than memorize it are provided by science classes taught within the context of science education, which increases the persistence of knowledge (Athuman, 2017; Wahyuni et al., 2017). By investigating and questioning in science lessons, it becomes easier to establish a connection between the knowledge that goes through the mental process and life (Karapınar, 2016; Wahyuni et al., 2017). One of the best settings for acquiring the skills that people with a scientific literacy should have is in laboratories, which are like the kitchen of science classes. Laboratories can be thought as a way that enables individuals to comprehend scientific knowledge, learn by practicing science, and participate in the development of science (Surpless et al., 2014). Laboratories are a complementary way of science education that promote inquiry and also provide skills including observation, data collection, classification, and experimentation (Keskin Geçer, 2018; Wenning, 2011). Because of this, laboratories are an essential part of raising scientifically literate citizens of the world. While laboratories play an active role in providing permanent learning, they also give the global scientifically literate individual the skills, attitudes and values that should be. This shows that global scientific literacy is related to various factors.

When the literature is examined, Çepni et al. (2012, pp.40-42) point out that being a scientifically literate individual requires the skills to question, solve problems, apply science process skills successfully, and have a positive attitude towards laboratory and science. Similarly, the National Research Council [NRC] (1996, p.22) defined scientific literacy as a concept that includes various skills such as understanding scientific concepts, questioning and using science process skills. In this regard, investigating the relationship among scientific literacy and numerous variables is critical for developing globally skilled individuals with scientific literacy skills. Pre-service teachers who will be practitioners of formal education in their professional lives have the most responsibility for developing scientifically literate people, which is a crucial need of our time (Pahrudin et al., 2019). Due to the fact that the qualities of pre-service teachers would immediately affect their students and the effectiveness of the teaching process (Atikoh & Prasetyo, 2018). In line with this significance, it is critical to investigate the relationship among global scientific literacy and various characteristics of pre-service teachers who would perform the teaching profession in science courses.

The Relationship Between Global Scientific Literacy and Inquiry Skills

One of the fundamental characteristics of a scientifically literate individual is the ability to question (Lederman et al., 2014; Wen et al., 2020). Because scientifically literate people are defined as individuals who are sensitive to the events related to science, go down to the source of the events, identify possible problems, reach information, make explanations and therefore have the ability to question (MoNE, 2018). Because scientifically literate individuals are described as those who are sensitive to scientific events, investigate the events in depth, recognize potential difficulties, obtain knowledge, make explanations, and thus have the ability to question. It is very critical to acquire inquiry skills in laboratory studies. Science laboratories, which incorporate inquiry-based activities, allow people to develop their ideas while also teaching them investigation, questioning, and scientific thinking skills (Hofstein &

Lunetta, 2004). Inquiry is a critical component of science programs at all levels and in all areas of science (NRC, 1996). Inquiry-based science teaching is used as a strategy to improve individuals' scientific literacy competencies (Gormally et al., 2009; Khumraksa & Phengkampang, 2021). Inquiry skills enable the individual to come to a conclusion by developing alternate thoughts and giving numerous solutions in the face of new problems. Thus, in the developing world, he advances on his path to become a scientifically knowledgeable individual. In this regard, inquiry skill is one of the basic skills that scientifically literate pre-service teachers should have (Balbağ & Aynur, 2020; Imaduddin & Hidayah, 2019).

The Relationship Between Global Scientific Literacy and Science Process Skills

Science process skills are among the skills that science education aims to gain individuals. Scientifically literate person uses scientific knowledge and apply science process skills while solving the problem they encounter and making decisions to find a solution (Fives et al., 2014; Khaeroningtyas et al., 2016; MoNE, 2018). Thus, people develop towards becoming scientifically literate at every stage of their lives. Science process skills that enable them to question, analyze and make decisions are critical for an effective science education. Because science process skills are intellectual skills used to create knowledge, solve problems scientifically, develop thinking skills as well as a crucial component of the inquiry process and also contribute to scientific literacy (Nugraha et al., 2018). In this regard, pre-service teachers need to have developed themselves in terms of science process skills in order to become lifelong learners who are scientifically literate (Dewi et al., 2021; Zainuri et al., 2020). Because there is a positive relationship between scientific literacy and science process skills.

The Relationship Between Inquiry Skills and Science Process Skills

Science education aims to train individuals who can integrate theory with daily life. This goal can be achieved with the help of inquiry and science process skills (Çolak, 2014). Inquiry and scientific process skills can be acquired through education in which individuals actively participate. According to Akkuzu Güven and Uyulgan (2019), science process skills involve the utilization of both physical and cognitive skills in order to acquire knowledge. On the other hand, inquiry includes cognitive skills such as gathering data based on varied facts, establishing connections between existing knowledge and data, developing hypotheses, and reasoning (Chen et al., 2018). When people inquire, their cognitive and scientific process skills are both also engaged (García-Carmona et al., 2017). Permanent learning occurs when inquiries are made during education. In particular, some studies in the literature reveal that individuals who can actively engage their science process skills during the inquiry process can achieve effective, easy and permanent learning by their own efforts (Akkuzu Güven & Uyulgan, 2019; Duschl et al., 2007; NRC, 2012). Settlage and Southerland (2007) emphasize that science process skills form a basis for inquiry. At this point, it may be claimed that inquiry skills and science process skills cannot be separated.

The age we live intends to provide individuals with lifelong learning skills rather than transferring existing knowledge (Marta-Lazo et al., 2019). Therefore, pre-service teachers should have met the requirements of the age (Akkuzu, 2012; Sandra, 2021). At this point, it is extremely important for pre-service science teachers to be scientifically

literate, to develop their inquiry skills and science process skills that they will use in the lifelong learning process (Koyunlu Ünlü, 2020).

The Relationship Between Science Process Skills and Self-Directed Learning Readiness in Laboratory

In general, education aims to change the behavior of individuals in the desired manner. This desired change is related to the readiness of individuals (Aktaş, 2019). Readiness is the prerequisite that an individual must have while new learning occurs (Aydın, 2001). Particularly in laboratories, readiness is critical for acquiring knowledge and skills. In laboratories, knowledge and skills are gained by doing and experiencing. People who learn by themselves in labs through hands-on experiences develop skills such as observation, problem-solving, inquiry, and questioning, and take responsibility for their own learning process. This process is defined as individuals' self-directed learning readiness (Alkan, 2012). Scientific process skills enable individuals to comprehend laboratory work, develop their responsibilities, make them active learners, and help them find ways of learning and discovery (Irwanto et al., 2019). For this reason, it can be said that there is a relationship between self-directed learning readiness in laboratory and science process skills. Because self-directed learning readiness requires having cognitive and psychomotor behaviors for a behavior to be acquired (Özbek, 2005; as cited in Önal, 2009). When pre-service teachers perform their responsibilities in laboratories, their science process skills improve and they can have sufficient knowledge and necessary equipment in the lifelong learning process (Akkuzu Güven & Uyulgan, 2019; Taylor et al., 2009). At the same time, pre-service teachers can participate in research as part of the self-directed learning process, make suggestions, be open to innovations, and evaluate the outcomes. Based on all these, it is necessary to reveal the relationship between pre-service teachers' self-directed learning readiness in laboratory and their science process skills.

The Relationship Between Science Process Skills and Attitude Towards Laboratory

Learning Science is a complex activity that requires to acquire scientific attitudes as well as scientific knowledge and science process skills. Gunawan et al. (2019) state that the method of learning and teaching science process skills is one that is aimed to help students comprehend facts, concepts, and apply them to their own attitudes. Zeidan and Jayosi (2015) emphasize that individuals with positive attitudes focus more on the scientific process. The researchers believe that the positive attitudes toward science makes the students more interested in focusing on science process. To put it another way, when students grasp the science process skills, science becomes more significant to them, leading to more positive attitudes toward learning. The feelings that individuals have while solving the problems they encounter are reflected in their behaviors. Ajzen (2001) state that attitudes play an important role in predicting behaviors. From this, it can be concluded that individuals' attitudes toward science-related activities increase their science process skills. Through hands-on experiences in laboratories, people can improve their science process skills, but they can also improve their attitudes towards the laboratory (Juhji & Nuangchalerm, 2020). Irwanto et al. (2019) state that the attitude towards the laboratory is an integral part of science

laboratory activities. According to Juhji and Nuangchalerm (2020), people with positive attitudes are more successful and develop better science process skills. Tinapay et al. (2021) state that individuals who have positive attitude towards science and enhance their science process skills will learn effectively and permanently. Individuals with science process skills, on the other hand, can alter their attitudes and values through comprehending facts and concepts more easily (Ogunleye, 2012). Scientifically literate pre-service teachers are expected to have adequate science process skills and positive attitudes in order to improve student performance and success in science fields. Because, being able to teach well in learning activities is related to the attitudes and science process skills of pre-service teachers (Zeidan & Jayosi, 2015).

When the aforementioned variables are taken into consideration, as well as the relationship among global scientific literacy and these variables, it is clear that global scientific literacy plays a critical role in science education. One of the primary considerations in selecting such a study subject has been the growing significance of global scientific literacy, which plays a significant role in the advancement of science education. In the current world, where scientific literacy is becoming increasingly important, educators who will teach scientific literacy to their students in accordance with the revised curricula bear enormous responsibility (Göktepe, 2019). Teachers, who are the implementers of the courses, are expected to have various knowledge, skills and positive attitudes. These characteristics will affect the scientific literacy levels of teachers who aim for their students to become strong scientifically literate individuals (Çepni et al., 2012). Because the scientific literacy levels of pre-service science teachers directly affect the students they will educate. In this regard, it is necessary to investigate the relationship among global scientific literacy and inquiry skills, science process skills, self-directed learning readiness in laboratory and attitudes towards the laboratory of pre-service chemistry, physics, biology and science teachers before graduating from university.

Significance of the Research

Given the significance of the research in terms of literature, it is clear that many studies shed light on the relationship between science process skills and scientific literacy (Gürses et al., 2015; Handayani et al., 2018; Hartini et al., 2018; Kaya et al., 2012; Sullivan, 2008; Turiman et al.2012; Zainuri et al., 2020). At the same time, we encounter studies on the effects of variables such as inquiry skills, self-efficacy or attitude on science process skills and scientific literacy (Çolak, 2014; Güçlüer, 2012; Shive, 2005). Furthermore, when the relevant studies are examined in terms of the sample group, these subjects are studied on students at different levels (primary, secondary, and university) (Çolak, 2014; Güçlüer, 2012; Gürses et al., 2015; Hartini et al., 2018; Karapınar, 2016; Sullivan, 2008; Usta & Çıkrıkçı-Demirtaşlı, 2014). However, no correlational studies that have addressed how these variables together affecting scientific literacy and identify their causal relationships. Structural Equation Modeling is the method used in multivariate correlational research to explain the theoretical framework by revealing the existence of correlations (Şimşek, 2007, p.43). In this context, our study is considered to be extremely important in regards to the development of scientific literacy, since it is based on the creation and validation of a Structural Equation Modeling (SEM) aimed at revealing the causal relations among

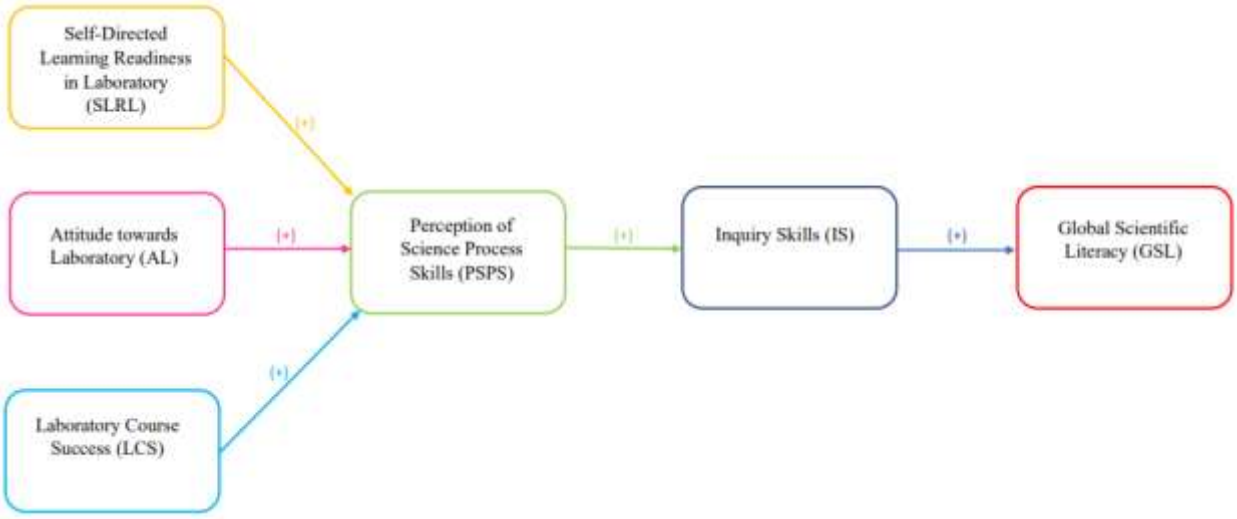
various variables and scientific literacy. This study also highlights the significance of laboratory procedures. Because it is possible for scientifically literate individuals to develop their inquiry skills and science process skills by performing laboratory applications. In this context, it is thought that the study has a particular relevance since the data acquired as a consequence of the study provides a broader view on laboratory education.

Purpose of the Research

The aim of this study is to examine the global scientific literacy of the pre-service science teachers (chemistry, physics, biology and science) with regard to various variables, including perceptions of their science process skills, readiness for self-directed learning in laboratory, attitude towards the laboratory and laboratory course success. For this purpose, a structural equation model (see Figure 1) was developed and tested, aiming to reveal the causal link among various variables and global scientific literacy.

Figure 1

The Hypothesized Research Model



In accordance with the aim of the research, answers to the following questions are sought:

1. Do pre-service science teachers' attitudes towards the laboratory, their readiness for self-directed learning in laboratory, and their success in the laboratory course(s) explain their perceptions of science process skills significantly?
2. Do pre-service science teachers' perceptions of science process skills explain their inquiry skills significantly?
3. Do the pre-service science teachers' inquiry skills explain their global scientific literacy significantly?
4. To what extent do the variables of perception of science process skills and inquiry skills mediate the relationship between self-learning readiness in the laboratory and global scientific literacy in the model?

5. To what extent do the variables of perception of science process skills and inquiry skills mediate the relationship between the attitude towards the laboratory and global scientific literacy in the model?
6. To what extent do the variables of perception of science process skills and inquiry skills mediate the relationship between laboratory course(s) success and global scientific literacy in the model?

Method

Model of the Research

Correlational research method was used in the study since the structural model developed in line with the purpose of the research requires advanced analysis techniques. In multivariate correlational studies, structural equation modeling was used because it is a method used to explain the theoretical framework by revealing the existence of correlations (Şimşek, 2007, p.43). The difference of SEM from other analyses is that it is a statistical approach that is used to test models in which correlational and causal relationships between observed (explicit, measured) and unobserved (latent, unmeasured) variables are present in their entirety (Yılmaz, 2004). Correlational studies are used to determine the relationship between at least two variables. In studies carried out using this methodology, the variables are not subjected to any external manipulation; rather the degree to which the known variable is related to other variables and the type of this relationship are determined. Hence, conclusions and remarks concerning cause and effect are drawn (Fraenkel et al., 2012).

Study Group

In the study, one of the non-random sampling methods, the convenience sampling method, was used. According to the convenience sampling method, the researcher chooses the sample that is easy to contact and obtain their participation (Fraenkel et al., 2012). From this point of view, the universe of the study consists of pre-service teachers studying in science education departments (chemistry, physics, biology and elementary science education) at the Faculty of Education. The sample consists of 294 volunteer pre-service teachers at all grade levels who are continuing their education in the science departments of the Faculty of Education of a state university in Turkey. The frequency (f) and percentage (%) values of the demographic characteristics of the sample group are given in Table 1.

Table 1

Demographic Characteristics of Pre-Service Science Teachers

Demographic Characteristics		*f*	*%*	*Laboratory Grades*
Gender	Girl	240	81.6	
	Boy	54	18.4	
Department	Chemistry Education	70	23.8	70.1
	Physics Education	35	11.9	65.0
	Biology Education	45	15.3	86.0
	Elementary Science Education	144	49.0	72.7
Grade Level	1	54	18.4	
	2	59	20.0	
	3	84	28.6	
	4	97	33.0	
Age	18	11	3.7	
	19	29	9.9	
	20	64	21.8	
	21	84	28.6	
	22	69	23.5	
	23	20	6.8	
	24	10	3.4	
	25 and above	7	2.3	
Total		294	100	

Data Collection Tools

Personal Information Questionnaire

Within the scope of the research, a questionnaire was created in order to obtain the demographic information of the pre-service teachers. Pre-service teachers were asked about their department, grade level, gender, age and laboratory grades in this survey. The data on the success in the laboratory course(s), which is one of the independent variables of the study, were presented on the basis of the grades that the pre-service science teachers took from the laboratory courses in the 2018 curriculum. To avoid interfering with each pre-service teacher's responses to the scales and to ensure that the analysis was carried out accurately and reliably, the pre-service teachers were asked to write their school numbers on the questionnaire.

Global Scientific Literacy Scale

The scale of Global Scientific Literacy (GSL), developed by Mun et al. (2015) considering 21st century skills and competencies, is based on raising global individuals who have social consciousness, character and values, and who have a good command of socio-scientific issues. The scale, adapted into Turkish by Çelik (2016), consists of 48 items. The validity and reliability studies are categorized under 4 factors of the scale of GSL, which was carried out on a sample of 645 pre-service teachers. The factors belonging to the scale, factor loading values and reliability coefficients are given in Table 2.

Table 2

Validity and Reliability of the Scale of GSL

Factors	Cronbach Alpha (α) Reliability Coefficient	Factor Loading Values	Number of Items
Habits of Mind	.81	.48–.67	13
Character and Values	.76	.46–.76	9
Science as a Human Endeavor	.79	.41–.65	13
Metacognition and Self-Direction	.85	.42–.71	13
Total	.91	.41–.76	48

The results of the Confirmatory Factor Analysis (CFA) of the construct validity of the scale are as follows: $\chi 2$ /df = 2.03, NFI = .94, NNFI = .97, CFI = .97, GFI = .88, AGFI = .86 and RMSEA = .04 The CFA results show that the model is compatible (Çelik, 2016). Within the scope of the research, the reliability of the scale was recalculated over 294 participants and the reliability coefficient of the whole scale was found to be .86. The 5-point Likert-type scale has a rating of "Strongly agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1)". There is no negative item in the scale. The highest score obtained from the scale is 240, and the lowest score is 48.

Inquiry Skills Scale

The scale of Inquiry Skills (IS) was developed by Aldan Karademir and Saracaloğlu (2013) to assess the inquiry skills of pre-service teachers which is one of the thinking skills that pre-service teachers have in their academic lives. The scale of IS has a 3-factor structure and consists of 14 items in total. The factor loading values of the scale are above .40. The “acquiring knowledge” factor consists of 6 items, the “controlling knowledge” factor consists of 5 items and the “self-reliance” factor consists of 3 items. The results of the CFA of the scale are as follows: $\chi 2$ /df = 4.55, NNFI = .91, CFI = .93, GFI = .95, AGFI = .93 and RMSEA = .06. The CFA results show that the model is compatible (Aldan Karademir & Saracaloğlu, 2013). The Cronbach Alpha (α) reliability coefficients of the factors are .76, .66 and .82, respectively. The reliability coefficient of the overall scale is .82. Furthermore, the researchers recalculated the scale's reliability over 294 participants, and the overall scale's reliability coefficient was found to be. 65. There are no negative items in the scale, which is rated as "Never (1), Rarely (2), Sometimes (3), Often (4), and Always (5)" on a 5-point Likert scale. The lowest score for the scale is 14, and the highest is 70.

Perception of Science Process Skills Scale

The scale of Perception of Science Process Skills (PSPS) developed by Ünal (2018) consists of 2 factors: basic and experimental. The scale, which is based on the development of these skills through the use of observation, examination and research in experimental activities, associating experiments with the subject and structuring concepts in the mind, is in 5-point Likert type format and is "Never (1), Rarely (2), Sometimes (3), Often (4) and Always (5)". The scale consists of 18 items and factor loading values range from .52 to .79. The scale's factor titled "perception of basic

process skills" contains 7 positive and 3 negative items, whilst the factor titled "perception of experimental process skills" contains 4 positive and 4 negative items. $\chi 2$ /df goodness of fit value calculated in the CFA conducted to test the accuracy of the model related to the PSPS is 4.12. The Cronbach Alpha (α) reliability coefficients of the factors are .74 and .72, respectively. The reliability coefficient of the overall scale is .76. In addition, the reliability of the overall scale was recalculated over 294 participants and it was found to be .83. While the lowest score that can be obtained from the scale is 18, the highest score is 90. The data obtained from the scale reveal the mediatory role of the perception of science process skills on global scientific literacy.

Laboratory Attitude Scale

The scale of Attitude towards Laboratory (AL) was developed by Akpınar and Yıldız (2006), which measures pre-service teachers' attitudes towards the laboratory within the scope of various factors. The LAS is a 5-point Likert-type data tool with a rating of "Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), and Strongly Disagree (1)". The validity and reliability of the scale of AL were examined using data from a sample of pre-service science teachers who took laboratory courses. The scale consists of 14 items and 4 factors. The Cronbach Alpha (α) reliability value of the four-item "enjoyment" factor is .75, the three-item "communication" factor is .70, the three-item "necessity" factor is .71, and the four-item "significance" factor is .66. The α reliability coefficient of the overall scale is .86. The reliability coefficient, which was recalculated over 294 participants within the scope of the research, is .75. The scale of AL has positive 9 items and 5 negative items. The minimum score that can be obtained from the scale is 14, and maximum score is 70.

Self-Directed Learning Readiness in Laboratory Scale

Cognitive, affective, and psychomotor characteristics are needed for an individual to be able to independently learn a particular subject and, as a result, to achieve a new behavioral change. The scale of Self-Directed Learning Readiness in Laboratory (SLRL) was developed by Alkan (2012), which is based on the idea that a person with these characteristics chooses what, how, where, and when to learn by taking control of the learning process. The scale consists of 5 factors and 32 items. The 5-point Likert-type scale has a rating of "Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1)". The scale of SLRL includes the factors of “desire for self-directed learning in laboratory” (11 positive items), “anxiety for self-directed learning in laboratory” (7 negative items), “self-management in laboratory” (5 positive items), “self-confidence in laboratory” (6 positive items) and “preliminary study for self-directed learning in laboratory” (3 positive items). The Cronbach Alpha (α) reliability coefficient for the overall scale is .93, and the Cr α values for the scale factors are .92, .84, .85, .76 and .75, respectively. Since the items in the “self-learning in laboratory” factor contain similar expressions with the items in the “enjoyment” factor in the attitude towards the laboratory scale, the “self-learning in laboratory” factor is not included in the research. The reliability coefficient of the scale was recalculated by subtracting this factor and it was found to be .71. Therefore, the highest score that can be obtained from the scale is 105 and the lowest score is 21.

Procedure and Ethical Approval

At the data collecting stage, valid and reliable scales appropriate for the purpose of the study were first sought. Before beginning the application phase of the scales, necessary permissions were obtained from the researchers who developed the scales. This process is followed by obtaining ethical committee permissions from the relevant institution, obtaining the necessary permissions from the university where the application will be made, and applying the scales. Ethical approval for this study was obtained from the Ethics Committee of the University dated 31.03.2021 and numbered E.85316909-640.99-36670. In addition, the research was carried out on volunteer pre-service teachers. For this, pre-service teachers were informed about the purpose of the study before proceeding to the scale application stage and the option of consent for voluntary participation was presented.

The application was carried out in the 2020-2021 Spring semester. Due to the pandemic process during this period, the application was made through the Google Forms survey management program, which is an online form creation tool. In order to test the model, it was ensured that each pre-service teacher filled out every scale completely. To avoid scale filling bias, the scales were administered throughout a five-week period, one scale per week, and the scales were not applied during the exam weeks to boost the research's reliability.

Analysis of Data

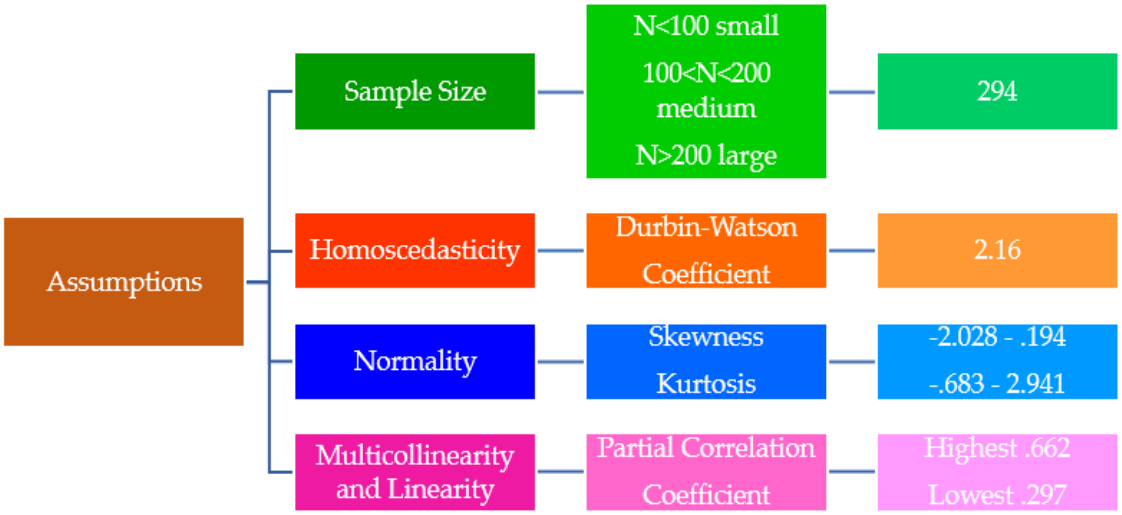
The variables in the proposed structural model are tested through a single model within the context of the indirect and direct relationships between the observed and latent structures. SEM attempts to explain the latent structures that cannot be measured directly and established in a theoretical framework using various indicators SEM also demonstrates how well the model fits the theoretical framework by revealing the existence of random correlations in the latent structure (Şimşek, 2007, p.51). SEM is a method that is frequently used in different disciplines and reveals how accurate models constructed using a deductive approach are. In this respect, SEM analyzes consist of confirmatory techniques (Şimşek, 2007, p.43). The well-known name for the statistical method that includes factor analysis and multiple regression is structural equation modeling (Kline, 2015). As a result, before beginning the analysis in multivariate statistics, it is crucial to decide which assumptions are required (Sümer, 2000). In this context, the assumptions of missing values, outliers, sample size, normality, multicollinearity, linearity and homoscedasticity were examined. First of all, the missing values in the data set were analyzed and it was seen that the scale items were filled in completely. According to Mertler and Reinhart (2017), extremely high or low values excluding the mean values in the data set are considered as outliers. The accuracy of the results drawn from the data set is significantly impacted by beginning the analysis without eliminating these values. For this reason, standardized z-scores were calculated to identify univariate outliers. In the literature, z scores that are not between -3 and +3 are considered outliers (Mertler & Reinhart, 2017, p.30-31). Mahalanobis distance values were examined to determine multivariate outliers. For this, chi-square values were calculated and values below .001 were determined as outliers (Tabachnick & Fidell, 2007). A total of 26 data were excluded from the data set as

outliers after the z scores and Mahalanobis distance values were analyzed. Examination of the assumptions and analysis was carried out on 294 participants.

One of the assumptions examined for the SEM analysis is to test the adequacy of the sample size for data analysis. A sample size of less than 100 is regarded as small, while values between 100-200 are considered medium, and values of 200 and above are considered large sample sizes (Khine, 2013). Siddiqui (2013) reports that a sample size of 200–400 is needed for 10-15 estimators (variables) for SEM in his review study, which cites numerous papers. In our study, 294 data were found to be sufficient for analysis, indicating that the sample size assumption was met. Homoscedasticity, which is a constant (or homogeneous) variance in a set of random variables is another necessary assumption for the SEM analysis. In order to meet this assumption, there should be no autocorrelation between the variables. For this reason, the Durbin-Watson coefficient is checked. The fact that this value is in the range of 1.5-2.5 indicates that the assumption is met (Kalaycı, 2009). The Durbin-Watson coefficient of the data set was found to be 2.16. This result shows that there is no autocorrelation in the data set. Another pre-analysis assumption is that the data set has a normal distribution (Tabachnick & Fidell, 2007). The study determined whether or not our data had a normal distribution by assessing the kurtosis and skewness coefficients, as well as the statistical, histogram, and P-P graphs from a graphical standpoint. When the literature is examined, it is stated that skewness and kurtosis values should be within ±3 limits in order to meet the normality assumption (Kalaycı, 2009; Kline, 2015, p.50). It was determined that the skewness coefficient of the data set was between -2.028 and .194, and the kurtosis coefficient was between -.683 and 2.941. These values indicated that the normality assumption was met. The partial correlation coefficient between the variables was examined for the multicollinearity and linearity assumptions. To meet these assumptions, it is preferable that the correlation between the observed variables be low. While Kline (2015) considers .85 and above to be a multicollinearity problem, this value is expressed as .90 or higher by Tabachnick and Fidell (2007). Examining the partial correlation coefficient, it was found that the highest correlation value was between PSPS and SLRL variables (.662) and the lowest correlation value was between AL and LCS variables (.297). These values indicated that the multicollinearity and linearity assumptions were met. Figure 2 summarizes the study's assumptions for the analysis and its findings. SPSS 22.0 statistical program was used in the analysis of all these assumptions.

Figure 2

Assumptions and Results of the SEM Analysis



The proposed structural equation model was analyzed using the LISREL 8.51 statistical program. Because no one criterion is acceptable within the scope of the SEM analysis, many fit indices are examined. In order to evaluate the model fit; Chi-square/Degree of Freedom ($\chi 2$ /df), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Standardized Root Mean Square Residual (SRMR), Non-normed Fit Index (NNFI), Goodness of Fit Index (GFI), Incremental Fit Index (IFI), Comparative Fit Index (CFI), and Relative Fit Index (RFI) were examined (Şimşek, 2007, p. 57).

Results

Findings of the Relationships Between the Variables

The correlation values between the variables in the suggested model were examined prior to the measurement model.

When Table 3 is examined, the correlations between the variables range between .02 and .73. "The perception of experimental process skills" factor of the PSPS scale and "the necessity" factor of the LT scale has the lowest relationship between observed variables ($r= .02$, $p<.05$). The highest correlation was between the "habits of mind" and "metacognition and self-direction" factors belonging to the scale of GSL ($r= .73$, $p<.01$). The observed variables' correlations were found to be moderately positive and significant in general. However, it can be said that the relationship between the factor of "necessity" and "preliminary study for self-directed learning in laboratory" is negative, low and insignificant ($r= -.12$, $p<.05$).

Table 3

Mean, Standard Deviation and Correlation Values of the Variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.1.BASIC	39.95	4.33	1																
1.2.EXPERIMENTAL	29.57	3.93	.714**	1															
2.1.ANXIETY	27.85	4.66	.549**	.457**	1														
2.2.SELF-MANAGEMENT	20.37	2.17	.527**	.444**	.536**	1													
2.3.SELF-CONFIDENCE	21.04	3.36	.496**	.510**	.592**	.553**	1												
2.4.PRELIMINARY	12.63	1.80	.338**	.368**	.250**	.254**	.247**	1											
3.1.ENJOYMENT	17.49	2.22	.398**	.266**	.486**	.452**	.438**	.109	1										
3.2.COMMUNICATION	12.76	1.97	.341**	.223**	.436**	.382**	.370**	.155**	.621**	1									
3.3.NECESSITY	14.66	0.73	.055	.020	.139*	.088	.134*	-.117*	.180**	.215**	1								
3.4.SIGNIFICANCE	18.03	1.95	.322**	.171**	.330**	.407**	.345**	.043	.633**	.541**	.198**	1							
4.1.HABITS OF MIND	54.98	5.31	.483**	.385**	.389**	.500**	.341**	.140*	.368**	.295**	.094	.353**	1						
4.2.CHARACTER-VALUES	38.74	4.28	.367**	.288**	.258**	.349**	.191**	.175**	.261**	.298**	.171**	.324**	.610**	1					
4.3.SCIENCE	56.16	2.10	.400**	.251**	.237**	.382**	.171**	.183**	.218**	.281**	.088	.289**	.534**	.571**	1				
4.4.METACOGNITION	55.35	6.11	.425**	.346**	.320**	.481**	.264**	.149*	.386**	.306**	.145*	.361**	.730**	.639**	.628**	1			
5.1.ACQUIRING	25.86	2.27	.365**	.254**	.230**	.302**	.184**	.180**	.224**	.174**	.129*	.261**	.561**	.391**	.380**	.509**	1		
5.2.CONTROLLING	18.61	2.84	.360**	.387**	.260**	.267**	.296**	.205**	.299**	.266**	.091	.263**	.467**	.345**	.316**	.489**	.528**	1	
5.3.SELF-RELIANCE	10.82	2.62	.287**	.219**	.302**	.202**	.295**	.081	.245**	.198**	.096	.174**	.249**	.164**	.153**	.158**	.226**	.322**	1

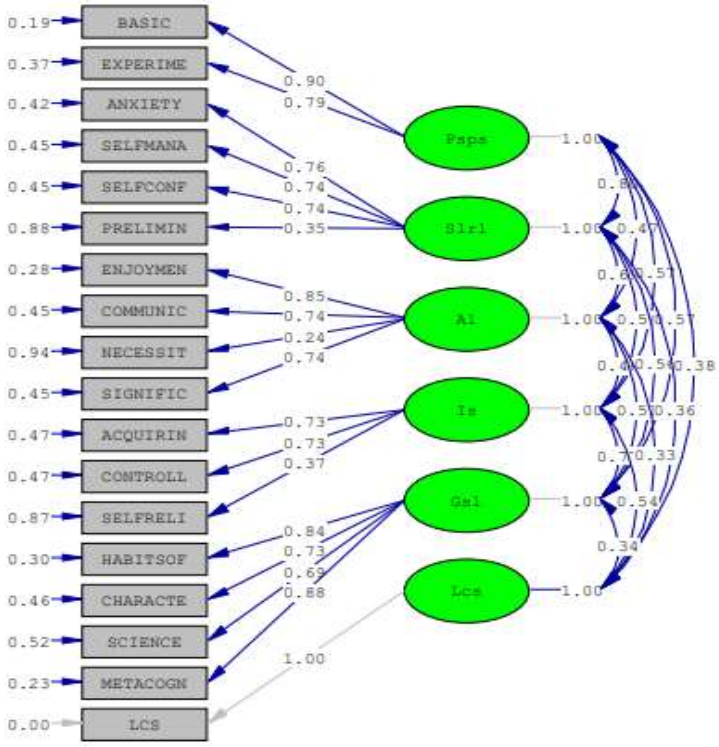
*Note. N= 294. *p<.05, **p<.01; 1. Perception of basic process skills, 2. Self-directed learning readiness in laboratory, 3. Laboratory attitude, 4. Global scientific literacy, 5. Inquiry skills*

Findings Related to Testing the Measurement Model

A two-step approach is often used in the SEM analysis to test the research model. Accordingly, first of all, it is checked whether the observed variables are reliable indicators of latent variables with the measurement model (Byrne, 2010; Şimşek, 2007, p.107). Defining the measurement model correctly and in accordance with its purpose is extremely important for the structural model. Because it is impossible to discuss the correlations between the structures without first examining how accurately the model's observable variables represent the latent variables. Standardized values of the measurement model are shown in Figure 3, and t values are shown in Figure 4.

Figure 3

Standardized Values of the Measurement Model



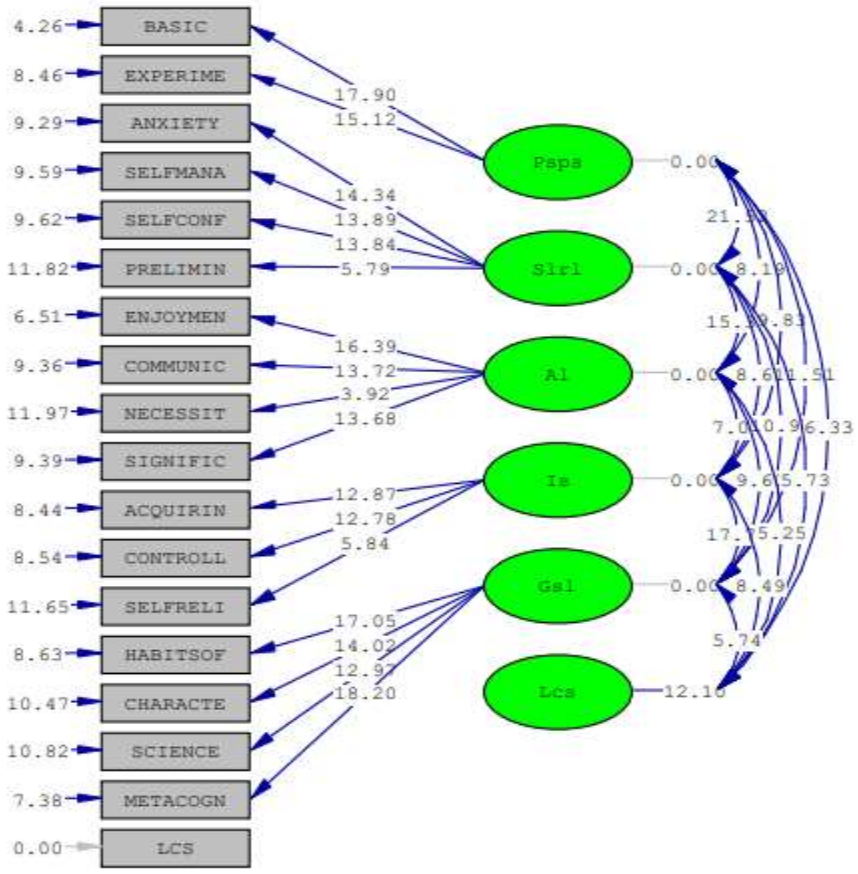
Chi-Square= 246.85, df= 121, p-value= 0.00000, RMSEA= 0.060

When the values in Figure 3 are analyzed, the factor loadings are found to be generally above .70. These values are an important indicator for the acceptance of the measurement model, but they are insufficient on their own. For this reason, all t-values of the measurement model should be statistically significant and the goodness of fit indices should be within the desired limits. Figure 4 also shows the t values for the factor loadings, and it is assumed that all of the t values are statistically significant.

If the significance level is .05, the critical t value is 1.96 (Şimşek, 2007, p.17). As a result, all observed variables in the model were found to be reliable indicators of latent structures.

Figure 4

t Values of the Measurement Model



Chi-Square= 246.85, df= 121, p-value= 0.00000, RMSEA= 0.060

Goodness-of-Fit Indices for Measurement Model

Goodness-of-fit indices obtained through the observed variables of the study are given in Table 4.

Table 4

Goodness-of-Fit Indices of the Measurement Model

Goodness-of-fit Indices	Good Value	Acceptable Value	Measurement Value	Interpretation
χ^2			246.85	
df			121	
χ^2 / df	2	5	2	Good
RMSEA	0<RMSEA<.05	.05<RMSEA<.10	.06	Acceptable
SRMR	0<SRMR<.05	.05<SRMR<.08	.05	Good
NFI	.95<NFI<1	.90<NFI<.95	.96	Good
NNFI	.95<NNFI<1	.90<NNFI<.95	.97	Good
GFI	.95<GFI<1	.90<GFI<.95	.91	Acceptable
CFI	.95<CFI<1	.90<CFI<.95	.98	Good
IFI	.95<IFI<1	.90<IFI<.95	.98	Good
RFI	.95<RFI<1	.90<RFI<.95	.94	Acceptable

When the goodness-of-fit indices of the measurement model were examined (see Table 4), it was found that $\chi 2$ /df = 2, SRMR = .05, NFI = .96, NNFI = .97, CFI = .98 and IFI = .98 were at the level of good fit indices. The indices of RMSEA = .06, GFI = .91 and RFI = .94 appeared to be acceptable values. All these values showed that the measurement model as a whole was supported by the sample data. With these findings, the measurement model was confirmed.

Correlations Between Latent Variables

The findings in Table 5 indicate that the relationships between latent variables are generally at medium and high levels. It was observed that the highest correlations were between "global scientific literacy" and "inquiry skills" (r= .77), and "perception of science process skills" and "self-directed learning readiness in laboratory" (r= .78). The lowest correlation with latent variables was seen in the "laboratory course success" variable (r= .33).

Table 5

Correlations between Latent Variables in the Measurement Model

Latent Variables	GSL	IS	PSPS	SLRL	AL	LCS
Global Scientific Literacy (GSL)	-					
Inquiry Skills (IS)	.77	-				
Perception of Science Process Skills (PSPS)	.57	.58	-			
Self-Directed Learning Readiness in Laboratory (SLRL)	.56	.53	.78	-		
Attitude towards Laboratory (AL)	.54	.46	.48	.70	-	
Laboratory Course Success (LCS)	.33	.53	.39	.33	.33	-

Testing the Structural Model

The structural model was tested when it was verified that the observed variables in the model represented the latent variables according to the measurement model. The structural model examines the correlations between the latent variables defined in the research model. In this context, it was determined whether the model proposed in the research is adequately compatible with the data set. Goodness-of-fit indices for the structural model are given in Table 6.

When the results shown in Table 6 were examined, it was found that the proposed structural model generally fit the data at an acceptable level. However, when the suggestions produced by the LISREL program were examined, it has been determined that associating the errors between the "Basic" and "Experimental" observed variables of the latent variable of the PSPS causes a significant decrease in the chi-square value, and thus this situation will contribute to the model. The existence of a link between observed variables belonging to the same latent structure is, theoretically, an expected circumstance. The goodness-of-fit indices of the revised structural model are given in Table 7. As a result of the modification, an improvement was observed in the goodness-of-fit indices.

Table 6

Goodness-of-Fit Indices for the Structural Model

Goodness-of-Fit Indices	Good Value	Acceptable Value	Value	Interpretation
χ^2			298.19	
df			128	
χ^2/df	2	5	2.33	Acceptable
RMSEA	0<RMSEA<.05	.05<RMSEA<.10	.07	Acceptable
SRMR	0<SRMR <.05	.05<SRMR<.08	.07	Acceptable
NFI	.95<NFI<1	.90<NFI<.95	.88	Acceptable
NNFI	.95<NNFI<1	.90<NNFI<.95	.91	Acceptable
GFI	.95<GFI<1	.90<GFI<.95	.90	Acceptable
CFI	.95<CFI<1	.90<CFI<.95	.92	Acceptable
IFI	.95<IFI<1	.90<IFI<.95	.93	Acceptable
RFI	.95<RFI<1	.90<RFI<.95	.85	Inadequate Compliance

Table 7

Goodness-of-Fit Indices for the Revised Structural Model

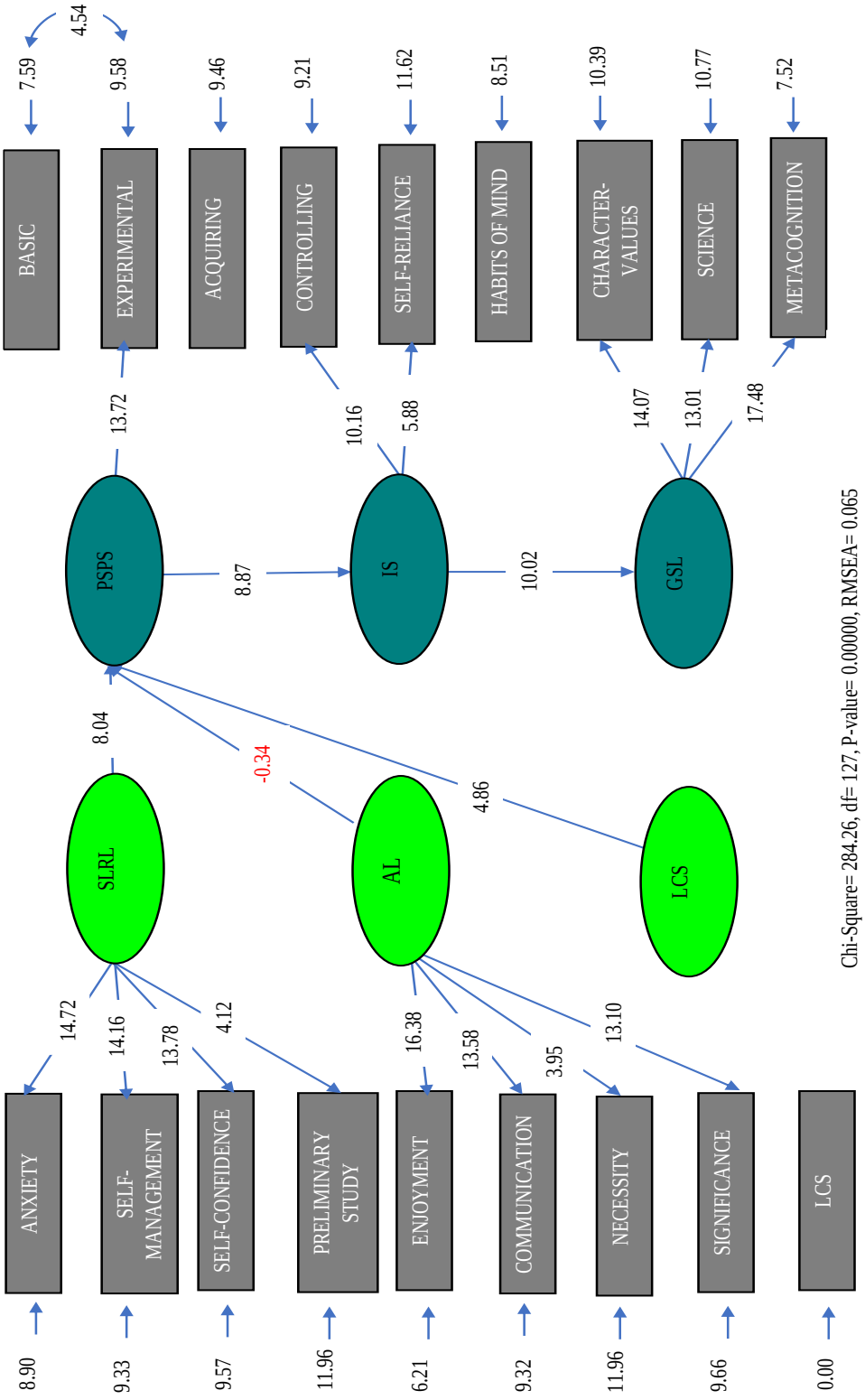
Goodness-of-Fit Indices	Good Value	Acceptable Value	Value	Interpretation
χ^2			284.26	
df			127	
χ^2/df	2	5	2.24	Acceptable
RMSEA	0<RMSEA<.05	.05<RMSEA<.10	.06	Acceptable
SRMR	0<SRMR<.05	.05<SRMR<.08	.06	Acceptable
NFI	.95<NFI<1	.90<NFI<.95	.95	Good
NNFI	.95<NNFI<1	.90<NNFI<.95	.97	Good
GFI	.95<GFI<1	.90<GFI<.95	.90	Acceptable
CFI	.95<CFI<1	.90<CFI<.95	.97	Good
IFI	.95<IFI<1	.90<IFI<.95	.97	Good
RFI	.95<RFI<1	.90<RFI<.95	.94	Acceptable

When the goodness-of-fit indices of the structural model (see Table 7) were examined, it was found that $\chi 2$ /df = 2.24, RMSEA = .06, SRMR = .06, GFI =.90, and RFI = .94 were at an acceptable level. NFI = .95, NNFI =.97, CFI =.97 and IFI = .97 were in the good-fit range. As a result of all these findings, the structural model was verified.

Figure 5 shows the t values for the structural model and the standardized values are given in Figure 6. As a result, when the t values were evaluated, the correlation between AL and PSPS variables was not significant, although the t values among the other variables in the model were significant.

Figure 5

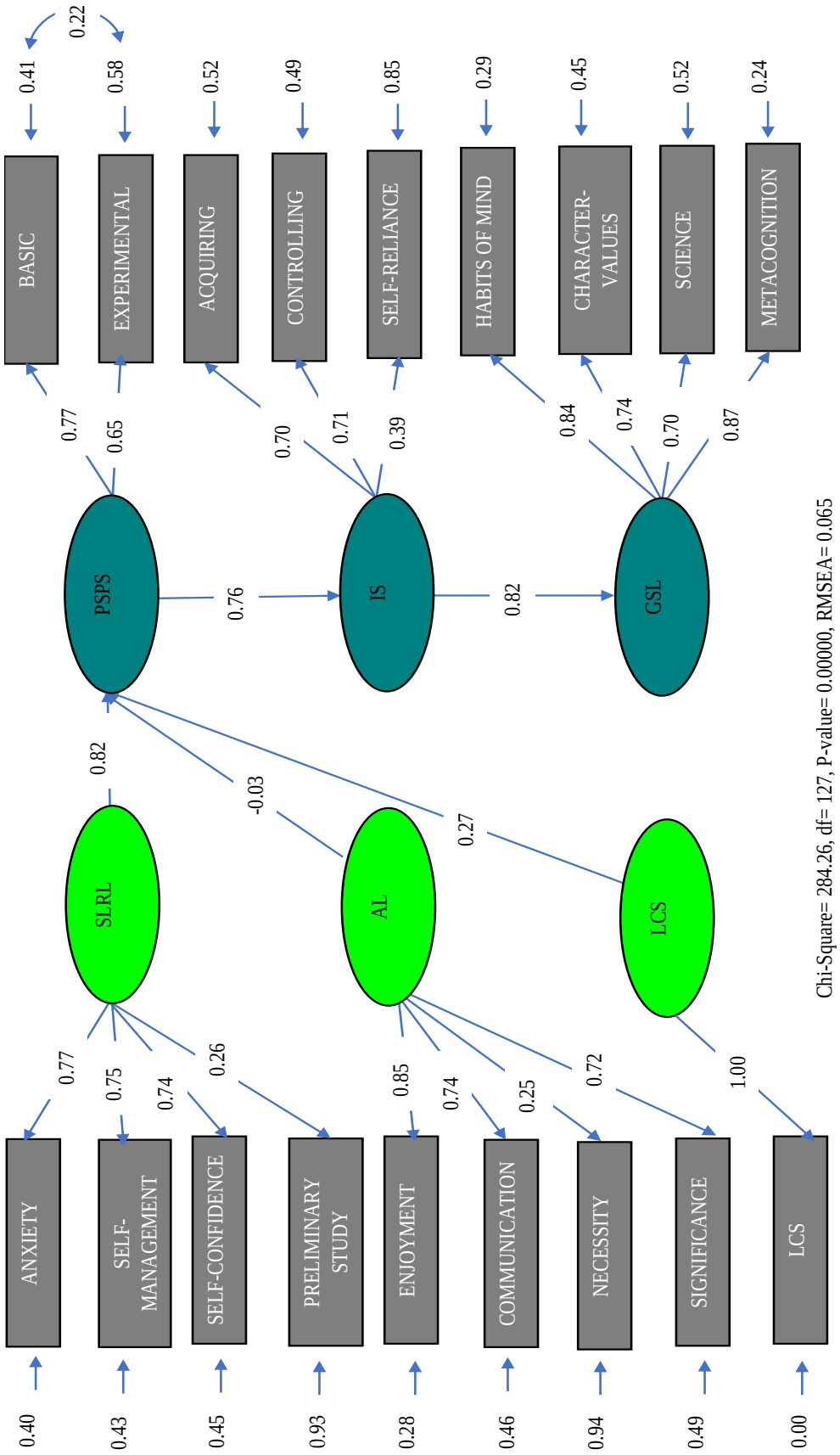
t-Values for the Structural Model



*Note. N= 294. *p<.05, **p<.01; SLRL= Self-directed Learning Readiness in Laboratory, AL= Attitude towards Laboratory, PSPS= Perception of Science Process Skills, LCS= Laboratory Course Success, IS= Inquiry Skills, GSL= Global Scientific Literacy.*

Figure 6

Standardized Values for the Structural Model



*Note. N= 294. *p<.05, **p<.01; SLRL= Self-directed Learning Readiness in Laboratory, AL= Attitude towards Laboratory, PSPS= Perception of Science Process Skills, LCS= Laboratory Course Success, IS= Inquiry Skills, GSL= Global Scientific Literacy.*

When indirect effects were examined, the indirect effect of the SLRL variable on IS was determined to be .62 and statistically significant (SH= .09, t=6.80, p<.05), the indirect effect of the LCS variable on IS was determined to be .20 and statistically significant (SH=.01, t=4.54, p<.05) and the indirect effect of AL variable on IS was -.02 and this indirect effect was not statistically significant (SH=.07, t= -.34, p<.05). Similarly, the indirect effect of SLRL variable on GSL was .51 and this indirect effect was significant (SH= .07, t=6.87, p<.05), the indirect effect of LCS variable on GSL was .17 and this indirect effect was significant (SH =.00, t=4.56, p<.05) and the indirect effect of AL variable on GSL was -.02 and this indirect effect was not statistically significant (SH=.06, t= -.34, p<.05). Finally, it was concluded that the effect of PSPS variable on GSL was .62 and this indirect effect was statistically significant (SH= .08, t=9.04 p<.05). The results indicate that the variables of PSPS and IS mediate the relationship among SLRL, LCS and GSL. However, it was revealed that the variables of PSPS and IS did not play a mediating role in the relationship between the variables of AL and GSL. Table 8 summarizes the significance of the indirect effects among the latent variables in the structural model.

Table 8

Indirect Effect between Variables

Variables	Indirect Effect
SLRL – IS	SIGNIFICANT
AL – IS	*INSIGNIFICANT*
LCS – IS	SIGNIFICANT
SLRL – GSL	SIGNIFICANT
AL – GSL	*INSIGNIFICANT*
LCS – GSL	SIGNIFICANT
PSPS –GSL	SIGNIFICANT

The amount of variance in the relationships among PSPS and SLRL, AL, and LCS can be discussed based on the regression equations given in Table 9. While SLRL and LCS variables predicted PSPS, it was seen that SLRL variable was the most important variable explaining PSPS. AL variable did not predict PSPS. Accordingly, these variables explained 84% of the PSPS (R^2 = .84). From this, it can be said that there is a close relationship between pre-service teachers' self-directed learning readiness in laboratory and their perception of science process skills. This regression equation, which confirms the relationship between LCS and PSPS, which is another variable, supports the view that pre-service teachers with high success in laboratory course success have a high perception of science process skills and perceive these skills correctly. When the relationship between the third variable, AL, and PSPS was examined, it was seen that the relationship between the attitude towards laboratory and the perception of science process skills is insignificant.

Table 9

Structural Equations among the Variables and the Amount of Variance Explained

Dependent Variables	Regression Equation of Independent Variable(s)	Amount of Variance Explained (R^2)
PSPS	.82*SLRL – .032*AL+ .035*LCS	.84
IS	.76*PSPS	.58
GSL	.82*IS	.67

In the second regression equation, the amount of variance explained by the mediator variable PSPS, which was the predictor of the IS variable, showed that the factors of PSPS were highly related to the factors of IS (R^2= .58). This shows that the inquiry skills of pre-service teachers are highly correlated with the perception of science process skills.

Finally, examining the third regression equation, the amount of variance explained by the mediator variable IS, which was the predictor of the GSL variable, showed that the factors of IS were highly related to the GSL factors (R^2= .67). In this context, it can be said that pre-service teachers' global scientific literacy is highly related to their inquiry skills.

Discussion, Conclusion and Recommendations

Within the scope of the research, we determined at what level the variables of self-directed learning readiness in laboratory, attitude towards laboratory, laboratory course success, perception of science process skills and inquiry skills predicted the global scientific literacy of the pre-service science teachers. In this context, we found that readiness for self-directed learning readiness in laboratory predicted global scientific literacy at a high level indirectly, and laboratory course success predicted global scientific literacy moderately and indirectly. However, it has been determined that the attitude towards laboratory does not explain global scientific literacy significantly. It was revealed that the perception of science process skills, which was another variable of the research, predicted global scientific literacy at a high level and indirectly, while inquiry skills predicted global scientific literacy at a high level and directly.

With the proposed structural model in line with these findings, it can be said that global scientific literacy is explained at a high level. Global scientific literacy, which is a concept that includes many skills, values and attitudes, has been discussed in a cross-sectional study involving pre-service science teachers. Thus, it has been tried to reveal how much global scientific literacy is related to the variables discussed and how much of it is explained. In this context, we found that the independent variables in the structural model, except for the attitude towards laboratory variable, explained the dependent variable of global scientific literacy at a significant and high rate, and the model was confirmed except for the attitude towards laboratory.

When the bilateral relations between the variables in the model were examined, we found that the pre-service science teachers' self-directed learning readiness in laboratory and their laboratory course success explained their perceptions of science process skills significantly; however, we determined that their attitudes towards

laboratory did not significantly explain their perceptions of science process skills. In addition, we found that the most important variable predicting the pre-service science teachers' perceptions of science process skills was the self-directed learning readiness in laboratory (β= .82, p> .01). In this regard, it can be asserted that the pre-service teachers who have a certain level of readiness in the laboratory have higher perceptions of science process skill levels. The pre-service teachers' confidence and preparation for laboratory studies are other factors contributing to this readiness. Also, it can be argued that pre-service teachers with readiness can manage their anxiety about laboratory courses and be self-sufficient in the lab. Similarly, a significant and positive relationship was found between pre-service science teachers' laboratory course success and their perceptions of science process skills (β= .27 p> .01). Various studies have showed that laboratories enable individuals to develop their scientific process skills (Akkuzu Güven and Uyulgan, 2019; George-Williams et al., 2020; Irwanto et al., 2019). At the same time, it can be stated that the basic skills required for laboratory activities to achieve their objectives are science process skills. In their study, Sinan and Uşak (2011) determined that there was a positive relationship between the science process skills of biology pre-service teachers and their laboratory course grades. Similarly, Aktaş and Ceylan (2016) found that there was a moderate, positive and significant correlation between pre-service science teachers' science process skills and academic achievement. In this regard, it may be argued that the high success level of individuals in laboratory courses is an indicator that they appropriately perceive their science process skills.

Another result of the study was that there was a negative and insignificant relationship between the attitudes towards laboratory of pre-service teachers and their perceptions of science process skills (β= -.03 p >.01). Contrary to what was predicted in the theoretical framework, the reason why this relationship turned out to be negative and insignificant could be shown as the negative impact of distance education in the course of the pandemic on the functioning of laboratory courses. Because there were limitations in laboratory activities during the pandemic, face-to-face education could not be done and therefore pre-service teachers could not have concrete experiences. Therefore, it can be said that pre-service teachers could not develop a positive attitude towards laboratory. The attitudes of pre-service teachers towards the laboratory, who could not find the opportunity to practice in the laboratory environment are also affected. Furthermore, when this result was analyzed in terms of the factors of the attitude towards the laboratory, it demonstrated that the factors of "necessity" and "significance" could not be properly comprehended by the pre-service teachers. In this regard, the relationship between pre-service teachers' perceptions of science process skills and their attitudes towards the laboratory was affected. In parallel with the results of the research, Saputra et al. (2020) determined that pre-service physics teachers had negative attitudes towards the laboratory and pointed out that the reason for this was that the applications were not done efficiently. Demir (2007) carried out a study to identify the variables that directly and indirectly affected the science process skills of pre-service teachers; however, he found that positive attitude had a positive effect on the acquisition of science process skills. Similarly, Korucuoğlu (2008) claimed that the progressive improvement in the level of science process skills of pre-service physics teachers was related to an improvement in their attitudes toward the course, and thus attitude was a significant variable for science process skills.

Another result examining the perception of science process skills and inquiry skills of pre-service science teachers was that there was a positive and significant relationship between these two variables (β= .76, p> .01). This result showed that the perception of science process skills explained the inquiry skills significantly (R^2= .58). The primary goal of inquiry is to begin the process of acquiring knowledge, to seek knowledge from life, and to improve skills and attitudes through knowledge (Wilder & Shuttleworth, 2005). In this context, the factor of the inquiry skills scale, "acquiring knowledge", includes the themes of doing research and asking questions. Pre-service teachers employ more than one method of acquiring knowledge when questioning knowledge, notably observation (Aldan Karademir & Saracaloğlu, 2013). Settlage and Southerland (2007) claimed that inquiry was built on science process skills. The cause for this might be attributed to basic processes in science process skills. Observation, one of the basic process skills, is the process of acquiring knowledge through the use of sense organs or tools that augment the sensitivity of the sense organs (Bass et al., 2009). In this process, we create new knowledge on top of existing knowledge. This is necessary for the inquiry process to begin. In addition, the inquiry skill requires skills such as observing, classifying, measuring and predicting, which are among the basic process skills. There are studies in the literature that show the positive effects of pre-service teachers' science process skills through inquiry (Duru et al., 2011; Irwanto et al., 2019; Ünal, 2018). In their study, Valls-Bautista et al. (2021) expressed that inquiry-based laboratory activities improved pre-service teachers' science process skills. In her research in which she carried out scientific inquiry activities within the scope of the laboratory, Koyunlu Ünlü (2020) found that pre-service teachers who enhance their knowledge and inquiry skills also improve their science process skills. All of these studies indicate that there is a significant relationship between inquiry and science process skills, and considering the functionality of inquiry for education, inquiry-based experiences and science process skills can be internalized by properly applying them. Consequently, it can be claimed that scientific process skills and inquiry abilities interact and improve one another.

Another notable finding of the study was the existence of a positive and significant association between the inquiry skills of pre-service science teachers and global scientific literacy (β=.82, p> .01). This result showed that inquiry skills explain global scientific literacy significantly. Inquiry skills explain 67% of global scientific literacy. According to the "science as a human endeavor" within the factor of global scientific literacy, individuals should know the social effects of science and have the inquiry and science process skills (Choi et al., 2011). Thus, inquiring individuals can use their ideas and make comments while seeking solutions to existing problems. Furthermore, another factor part of scientific literacy is the habits of minds, which is an auxiliary element in problem solving related to the challenges that may be encountered. Individuals engage in a variety of intellectual activities, such as testing hypotheses, solving practical problems, and having Socratic discussions through questioning (Windschitl, 2003), but they also employ skills like defending scientific claims, providing evidence, communicating, and using systematic thinking during this process. This demonstrates how efficiently inquiry is applied to mental processes. Also, acting with awareness of one's own intellect and cognitive abilities is another crucial component of being scientifically literate. In this context, being able to direct and

organize one's own learning; using cognitive processes such as self-planning, monitoring and evaluation is only possible if the individual goes through the inquiry process. Furthermore, Lederman (2009) asserts that experiencing the levels and methods of inquiry is critical for individuals to achieve their ultimate aim of being scientifically literate. In this regard, he claims that inquiry grows with scientific experiences and that it is critical to becoming scientifically literate. To summarize, inquiry skills are a crucial variable for individuals becoming effective scientifically literates.

When the mediation relations in the model were examined, we determined that the indirect effect of the self-directed learning readiness in laboratory on the global scientific literacy variable was .51 and this indirect effect was statistically significant (SH= .07, t=6.87, p<.05). Based on this result, the relationship between pre-service science teachers' self-directed learning readiness in laboratory and global scientific literacy is mediated by the variables of perception of science process skills and inquiry skills. This finding is interpreted as scientifically literate pre-service teachers with high perception of science process skills and strong inquiry skills have self-directed learning readiness in laboratory. Öztürk et al. (2017) found that the relationship between pre-service teachers' inquiry skills and self-learning skills was moderate, positive and significant. They have also claimed that inquiry skills and self-learning skills are explanatory and complementary to each other in learning. We determined that the indirect effect of success in laboratory course(s), which is the other independent variable of the study, on the global scientific literacy variable was .17 and this indirect effect was statistically significant (SH=.00, t=4.56, p<.05). This finding led to the conclusion that the variables of the perception of science process skills and inquiry skills had mediating roles in the relationship between pre-service science teachers' success in laboratory course(s) and global scientific literacy. This shows that scientifically literate pre-service teachers who have high perception of science process skills and strong inquiry skills also perform well in laboratory course(s). In their study, Tekin et al. (2016) determined that the higher the grade point average of pre-service science teachers, the higher their scientific literacy scores. In their study, Öztürk et al. (2017) determined that the inquiry skill levels of pre-service teachers were affected by the level of academic achievement, and they concluded that pre-service teachers with low academic success also had low levels of inquiry skill. In addition, Handayani et al. (2018) found a positive relationship between the scientific literacy levels of the pre-service biology teachers and their integrated science process skills. Finally, the indirect effect of the attitude towards laboratory variable on the global scientific literacy was examined and we found that this indirect effect was -.02 and not statistically significant (SH=.06, t= -.34, p<.05). This result reveals that the variables of perception of science process skills and inquiry skills do not have a mediating role in the relationship between pre-service science teachers' attitudes towards laboratory and global scientific literacy.

As a result, proposed structural model confirms the existence of a relationship among the variables of self-directed learning readiness in laboratory and laboratory course success and the perception of science process skills and shows that these variables predict global scientific literacy through the perception of science process skills and inquiry skills. Furthermore, a significant relationship was found between the perception of science process skills and inquiry skills in the structural model, and it was determined that the perception of science process skills predicted global scientific

literacy through the inquiry skills. In conclusion, considering the goodness of fit indices, we found that the model was compatible with the data, and the entire model was confirmed except for the attitude towards the laboratory.

Implications

In the light of the results, the following suggestions are presented.

- The verification of the structural model set forth in this study was carried out by collecting the data instantaneously in a certain time period. In future studies, the structural model proposed by the researchers can be validated by examining pre-service science teachers' time-dependent changes and tendencies regarding these variables through longitudinal studies.
- Since this study took place during the pandemic, pre-service teachers attended their laboratory courses via distance education at the time. Considering the importance of laboratory applications that provide concrete experiences, the structural model established on the basis of laboratory experiences can be reanalyzed on individuals who have been doing all laboratory courses practically throughout their education.
- The participants of this study were selected from the population using convenience sampling method. Therefore, the results of the study cannot be generalized to all pre-service science teachers in the population. Accordingly, it is recommended that this study be conducted with a sample that has the power to represent the universe.
- In the study, the fact that the attitude did not explain the science process skills significantly reveals that this relationship should be reconsidered in different sample groups. As a result, the validity of the structural model may be examined in light of the studies carried out on pre-service teachers enrolled in the faculties of education at various universities, and the results can be compared.
- The structural model in the study was limited by considering the relevant variables. Considering the relationship between scientific literacy and various variables (nature of science, problem solving skills, critical thinking skills, etc.) in the literature, it can be analyzed by suggesting new alternative models.

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Statement of Responsibility

Derya Serbest; literature review, methodology, data collection, data analysis, processing and interpretation of data, writing-original draft, editing and visualization. Nalan Akkuzu Güven; literature review, design of research process, construction of the proposed structural model according to the theoretical framework, methodology, data collection, data analysis, processing and interpretation of data, writing-review & editing, translating, supervision and project administration.

Conflicts of Interest

The authors declare that there is no conflict of interest.

Author Bios

Derya Serbest, graduated from Dokuz Eylül University, Department of Chemistry Teaching in 2019. She started her master's degree in the field of Chemistry Education at Dokuz Eylül University in 2019 and completed her master's education in 2022. The master's thesis was supported within the scope of the university's scientific research projects. She has studies in areas such as scientific literacy, science process skills and problem-solving skills.

Professor Nalan Akkuzu Güven obtained her PhD degree from Dokuz Eylül University Graduate School of Educational Sciences in 2012. She published many articles in various international and national academic journals. Her studies focus particularly on the chemistry and science education, laboratory safety, environmental education, chemistry laboratory activities, pre-service teacher training, scale development and structural equation modeling. Currently, she is teaching at Dokuz Eylül University, Buca Faculty of Education, Department of Mathematics and Science Education.

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The Mediating Role of Reading Attitude in the Relationship between Elementary School Students' Reading Engagement and Reading Comprehension Skills

İlkokul Öğrencilerinin Okumaya Adanmışlıkları ile Okuduğunu Anlama Becerileri Arasındaki İlişkide Okuma Tutumunun Aracılık Rolü

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ABSTRACT: This study aimed to examine the effect of reading attitude and reading engagement on reading skills success and the mediating role of reading attitude in the relationship between reading engagement and reading comprehension skills. The data for this research was collected in the spring of 2021. The "Reading Success Scale," "Reading Engagement Scale," and "Reading Attitude Scale" were applied to 491 students from the Central Anatolia region in Turkey. The TAP and IBM SPSS 24 software were used to analyze data obtained from the scales used in the study, while the macro mediation test Process 3.5.3 developed by Hayes (2018) was used to measure the mediators in the study. A mediating role model was established in the study to evaluate the hypotheses. The study revealed that reading engagement affects reading comprehension significantly and positively; reading attitude does not have a significant effect on reading comprehension; reading engagement affects reading attitude significantly and positively; and that, in the absence of reading attitude, reading engagement has a positive and significant effect on reading success The study further revealed that engagement in reading accounts for approximately 21% of the variation in reading attitude. In conclusion, the study suggests further exploration of the roles played by different variables in mediating the relationship between reading engagement and reading comprehension success.

Keywords: Reading, Reading attitude, reading comprehension, reading engagement, primary school.

ÖZ: Bu araştırmada okuma tutumunun ve okumaya adanmışlığın okuma başarısına etkisi ve okuma tutumunun okumaya adanmışlık ile okuduğunu anlama becerisi arasındaki ilişkide üstlendiği aracılık rolünü incelemek amaçlanmaktadır. Türkiye'nin Orta Anadolu Bölgesi'ndeki dokuz ilkokuldan 491 öğrenciye "Okuma Başarısı Ölçeği", "Okumaya Adanmışlık Ölçeği" ve "Okuma Tutumu Ölçeği" uygulanmıştır. Çalışmada kullanılan ölçeklerden elde edilen verilerin analizinde TAP programı, IBM SPSS 24 programı ve araştırmalarda aracı değişkenlerin etkisinin ölçümü için Hayes (2018) tarafından geliştirilen Process 3.5.3 adlı makro aracılık testi kullanılmıştır. Araştırmada hipotezlerin test edilmesi amacıyla aracılık rolü modeli kurulmuş ve sonuçta okumaya adanmışlığın, okuduğunu anlamayı anlamlı düzeyde ve olumlu yönde etkilediği; okuma tutumunun okuduğunu anlama üzerinde anlamlı bir etkisinin olmadığı; okumaya adanmışlığın, okuma tutumunu anlamlı düzeyde ve olumlu yönde etkilediği; okuma tutumunun olmadığı durumda okumaya adanmışlığın, okuma başarısı üzerinde olumlu yönde ve anlamlı bir etkisinin olduğu görülmüştür. Araştırma sonunda bundan sonraki çalışmalarda okumaya adanmışlık ile okuduğunu anlama başarısı arasındaki ilişkiye aracılık eden farklı değişkenlerin rolünün incelenmesi tavsiye edilmiştir.

Anahtar kelimeler: Okuma tutumu, okuduğunu anlama, okumaya adanmışlık, ilkokul.

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Reading is an ability that is essential not only in order to comprehend a text, but also for children to thrive in their education, complete their academic and personal development in the future, and cope with the problems in their social life (Ateş, 2017; Chotitham & Wongwanich, 2014; Troy & Carol, 2011). When the acquisition of reading skills begins, the capability of students to access knowledge and interpret that information correctly is only possible through proficient reading skills. This process is critical for acquiring a reading habit (Zhao et al., 2019). Reading is a variable that affects the success of individuals in their academic and social lives. Nevertheless, numerous children and adolescents show restricted interest in reading activities Organisation for Economic Co-operation and Development (OECD, 2017); 40% of surveyed students from fifty countries report they have “little” or “less” interest in reading classes International Research on Development in Reading Skills (PIRLS, 2016). According to the National Center for Education Statistics (2003), almost 40% of children in the fourth grade lack basic reading skills. Students with poor reading skills tend to drop out of school Jimerson et al.,(2000), show signs of depression (Maughan et al., 2003), and have behavioral problems (Clarke et al., 2008). Although the cognitive dimension of reading is the point of focus in studies to understand the reading difficulties of students, recent studies have also demonstrated that the emotional dimension affects reading success to a great extent (Sur & Ateş, 2022); emotions are among the essential causes of success or failure with reading.

Reading engagement (De Naeghel et al., 2012; Esmer, 2019; Wantchekon & Kim, 2019) and reading attitude (Susar Kırmızı, 2011; Wahyuni B & Yuyu, 2020) facilitate students’ development of reading skills and conceptual knowledge, acquisition of reading habits, use of cognitive strategies, and play an important role in predicting student scores from reading tests (Uyar Aydın & Balkan, 2022). Studies have shown that participation in reading activities significantly contributes to the betterment of students’ reading comprehension skills, especially starting from the final year of elementary school and the following years (Guthrie & Klauda, 2015; Klauda & Guthrie, 2015). Engagement is a concept that has enjoyed increasing popularity in educational and developmental psychology and has been vigorously researched and studied by specialists, especially in the last decade. An engagement is the time and effort spent and persistence shown to achieve the desired goals (Barber & Klauda, 2020). Reading engagement is sparing time for reading activities, using strategies effectively, and trying to correctly understand what is being read (Guthrie et al., 1998; Son, Baroody & Opatz, 2023). According to this perspective, readers with high engagement are both internally motivated and use reading strategies successfully, whereas readers with less interest are less motivated and use fewer strategies to understand the topic.

When Appleton et al. (2008) reviewed the definitions of engagement, they concluded that almost all definitions included behavioral, and most definitions included emotional components; however, very few definitions included the academic or cognitive components. Researchers, adopting a two-layered model generally argue that engagement is comprised of emotional and behavioral dimensions (Wantchekon & Kim, 2019). However, new research links engagement with the cognitive dimension, arguing that skills and strategies should be effectively applied, carefully monitored, and checked when reading. Reading engagement is explained by a triple structure that adds a

cognitive size to emotional and behavioral sizes (Barber & Klauda, 2019; Johnson & Blair, 2003).

Cognitive engagement refers to knowing how and when to use high-level strategies to reach deeper levels of meaning. The cognitive dimension of reading engagement requires readers to make strategic choices in terms of reading and use conditional information to determine how and when to employ reading comprehension strategies. Behavioral engagement includes taking part in / being part of reading activities and all observable actions or performances. Emotional participation requires readers to be interested in and attach value to reading, to believe in themselves as readers, and to love reading skills (Barber & Klauda, 2020; Zhao et al., 2019). Reading engagement is an overarching framework subsuming the spectrum of personal beliefs and cognitive and behavioral practices (Whitaker, 2009).

Although engagement has cognitive, behavioral, and affective dimensions, some studies on reading highlight the affective dimension of engagement and associate engagement with "reading for pleasure" (Smith et al., 2012). Emotional engagement covers emotional reactions that occur while reading a text, such as motivation, interest, the megrims, bliss, sorrow, and worry. From this aspect, reading engagement is a concept closely related to reading attitude.

An attitude, organized by experience, is a mental and neural state that requires responding to a certain object positively or negatively (Fishbein & Ajzen, 1975). Attitude, which enables us to see things in a negative or positive light, has a complex structure with cognitive, affective, and behavioral components (Eagly & Chaiken, 1998; Sukarni, 2019). The cognitive component refers to all opinions and beliefs one has about an object, while the emotional component refers to emotional reactions, and the behavioral component refers to how we react to an object or a situation. Reading attitude is a concept referring to all emotions, tendencies, or predispositions to reading (Akhmetova et al., 2022; McKenna et al., 2012; Petscher, 2010), and affective perceptions about reading (Murtafi'ah & Putro, 2019). Reading attitude is a mental status accompanied by feelings about reading, leading a student to embrace or avoid the act of reading. Opinions, beliefs, and values about reading constitute the cognitive dimension of reading, while emotions about reading constitute its emotional dimension, and behavioral planning about reading constitutes its behavioral dimension.

Attitudes affect a person's intention or desire to behave or act in a particular way. Attitudes and intentions form the basis of behavior (Ajzen & Fishbein, 2005). Positive attitudes toward reading facilitate the act of reading, giving one more motivation to read actively. Therefore, attitude, which forms the basis of active reading /long reading, is closely related to engagement. Engagement refers to trying, sparing time, showing perseverance to achieve the desired end, and participating in reading activities (Guthrie et al., 2012). Attitude is a fundamental factor for behavioral engagement, which is associated with the observable act of reading. Attitude affects behavioral engagement and vice versa. Children without reading engagement lack interest in reading, even if they possess the ability to read; consequently, they tend to avoid reading altogether (Ng & Bartlett, 2017). According to McKenna's Reading Attitude Developmental Model (1994), reading attitude develops over time due to three factors: clubby beliefs, individual beliefs, and reading experiences. Clubby beliefs and reading experiences that form attitudes are closely related to the extent of engagement.

Therefore, it suggests that increasing reading engagement can positively affect reading attitude, and improving reading attitude can also positively affect reading engagement.

Reading attitude not only enables more reading but also positively affects the utilization of reading strategies. It is evident that individuals who like reading will read more, and reading more will positively influence the use of reading strategies. In her study, Susar Kırmızı (2011) concluded that 44% of the variance in my reading comprehension strategy use was explained by reading attitude. Based on research, it is plausible to argue that the most important factor affecting the use of strategies is the reading attitude. Attitude has both a positive effect on the use of strategy and facilitates cognitive engagement that requires using the correct strategy at the correct time when reading.

This study explores the connection between 4th-grade students' reading attitude, level of reading engagement, and reading comprehension skills. Despite assertions in the literature by many specialists regarding the close relationship between attitude and engagement, PISA regards attitude as a mere component encompassed within the scope of engagement (Brozo et al., 2007). No study has been found in the literature that detects a relationship between attitude towards reading and dedication to reading and reveals the extent of the relationship between the two variables. While it is acknowledged in the literature that a relationship exists between reading attitude and reading dedication, no study disclosing the extent of this relationship has been identified. Additionally, no study has been found in the literature that determines the mediating role of reading attitude in the relationship between reading commitment and reading comprehension. This research is important for the literature as it determines the effect of commitment to reading on reading attitude, the effect of reading attitude on reading comprehension, and the relationship between reading attitude, commitment to reading, and reading comprehension. Accordingly, the below hypotheses were evaluated:

1- Reading engagement is a significant predictor of reading attitude.

2- Reading engagement is a significant predictor of reading comprehension.

3- Reading attitude is a significant predictor of reading comprehension.

4- Reading attitude has an intermediating role in the relationship between reading engagement and reading comprehension.

Method

Model of the Research

This research was designed in a descriptive survey model because it was aimed to determine the mediating role of reading attitude in the relationship between 4th-grade students' commitment to reading and their understanding of what they read. The descriptive survey model is one of the most common quantitative research methods used to summarize the characteristics of individuals, groups, or physical environments (Büyüköztürk et al., 2012). In other words, in quantitative research, it refers to numerically revealing opinions about the general universe through a sample selected from a universe (Creswell, 2013).

Study Group

The participants were 4th-grade classroom students from nine different schools in the center of a province in the Central Anatolia region of Turkey willing to complete data collection tools. Schools were selected from the city center to ensure no big differences exist between respondents regarding lifestyle and economic opportunities. 4th-grade students were selected because compulsory education in Turkey involves test-based measurement and evaluation from fourth grade to 12th grade, and no such measurement and evaluation method is applied in the first three grades. Considering the fully completed data collection tools, data was collected from a total of 491 students. Some demographic information of the participants is provided in Table 1.

Table 1

Distribution of the Sample

		n	%
Schools	1st College	57	11.6
	2nd College	60	12.2
	3rd College	37	7.5
	4th College	78	15.9
	5th College	36	7.3
	6th College	47	9.6
	7th College	49	10.0
	8th College	102	20.8
	9th College	25	5.1
Gender	Female	247	50.3
	Male	244	49.7
	Total	491	100.0

As seen in Table 1, data was collected from 8 different schools within the scope of this research. 57 students from the first school (11.6%), 60 students from the second school (12.2%), 37 students from the third school (7.5%), 78 students from the fourth school (15.9%), 36 students from the fifth school (7.3%), 36 students from the sixth school (7.3%). 47 students (9.6%), 49 students (10%) from the seventh school, 102 students (20.8%) from the eighth school, and 25 students (5.1%) from the ninth school participated in the research. The number of female students participating in the research is 247, the number of male students is 244, and the total number of students is 491. The highest number of participants were from the eighth school, while the lowest number were from the ninth school. This was considered normal as the number of students at the schools varied. The numbers of participants from other schools are close to each other. While the distribution of participants by gender is also close to each other.

Collection of Data

The data was collected in Spring 2021. Permission for the use of the data collection tools was obtained by email for the Reading Comprehension Scale developed by Whitaker (2009), Reading Attitude Scale by Mckenna and Kear (1990) and

translated into Turkish by Çakıroğlu and Palancı (2015), and the Reading Comprehension Test for Fourth Grade Students improved by Yılmaz (2020). Subsequently, an application was made to the Ethics Committee of XXX University, and an approval with the decision number XXX was received. Upon the approval of the ethics committee, an application was made to the Regional Office of National Education in the respective province, where data was to be collected for permission to collect data from schools, and permission was granted with a letter dated 05.04.2021 and numbered XXX. However, as there was no face-to-face education for most of the spring semester owing to the pandemic, the process was postponed. The data collection process was restarted after the announcement that the schools were only partially open for face-to-face education (two days a week in two groups, with student numbers reduced by half). The researchers visited the schools for which permission for the study was received, and meetings were held with principals and 4th-grade teachers. After receiving the permission of students' parents through teachers, the scales were applied. The survey, which was originally planned to include 10 schools and approximately 1200 students, was downsized owing to the pandemic, with data collected from nine schools and 491 students. No funds or grants were used in conducting this study.

Data Collection Tools

The Reading Comprehension Test developed by Yılmaz (2020) for 4th-grade students consists of four texts and 20 items, 18 of which are multiple-choice questions, and two of which require short answers. The lowest score on the scale is 0 (when none of the questions are answered correctly), and the highest is 100 (when all questions are answered correctly). In the study, item difficulty was determined to range between 0.61 and 0.73, and item discrimination to range between 0.26 and 0.56, with the reliability coefficient (KR-20) set at 0.84.

TAP (Test Analysis Program- version 19.1.4) was used to analyze items for the reading comprehension test. According to data obtained from the TAP, the average hardship of the test was 0.75, and the average item discrimination index was 0.43. The credibility of the test (KR-20) was 0.84. Based on the evidence, it was finalized that the average difficulty grade of the test was "very easy," the item discrimination index was "very good," and the reliability coefficient was "high". No problematic items were detected during the one-by-one examination of the items and choices.

The Reading Engagement Scale Whitaker (2009) developed is a five-point Likert-type scale. The score spectrum of the scale ranges from 1 to 5, corresponding to the following statements, respectively: "Not at all like me," "Not much like me," "Can't decide," "Kind of like me," and "A lot like me!" The scale contains 40 items. The highest value that can be obtained from the scale is 200, and the lowest value is 40. A three-factor structure was obtained in the factor analysis performed on the scale, and the total variance was 53.31%. The reliability (Cronbach's Alpha) coefficients of the factors in the scale were 0.87, 0.77, and 0.65, respectively.

To demonstrate the validity and credibility of the scale for this study, exploratory factor analysis, confirmatory factor analysis, and analyses to reveal internal consistency coefficients were performed. In the exploratory factor analysis, after the items that were not included in any factor or that were included in multiple factors were excluded, analyses were performed on the remaining 11 items. According to the

findings, the total variance explained by the Reading Engagement Scale, which has a two-factor structure, was 47.83%. In both factors, factor loading values ranged between 0.59 and 0.77. The reliability level of the scale (Cronbach's Alpha) was 0.75, while the reliability level of each factor (Cronbach's Alpha) was 0.71 and 0.78, respectively. It was decided to perform a confirmatory factor analysis according to the findings acquired and, consequently, the exploratory factor analysis.

As a result of the confirmatory factor analysis, each item had significance at a level of $p<0.01$ in its own factor, and the standardized regression weights of the items ranged from 0.44 to 0.75. The kindness of fit indices formed as a result of the confirmatory factor analysis showed the following values: $X^2/df= 1.58$, SRMR= 0.034, GFI= 0.977, AGFI= 0.96, CFI= 0.98, NFI= 0.947, RMSEA= 0.034. These values are within the range of best-fit values (Hu & Bentler, 1999; Kline, 2011).

The "Reading Attitude Scale" improved by McKenna and Kear (1990) and translated into Turkish by Çakıroğlu and Palancı (2009) is a four-point Likert-type scale. Each item contains four facial expressions by Garfield with values of 4, 3, 2, and 1 appointed to them, meaning very happy, slightly happy, slightly upset, and very upset, respectively. The scale contains 20 items. The highest value that can be obtained from the scale is 80, and the lowest value is 20. A two-factor structure was achieved in the factor analysis performed on the Turkish version of the scale, and the total variance was 55.26%. The credibility coefficient (Cronbach's Alpha) of the scale was 0.84. In the confirmatory factor analysis performed for the Turkish version of the scale, the following worths were found: $X^2/df= 2.81$, RMSEA= 0.004, AGFI= 0.91, CFI= 0.94.

As with the other scales, exploratory factor analysis, confirmatory factor analysis, and analyses to reveal internal consistency coefficients were performed to demonstrate the validity and reliability of the scale. In the exploratory factor analysis, after the items that were not included in any factor or that were included in multiple factors were excluded, analyses were performed on the remaining 19 items. According to the findings, the total variance explained by the reading attitude scale, which has a three-factor structure, was 49.83%. In both factors, factor loading values ranged between 0.59 and 0.77. The general reliability level of the scale (Cronbach's Alpha) was 0.89, while the reliability level of each factor (Cronbach's Alpha) was 0.81, 0.77 and 0.73, respectively. In light of the obtained findings, it was decided to conduct a confirmatory factor analysis, subsequently concluding the exploratory factor analysis.

As a result of the confirmatory factor analysis, it was concluded that each item had significance at a level of $p<0.01$ in its own factor and that the standardized regression weights of the items ranged from 0.47 to 0.72. In the goodness of fit indices formed as a result of the confirmatory factor analysis, the following values were obtained: $X^2/df= 1.85$, SRMR= 0.036, GFI= 0.952, AGFI= 0.936, CFI= 0.96, NFI= 0.920, RMSEA= 0.042. Of these values, AGFI and NFI are acceptable fit values, while the others are good fit values (Hu & Bentler, 1999; Jöreskög & Sörbom, 1993; Kline, 2011).

TAP and IBM SPSS 24 software were used to analyze the data obtained from the scales, while the macro mediation test Process 3.5.3 developed by Hayes (2018) was downloaded (http://processmacro.org/download.html, 10.06.2021) and used to measure the impact of mediating variables in the study.

Results

Table 2 contains the correlation matrix and descriptive statistics regarding the data obtained and shows a plus, moderate, and significant relationship between reading understanding and reading engagement. There is a low, positive, and significant relationship between reading comprehension and reading attitude and a positive, moderate, and important relationship between reading engagement and reading attitude. In light of data obtained from data collection tools, all scales show a significant relationship with each other.

Table 2

Correlation Matrix and Descriptive Statistics for Study Measures

	1	2	3
1- Reading Comprehension	---	.323**	.098*
2- Reading Engagement	.323**	----	.458**
3- Reading Attitude	.098*	.458**	---
M	75.19	4.37	3.43
SD	19.50	.62	.43

Note. *M* = mean; *SD* = standard deviation **$p \leq .05$. ***$p \leq .01$.

A mediation role model was established to evaluate the hypotheses set forth (Figure 1). Figure 1 shows that reading engagement affects reading attitude significantly and positively (b=0.657, %95 CI [0.5436, 0.7704], t=11.385, p<0.001). Reading engagement accounts for approximately 21% of the variation in reading attitude (R2 = 0.2095). The first hypothesis was verified based on this finding.

It is seen that reading engagement affects reading comprehension significantly and positively (b=11.085, %95 CI [8.1016, 14.0692], t=7.2998, p<0.001). The second hypothesis was accepted based on this finding.

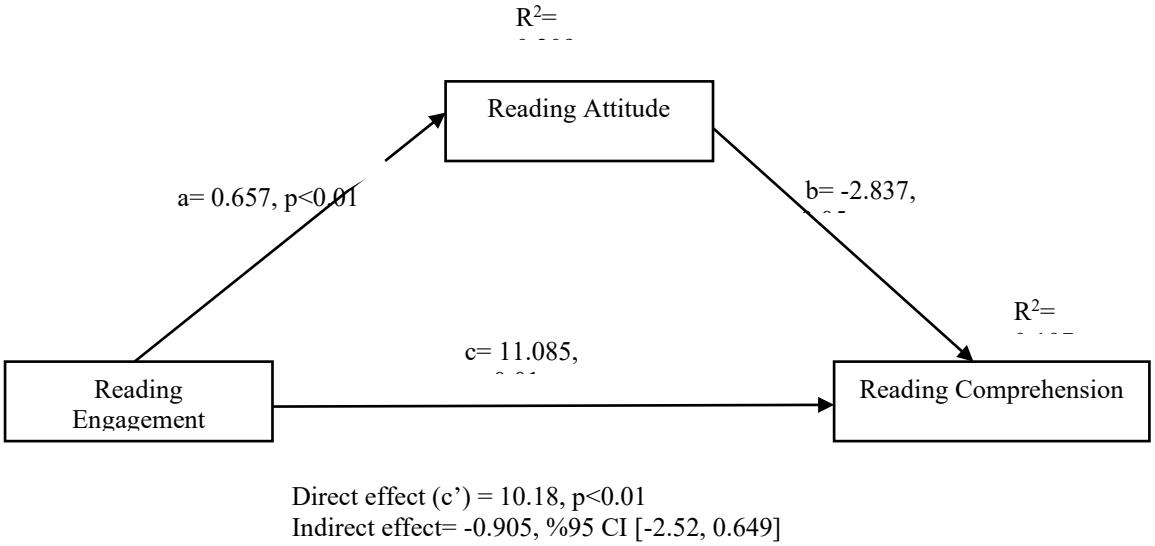
In contrast, reading attitude did not exhibit a significant effect on reading comprehension (b=-2.8366, %95 CI [-7.1195, 1.4463], t=-1.3013, p>0.05). Reading attitude and reading engagement account for approximately 11% of the variation in reading attitude (R2 = 0.1071). The third hypothesis was rejected based on this finding.

Considering the total effect model, it is seen that in the absence of reading attitude, reading engagement has a positive and significant effect on reading success (b=-10.18, %95 CI [7.53, 12.84], t=7.54, p<0.001). Whether reading engagement has an indirect effect through reading attitude was determined in accordance with the reliance intervals acquired by the Bootstrap method. In accordance with this, it was determined that the indirect effect of reading attitude on reading comprehension is important; therefore, reading attitude mediates the relationship between reading engagement and reading comprehension (b=-0.905, %95 BCA CI [-2.52, 0.6490]). The adjusted bias and the accelerated reliance interval values (BCA CI) through the Bootstrap analysis do not cover the 0 (zero) value. The exact normalized effect size of the mediatorship effect (K2) is -0.03, and the partially standardized effect size is -0.05. Interpretation of the effect size follows guidelines wherein if K2 = 0.01, the effect is considered low, if K2 =

0.09, it is considered medium, and if K2 = 0.25, it is considered high (Preacher and Kelly, 2011). The exact standardized impact dimension of effect is -0.03, which can be said to have an impact size close to that of the low value. The fourth hypothesis was accepted based on this finding.

Figure 1

The Mediating Role of Reading Engagement in the Relationship Between Reading Attitude and Reading Comprehension



Note: Non-standardized beta coefficients were reported. R^2 values show the reported variance.

Conclusion, Discussion, Suggestions

The relationship between elementary college learners' reading attitude and reading understanding success and reading engagement and reading comprehension success has been investigated in a vast number of studies (Campbell et al., 1997; Guthrie et al., 2012). Similarly, the relationship between reading motivation and reading engagement was established in previous studies (Unrau & Quirk, 2014). However, although there are only a few studies investigating the relationship between reading attitude and participation (Jeffery, 2017), no research has been found that detects the relationship between reading attitude and reading dedication. In spite of the fact that there is much research examining students' reading attitudes, the mediator role of reading attitude in the relation between reading engagement and reading comprehension skills is a subject that has not yet been studied. In this study, the mediating part of reading attitude in the relationship between reading engagement and reading comprehension skills has been established to complete a space in the literature.

In the first research hypothesis, it was assumed that reading engagement is an important predictor of reading attitude. The mediating role model established to test the hypothesis has shown that reading engagement affects reading attitude significantly and positively. Reading engagement accounts for approximately 21% of the variation in reading attitude. When the literature was examined, no research could be found on the extent to which commitment to reading affects the change in reading attitude.

Engagement, which has cognitive, affective, and behavioral dimensions, is a concept related to reading attitude. The affective dimension of engagement involves affective reagents an individual has while reading, such as worry, bliss, sorrow, boredom, and sadness. Meanwhile, reading attitude is defined as the sum of emotions that lead the student to have a desire to read or prevent reading.

In accordance with reading engagement, reading motivation and attitude lead to the act of reading, which brings academic success. Thus, when students set themselves a reading goal, attach value to reading, and trust in themselves as readers, they fully and intentionally participate in reading activities. Coherent and active participation in reading, in return, assistant individualistic create the cognitive duration required to understand what they read. It is more likely for students who like the shared experience of reading, believe that reading is significant, and know the pleasure of reading to put in the time and effort needed to understand texts fully (Guthrie & Wigfield, 2000). While reading attitude affects reading engagement positively, reading engagement accounts for a significant part (21%) of the change in reading attitude.

In the second research hypothesis, it was accepted that reading commitment was a significant predictor of reading comprehension. The mediating role model established to test the hypothesis has shown that reading engagement affects reading comprehension skills success significantly and positively. Reading engagement accounts for 11% of the modification in reading dexterity success. A review of the literature shows studies with similar findings regarding the effect of reading engagement on reading success. In his study, Esmer (2019) established that reading engagement is the strongest predictor of reading skills in informative texts, and Stratus (2007) found that reading engagement is a significant predictor of reading achievement. According to a research study involving students across the age spectrum of 13 to 17, those with a higher level of reading engagement demonstrated more advanced reading success compared to students with lower grades of reading engagement. Guthrie and Wigfield (2000), in their study, found that 13-year-old students with high reading engagement had higher reading achievements than 17-year-old students with low reading engagement. Both studies in the literature and this study demonstrate that reading engagement is a significant prophet of reading skills. When students set themselves a reading goal, attach value to reading, and trust in themselves as readers, they fully and more intentionally participate in reading activities. The cognitive dimension of engagement, which is a three-dimensional structure, requires the reader to use strategies in the reading process; the behavioral dimension requires them to spare time for reading; and the affective dimension requires them to love reading. Sparing time for reading, using the necessary strategies in the reading process, and loving reading increase reading skills success. According to PISA findings, engagement is a critical component of reading skills success. The fact that good readers are more inclined to read ensures the development of vocabulary and comprehension skills. On the other hand, it is seen that there is a continuous decrease in the skill levels of weak readers who avoid reading (Brozo et al., 2007). There is a strong correlation between reading engagement and reading success.

In the third research hypothesis, it was accepted that reading attitude is an important prophet of reading understanding success. The mediating role model established to evaluate the hypothesis demonstrates that reading attitude does not have a

significant impact on reading comprehension. This result obtained at the end of the work led to the rejection of the research hypothesis. In the fourth research hypothesis, reading attitude was deemed to have an intervening role in the relationship between reading engagement and reading comprehension. According to the mediating role model established to evaluate the hypothesis, the remote impact of reading attitude on reading comprehension is important, and reading attitude intervenes in the relation between reading engagement and reading comprehension. The results obtained under the third and fourth hypotheses of the study are consistent with and support each other. Because reading attitude does not directly affect reading comprehension skills, it affects it indirectly by mediating the relationship between reading dedication and reading comprehension.

A large number of studies show that reading attitude affects reading success positively and that the relation between the two factors is positive. In their studies, McKenna et al. (1995) and Donaldson (2010) found that students with high reading comprehension scores have high reading attitudes, whereas students with low reading comprehension scores have low reading attitudes (Agustiani, 2017). This study's finding that reading attitude is not an important predictor of reading comprehension success runs counter to what has been reported by other studies.

According to the model of Ajzen and Fishbein (2005), attitudes do not affect the reading success of an individual directly, but they affect the intent or want to perform an attitude or an activity. Ainley (2006) examined the effect of emotions such as the megrims and happiness on readers' reading behavior and concluded that emotions mediate reading behavior. Researchers theorized that attitude affects students' motivation and subsequent success by increasing the time they spend on reading (McKenna et al., 1995). Therefore, it can be suggested that reading attitude is not a variable that has a direct effect on reading success. Consequently, how one feels about reading does not go far enough to increase reading success on its own when not supported by other factors. A student with a positive attitude toward reading can expect higher reading scores, sparing more time and effort for reading. A more positive reading attitude translates into more time and effort spent understanding what is being read. This goes to show how reading attitude has a mediating role between reading engagement and reading skills success. The reading engagement of students affects their reading comprehension levels positively, whereas their reading attitude does not have an important effect on their reading skill levels. However, reading engagement has an important effect on reading attitude. When the mediating role is examined, it is seen that increasing reading attitude will have a low-level positive effect on reading success by affecting reading dedication. It is possible to say that giving more importance to reading dedication than reading attitude will have a greater impact on reading comprehension.

"Reading Commitment Scale" is a scale whose validity and reliability have been confirmed through an application on fourth grade students studying in nine different schools, but more research is needed to confirm its validity and reliability at the national level. The sample level of the current study was selected from 4th-grade students. Choosing the sample group for future research from fifth, sixth, seventh, and eighth-grade students will enable the reading dedication levels of students in different age groups to be determined and compared with each other. Quantitative research method

was used in the current research. In future studies, it is possible to examine students' reading commitment levels with research models using qualitative, mixed methods. In this study, the mediating role of reading attitude in the relationship between reading dedication and reading comprehension was examined. In future studies, the role of different variables that may mediate the relationship between reading commitment and reading attitude can be examined.

Statement of Responsibility

Both researchers contributed equally to the introduction, method, findings, and conclusion sections of the study.

Conflicts of Interest

There is no conflict of interest to disclose.

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Program Evaluation Study for Measurement and Evaluation Course in Distance Education*

Uzaktan Eğitimde Ölçme ve Değerlendirme Dersine Yönelik Bir Program Değerlendirme Çalışması

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ABSTRACT: This study aims to evaluate the online measurement and evaluation course in teacher training programs during the COVID-19 process. In the study, we sought answers to two primary research questions: What are the opinions of teachers and school administrators regarding their measurement and evaluation competencies? Does the online "measurement and evaluation" course have the qualities of an effective program in the "antecedents, transactions, and outcomes" dimension? We structured the research into two phases within a multistage evaluation design framework. The findings show that there were problems and positive aspects in all dimensions of the program. For example, adapting teacher training programs developed before COVID-19 to distance education processes was challenging. In distance education, some practices contradict the modern teaching and assessment approach. Such problems were reflected in teachers' acquisition of measurement and evaluation competencies. The achievement test we applied to the observed groups also confirmed these findings. For this reason, responsible organizations should not ignore the fact that we cannot renounce distance education. During program development, they should reconsider how the teachers will acquire measurement and evaluation competencies and how we will measure and evaluate in distance education.

Keywords: Measurement, evaluation, distance education, teacher training, program.

ÖZ: Bu çalışmanın amacı, COVID-19 sürecinde öğretmen yetiştirme programlarında yer alan çevrimiçi eğitimde ölçme ve değerlendirme dersinin değerlendirilmesidir. Çalışmada iki temel araştırma sorusuna yanıt aranmıştır: Öğretmenlerin ve okul yöneticilerinin ölçme ve değerlendirme yeterliklerine ilişkin görüşleri nelerdir? Çevrimiçi "ölçme ve değerlendirme" dersi "girdiler, işlemler ve çıktılar" boyutlarında etkili bir programın sahip olması gereken nitelikleri taşıyor mu? Araştırma çok aşamalı bir değerlendirme tasarımı çerçevesinde iki aşamalı olarak yapılandırılmıştır. Araştırma bulguları, programın tüm boyutlarında sorunların ve olumlu yönlerin olduğunu göstermektedir. Örneğin, COVID-19 öncesi geliştirilen öğretmen yetiştirme programlarını uzaktan eğitim süreçlerine uyarlamak güçtür. Uzaktan eğitimde, bazı uygulamalar modern öğretim ve değerlendirme anlayışıyla çelişmektedir. Bu tür sorunlar öğretmenlerin ölçme ve değerlendirme yeterliklerini kazanmalarına yansımıştır. Gözlem yapılan gruplarda uygulanan başarı testi de bu bulguları doğrulamıştır. Bu nedenle sorumlu kuruluşlar uzaktan eğitimden vazgeçmenin artık mümkün olmadığını göz ardı etmemelidir. Ayrıca bu kuruluşların program geliştirme süreçlerinde uzaktan eğitimde ölçme ve değerlendirmenin nasıl yapılacağının yanı sıra öğretmenlerin ölçme ve değerlendirme yeterliklerini nasıl kazanacağını yeniden düşünmeleri gerekmektedir.

Anahtar kelimeler: Ölçme, değerlendirme, uzaktan eğitim, öğretmen yetiştirme, program.

* This study was produced from the Ph.D. dissertation titled *Evaluation of Measurement and Evaluation in Education Curriculum* prepared by the first and corresponding author of this research.

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People use the concept of evaluation when making decisions about the quality of any business, program, or object. Comments or decisions about the quality of an education system, teaching, or programs related to this system are also associated with evaluation. In this context, evaluation in education refers to the process of considering and deciding the success of learning and teaching according to specific criteria based on the measurement results (Morrow Jr et al., 2000; Secolsky & Denison, 2018). In determining the quality of the teaching activity, we frequently come upon concepts such as testing, measurement, evaluation, and assessment. People use these terms interchangeably and sometimes even mix them up (Mehrens & Lehmann, 1991). Measurement is the process of using measuring tools to determine an object's quantity or value its features by assigning numeric or symbolic values. (Morrow Jr et al., 2000; Mislevy, 2018; Scriven, 1981). Based on this definition, it is conceivable to express that the role of measurement is to provide decision-makers with accurate information about the feature to be evaluated (Mehrens & Lehmann, 1991). From this point of view, considering measurement and evaluation processes complement each other, the accuracy of the measurement process may also affect the accuracy of the evaluation process and the decisions to be taken. Accordingly, teachers have an essential role in measuring and evaluating the quality of teaching. Teachers' role demonstrates these people must acquire measurement and evaluation competencies. Researchers have been working on teachers' measurement and evaluation competencies for years (Chan & Luk, 2021; DeLuca et al., 2016; Holmes, 1971; Plake, 1993; Zhang, 1996). This condition may indicate that the subject has maintained its importance and popularity over the years.

Measurement and Evaluation Education in Teacher Training Programs

Various organizations that develop standards for the quality of teachers and teaching in the world consider measurement and evaluation among the core teacher competencies (DfE. UK, 2021; DfE. US, 2021; ISO, 2021; QCT, 2021). Likewise, in the research country, measurement and evaluation are commonly included among teacher competencies and teacher training standards (EPDAD, 2020; MNE, 2017; MNE, 2019). Over the years, different courses have existed in teacher training programs to acquire measurement and evaluation competencies in Türkiye. For the first time in this field, a measurement and evaluation course was figured in the program of two-year education institutes that trained classroom teachers in 1974 (MNE, 1975). The related course continued to be conducted by teacher training institutions affiliated with the Council of Higher Education (CHE) as a three-credit course with the regulations made in 1980, 1982, and 1985 (MNE, 1980; CHE, 2007). CHE replaced the "measurement and evaluation" course in teacher training programs with a four-credit Instructional planning and evaluation course with the 1997 regulation (CHE, 1998). The Council removed the relevant course from the programs with the 2007 regulation and brought back a three-credit measurement and evaluation course with new contents according to the progressive approach (Ada & Baysal, 2013; CHE, 2007). The last update in teacher training undergraduate programs occurred in 2018, and they reduced the credits of the measurement and evaluation course to two with more straightforward contents. All these changes may lead to future stability issues in the measurement and evaluation training provided to teachers in Türkiye.

The COVID-19 pandemic has taken the entire world under its influence in a short time. For this reason, many educational institutions have switched to online teaching activities during the pandemic. Besides its various advantages in terms of time, place, and economy, distance education has considerable challenges. Assessing student achievement is among these difficulties (Conrad & Openo, 2018; Kearns, 2012; Kim et al., 2008). After COVID-19, distance education has also become widespread in teacher training institutions. In addition to the concern of *how we will carry out the measurement and evaluation processes in distance education*, this situation has also revealed the question of *how pre-service teachers will acquire measurement and evaluation competencies*. In current studies, there is a tendency to seek new ways to overcome assessment problems in distance education (Barthakur et al., 2022; Pavličet al., 2022; Raje & Stitzel, 2020). However, it is a matter to contemplate whether pre-service teachers can adequately acquire the measurement and evaluation competencies through distance education and to what extent the measurement and evaluation training offered to teachers responds to their needs. One of the best ways to find answers to these questions may be an evaluation of online measurement and evaluation course in teacher education.

Measurement, Evaluation and Program Evaluation

Evaluation is an expression that people use to determine the quality of the program as much as to assess the quality of teaching activities. This process, in which we determine the quality of the program and decide its future, is referred as program evaluation (Fitzpatrick et al., 2011; Mertens & Wilson, 2019; Stufflebeam & Coryn, 2014). Today, various institutions increasingly use program evaluation to meet the demand for information on performing public and non-profit schools and private instructional programs (Grayson, 2018). This case discloses that the information needs of the stakeholders regarding the quality of the implemented programs are increasing, and program evaluation is one of the main mechanisms in meeting this need.

Some studies have been under the title of program evaluation for measurement and evaluation discipline in teacher training programs. However, in these studies, researchers examined various practices, approaches, and trends towards the relevant course conducted rather than a systematic program evaluation process (Safrit, 1990; Veal, 1990). Today, some studies in teacher training, measurement, evaluation, and program evaluation focus on the practice of measurement in program evaluation or program-based measurement (Alkharusi, et al., 2011; Graves, 2010; Harris, 2017; Tang, 2012). Different researchers have various studies also on program-based measurement and evaluation (Christ & Desjardins, 2018; Fuchs, 2017; Noble, 2012; Shapiro & Gebhardt, 2012; Tindal, 2013). In these studies, researchers evaluate applications for using program-based measurement and evaluation in different disciplines in the historical process. Another type of study in which the concepts of measurement and evaluation and program evaluation are a matter of research is studies that adopt the use of measurement and evaluation in program evaluation (Harmon et al., 1998; McDowell, 1992; Tusing & Breikjern, 2017). These studies include various measurement and evaluation approaches and methods researchers can employ in the program evaluation process.

Various studies in Türkiye examine situations such as teachers' measurement and evaluation competencies, perceptions, and needs, sometimes under the title of evaluation. (Duman, 2019; Karakuş & Turhan Türkkan, 2017; Karaman and Şahin 2014; Koç, 2019; Sabancı and Yazıcı 2017; Sevimel Şahin, 2019; Yaralı, 2017). However, in these studies, no direct evaluation research was found regarding the measurement and evaluation course in teacher training programs. Other studies examining measurement and evaluation education for teachers in various contexts in Turkey were either not conducted within the scope of program evaluation or did not focus on a specific teaching area.

The importance of measurement and evaluation as a teaching competence, the possible instabilities in the research country in this regard, limited studies on the subject in the literature, and the online education needs arising from situations such as COVID-19 require the evaluation of teachers' measurement and evaluation training programs. Given the importance of this aspect of teacher education, we believe that a comprehensive evaluation of measurement and evaluation program is necessary to equip teachers with the skills they need to provide quality education to their students. Thus, this study will provide the opportunity to facilitate the identification of shortcomings in the pertinent programs, and the derived insights will provide a foundation for updating these programs to strengthen their contribution to the teacher education system.

Aim

This study aims to evaluate the online measurement and evaluation course in teacher training programs during the COVID-19 process in Türkiye. In the first step, we aim to describe the situation of teachers and school administrators regarding the measurement and evaluation competencies. The primary purpose here is to reveal the measurement and evaluation needs in the field where the teaching profession is carried out. Based on this, the next step is to determine whether the course meets the needs in the field in the dimensions of "antecedents, transactions, and outcomes" as required by the program evaluation procedures adopted in the study. In line with these aims, the research pursued answers to the following questions:

1. What are the opinions of teachers and school administrators regarding their measurement and evaluation competencies?
2. Does the "measurement and evaluation" course have the qualities of an effective program in the "antecedents" dimension?
3. Does the "measurement and evaluation" course have the qualities of an effective program in the "transactions" dimension?
4. Does the "measurement and evaluation" course have the qualities of an effective program in the "outcomes" dimension?

Method

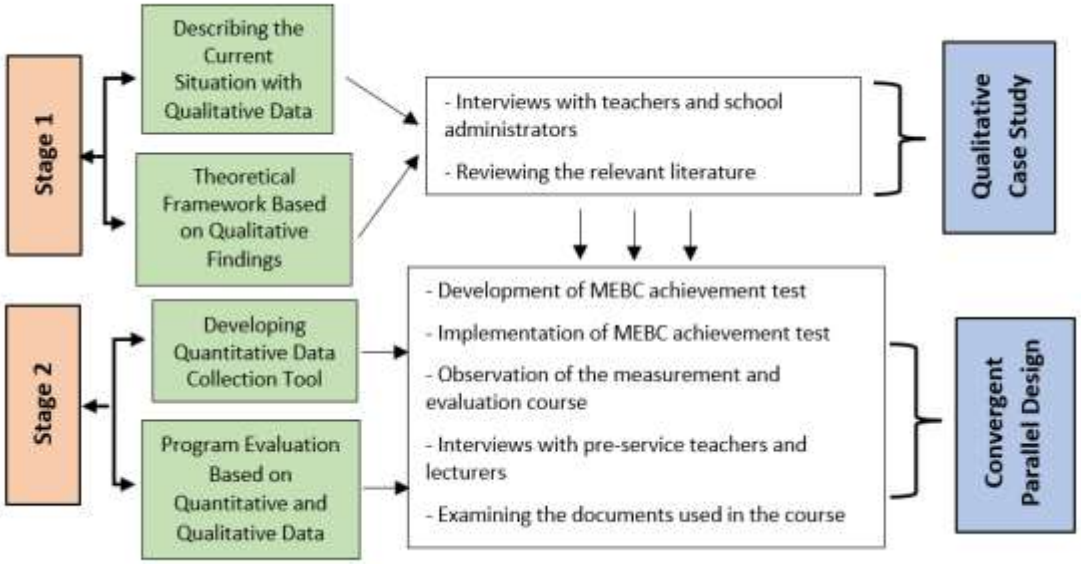
Research Design

This study is a program evaluation research using a multistage evaluation design. Multistage evaluation design is a mixed-method design that we utilize to evaluate the effectiveness of a program or project (Creswell, 2015). Multistage evaluation design, also known as mixed method "program evaluation design,"

comprises one or more core designs added to the steps in an evaluation setup conducted to evaluate the success of an intervention or a program (Creswell & Plano-Clark, 2018). Under related design, this research used a qualitative case study and mixed convergent parallel design. We examined the measurement and evaluation course as a single "case." This type of case study that deals with a whole situation is a singular case study design (Stake, 2005). Moreover, the purpose of convergent parallel design is to collect both quantitative and qualitative data simultaneously, combine these data, compare the results, and explain the differences in the results (Cohen et al., 2007; Patton, 2015). Figure 1 demonstrates the execution stages of the multistage evaluation design used in the research.

Figure 1

Execution Stages of the Multistage Evaluation Design.



The study was conducted in two stages, in which program evaluation procedures were employed in addition to the methodological design. This approach allowed us to evaluate the effectiveness of the program in a comprehensive manner, ensuring that all relevant factors were considered.

Program Evaluation Procedures

We used Stake's Responsive Program Evaluation Model to evaluate the measurement and evaluation course program. We benefited from the "Description Matrix" of Stake's Congruence-Contingency Model to collect descriptive data regarding the evaluated program. Stake's Responsive Model is an evaluation approach or model that also includes the Congruence-Contingency Model that he developed before (Stufflebeam, 1983). The Congruence-Contingency Model is a participant-oriented model developed in 1967 that aims to conceptualize the program evaluation process and make it understandable. The model deals with the dimensions of *antecedents*, *transactions*, and *outcomes* in program evaluation (Stake, 1967; Stufflebeam & Coryn, 2014). Today, researchers also use the Congruence-Contingency Model's data collection approach in describing the program's activities in the responsive model (Stufflebeam & Coryn, 2014). However, although Stake has laid its foundations in the Congruence-Contingency Model, Responsive Evaluation is more informal, pluralistic, and process-

oriented (Fitzpatrick et al., 2011). Stake (2011) expressed that the responsive model adopts an approach that compromises some measurement precision to increase the findings' usefulness. Because responsive evaluation also uses informal data collection processes that require natural communication with stakeholders (Stake, 2014; Stake, 2013). For this reason, we took measures to strengthen this weakness of the model. For this purpose, the program evaluation standards prepared by the Joint Committee on Standards for Educational Evaluation (JCSEE) were used during the program evaluation process. Moreover, the qualitative findings of the study were supported by quantitative data, and an achievement test was developed in this context.

Data Collection Procedures

Qualitative Data Collection

In the qualitative data collection processes, we used semi-structured interview and observation forms for teachers, school administrators, instructors, and pre-service teachers. Interview forms comprise 5 to 8 questions for each interviewer and sub-questions that may change according to the interview flow. The interview questions cover opinions about the model's dimensions used in program evaluation procedures. In the observation form, there are the following variables that we think will help to observe teaching activities in distance education processes:

1. The design of the distance education platform
2. Student-teacher interaction
3. Teaching strategies, approaches, methods, and techniques
4. Tools, resources, and materials
5. Assessment methods and techniques

In preparing the interview and observation forms, we received the expert opinions of individuals in the fields and disciplines of curriculum and instruction, measurement and evaluation, and qualitative research methods at three universities. Moreover, we subjected the interview forms to pilot applications and rewrote some questions because they lacked intelligibility. In addition, we asked the interviewees to confirm whether there was any problem with the interview content. Of the 67 interviewees who were asked for participant confirmation, 47 responded, and two lecturers, a teacher, and a pre-service teacher made additions to the questions that they answered incompletely because of anxiety, stress, and inattention during the interview.

Researchers assumed the role of the observer as a participant under the non-participant observation approach in order not to affect the research area and not be affected by the research area during the observations. In this context, the possibility of not being physically present in the teaching environment and not interacting, thanks to the distance education process, contributed to not affecting the research area.

Quantitative Data Collection

Measurement and Evaluation Basic Concepts (MEBC) Achievement Test was another measure we took to strengthen the part of the Responsive Model that compromises some precision in measurement. For this reason, we applied an achievement test to the pre-service teachers who took the measurement and evaluation

course to evaluate their learning with a standardized tool. We adopted the goal selection and writing principles of (Miller et al., 2009) in preparing test items. In this context, we set 10 goals in different cognitive learning stages, including the seven-week objectives and contents in the courses until the midterm week. To ensure content validity, we prepared a pool of 84 questions, including items for each objective. A preliminary test, comprising 30 questions in a multiple-choice format with five choices, was developed using items from the abovementioned pool. The test was then made accessible on online platforms such as Google Forms and Microsoft Forms to facilitate applicability in an online learning environment. Therefore, a question distribution was adopted to ensure content validity, with at least two questions for each outcome. Ultimately, we made a 30-minute preliminary application of the draft test to predict and provide psychometric qualities in 2 groups (132 pre-service teachers) that were equivalent to the observed groups.

Table 1

Item Statistics Regarding the Pre-Application of the Achievement Test.

n	$\bar{X}$	*ss*	Skewness-Kurtosis	Number of Items Discarded	Item Difficulty	Item Discrimination	KR20
132	54.80	3.89	0.086 - 0.916	7	0.54	0.40	0.70

We examined the skewness and kurtosis coefficients to determine whether the distribution of the achievement test results was normal, which revealed a range of values between 0.086 and 0.916. The fact that these values are between +1 and -1 means that the scores do not significantly deviate from the normal distribution (Büyüköztürk, 2014). For this reason, we performed the remaining analyzes assuming that the test scores indicated normal distribution. Item difficulty of 0.50 and around item discrimination of 0.30 and above is reasonable in a test (Güler, 2018). In cases where item discrimination is below 0.20, practitioners should remove the item from the test and correct the ones above this value (Atılgan, 2018). Therefore, we removed seven items with item discrimination below 0.20 from the test, corrected four items with a corresponding value between 0.23 and 0.28, and included them in the test. After these procedures, the mean scores obtained became 54.8 out of 100, the item difficulty 0.54, and the item discrimination 0.40. Eventually, we applied the KR20 test to determine the reliability of the achievement test scores and calculated it as 0.70. It is satisfactory for the KR20 reliability coefficient to be above 0.50 in tests performed for the first time under 50 items (Salvucci et al., 1997). After all these processes, the preliminary application of the Measurement and Evaluation Basic Concepts (MEBC) Achievement Test was completed, and we shaped the test in its final form as 23 items with five options.

Participants, Data Collection and Analysis

This study is a two-stage research because of its methodological design. For this reason, there are various sampling methods for collecting qualitative and quantitative data at each stage. Ensuring the representativeness of the sample population is necessary to realize valid and reliable data collection processes in research (Miles et al., 2014). In

this respect, we used different sampling methods to form the correct sample groups according to the data needs.

Table 2

Type of Data Needed, Sampling Methods Used, and Participants.

Stages	Transactions Taken	Data Collection Tools	Sampling Method	N	Sample Characteristics
Stage 1	Describing the Current Situation with Qualitative Data	Semi-structured interviews	Criteria Sampling	16 Teachers, 8 School Administrators	Adopted Criteria *(Different school types, teaching levels, branches, and professional experience)*
	Theoretical Framework Based on Qualitative Findings				
Stage 2	Developing Quantitative Data Collection Tool	Achievement test pre-application	Typical Case Sampling	132 Pre-service Teachers	Participant Features *(Typical two groups that took the measurement and evaluation course)*
	Program Evaluation Based on Quantitative and Qualitative Data	Observations	Study group	484 Pre-service Teachers	Participant Features *(6 different branches and classes where the measurement and evaluation course was carried out)*
		Achievement test actual application	Study group	364 Pre-service Teachers	Participant Features *(All groups that took the course during the observation period)*
		Semi-structured interviews	1. Maximum Diversity Sampling	36 Pre-service Teachers	Participant Features *(3 teacher candidates from each group who took the lesson online during the observation period and face-to-face in the previous term)*
			2. Study group	7 Lecturers	*(Lecturers teaching the course)*

During the initial phase of our study, we conducted semi-structured interviews with teachers and school administrators employed in public schools across Türkiye. Our sample selection involved individuals from various educational levels and types, including preschools, primary, secondary, and high schools. These schools were categorized into three groups to ensure a balanced representation of the student population, and participants were selected to ensure that each group did not exceed 25% of the total number of participants. In addition, teaching branches were classified into seven groups based on their field and professional characteristics, with at least three or four participants included from each branch.

In the second stage, we collected data from pre-service teachers who took the online measurement and evaluation course in four faculties of three different state universities in Türkiye and from the lecturers of the course. In this context, by observing the online courses for 14 weeks, we collected data from 484 pre-service teachers from six different branches (Science Education, Theology Bachelor's Program, Music Education, Preschool Education, Special Education, Guidance and Psychological Counseling) and classes in four faculties where the measurement and evaluation course was conducted by four instructors. We pre-applied the online achievement test on 132 pre-service teachers who took the course in the previous semester and applied the decisive test to 364 pre-service teachers from six different groups during online courses. In addition, we conducted semi-structured interviews with 36 pre-service teachers from different departments (Science Education, Theology Bachelor's Program, English Language Teaching, Mathematics Education, Music Education, Preschool Education, Special Education, Guidance and Psychological Counseling, Social Studies Education, Elementary Education, Turkish Language Teaching) who took the measurement and evaluation course and seven lecturers who led the course in the faculties where the observations were made. Four instructors were the academics whom we observed in their lessons.

NVIVO 10 was used in qualitative data analysis. In this context, we coded the interview and observation data through the related software and classified them into themes. We calculated the Cohen Kappa coefficient of agreement for the sake of consistency among coders to determine the reliability of these data and to see whether they correctly coded the contents of the research questions. The value we calculated varied between 0.63 and 1.00. According to Landis & Koch (1977), an agreement between 0.61 and 0.80 is satisfactory, while an agreement between 0.81 and 1.00 means a near-perfect fit.

We analyzed the quantitative data collected by the MEBC achievement test using the Test Analysis Program (TAP) and IBM SPSS Statistics 25. Initially, we assessed the normal distribution of the test scores by examining the skewness and kurtosis coefficients. To investigate potential variations in the test scores concerning factors such as department and gender, we employed Independent Samples T-Test, One-Way ANOVA, and Mann-Whitney U tests, contingent upon fulfilling the normal distribution assumption. We checked the Levene statistic regarding the homogeneity of variances before examining the test results for the department variable to which we applied One-Way ANOVA and found the significance level of the Levene value for the quotient variable to be lower than .05. For this reason, we used the Games-Howell Post Hoc Test to see which group averages differed significantly in the ANOVA test. Researchers commonly prefer the Games-Howell Test as it is used in cases where variances and sample numbers are not equal, is considered conservative to protect the margin of error, and provides the significance value between the mean scores of the groups (Armstrong et al. 2000). We also calculated the effect size for the variables with a significant difference according to the test results.

Findings

Opinions of Teachers and School Administrators on their Measurement and Evaluation Competencies

The interviewers mentioned three measurement and evaluation competency levels: "low, medium, and high."

Table 3

Descriptive Statistics on Measurement and Evaluation Competency Views of Teachers and School Administrators

Theme	Measurement and Evaluation Competence	Teachers			School Administrators		
		Participants	f	%	Participants	f	%
Codes	High	Teacher I Teacher M	2	12.5	Principal A Principal D Deputy Principal A	3	37.5
	Medium	Teacher A Teacher B Teacher C Teacher D Teacher E Teacher K Teacher L Teacher N Teacher 0 Teacher P	10	62.5	Principal B Principal E Deputy Principal B Deputy Principal C	4	50
	Low	Teacher F Teacher G Teacher J Teacher H	4	25	Principal C	1	12.5
	Total		16	100%		8	100%

Teachers consider themselves moderately competent at 62.5%, at a high level of 12.5%, and at a low level of 25% in measurement and evaluation. Respectively, school administrators consider themselves moderately competent at 50%, high at 37.5%, and low at 12.5%. This finding means school administrators assess themselves as more qualified than teachers in measurement and evaluation. However, it is probable to claim that teachers and school administrators assume themselves to be moderately sufficient.

Quality of the "Antecedents" Dimension of the Measurement and Evaluation Course

We examined the program's *antecedents* in terms of objectives, contents, readiness levels, expectations, attitudes, motivations of pre-service teachers, and instructive quality. The syllabuses and participant views have been the primary data sources of the study on this subject.

Table 4

Interview Codes and Descriptive Statistics Regarding the Quality of Program Antecedents

	Lecturers		Pre-service Teachers	
Theme	Codes	f	Codes	f
Quality of Antecedents	Limiting content criteria	7	Low student readiness	28
	Employment motivation source	7	Field incompatible content	25
	Low student readiness	6	Negative student attitude	19
	Positive lecturer attitude	6	Successful lecturers	12
	Negative student attitude	5	Low student motivation	10
	Limiting objectives criteria	4	Field-specific expectations	7
	Lecturer quality issues	3	Objectives unknown	3
	Total	38	Total	104

In the interviews, many pre-service teachers expressed that their measurement and evaluation knowledge infrastructure and readiness levels are insufficient. Similarly, lecturers consider the readiness level of teacher candidates inadequate. Especially, pre-service teachers with no background in mathematics, such as music and theology, stated that they had fears and prejudices that the course would challenge them at the beginning of the semester. According to the interviewees, these and similar cases are issues that create negative attitudes towards the course. Instructors think that measurement and evaluation, one of the basic skills in teachers' employment, is the most important source of motivation for the course. However, pre-service teachers consider this assumption a source of stress that reduces their motivation. In addition, although the instructors state that there are sometimes problems with the quality of the lecturers who conduct the course, the teacher candidates have positive views on this subject.

We examined the objectives in the syllabuses of the courses, considering the principles of goal selection and writing. Thus, we detected some problems, such as some objectives showing over one learning product, ending with different incompatible statements such as "will do, does, can use or uses" and pointing to the learning process instead of the learning product. We also received the opinions of the lecturers and pre-service teachers regarding the objectives of the program. Lecturers consider CHE regulations and Bologna and accreditation processes to be limiting factors in setting objectives. Pre-service teachers, on the other hand, avoided answering the questions about the objectives.

The observations and document examinations related to the course contents indicated that the weekly course contents presented to pre-service teachers largely matched the planned contents in syllabuses. However, since some contents were not completed in the scheduled times, the instructors could not present essential subjects such as "test and scale development," "statistical operations on the measurement results," "item analysis," and "evaluation of student achievement" and "graphics and standard test scores" in some groups. Instructors who conducted the course in over one field presented the same content in different groups. This situation reveals that there is no field-specific regulation in the course contents. At this point, the question of whether

the measurement and evaluation course meets the information needs of different teaching fields on this issue appears in mind. Both instructors and pre-service teachers criticized this issue. There were criticisms of pre-service teachers, especially in preschool, special education, music teaching, and guidance and psychological counseling (GPC) about the measurement and evaluation course's contents, were not suitable for their fields.

Quality of the "Transactions" Dimension of the Measurement and Evaluation Course

We included the distance education platforms, the teaching methods and techniques used, the duration of the course, the tools and materials, the communication and participation processes, and the measurement and evaluation methods in the *transactions* dimension of the program. In this context, we also received the lecturers' and pre-service teachers' opinions regarding this dimension.

Table 5

Interview Codes and Descriptive Statistics Regarding the Quality of Program Transactions.

	Lecturers		Pre-service Teachers	
Theme	Codes	f	Codes	f
Quality of Transactions	Limited lesson time	7	Methods and techniques	27
	Distance education limitations	6	Source-material	22
	Methods and techniques	6	Distance education limitations	21
	Source-material	3	Limited lesson time	15
	Interaction and participation	3	Homework	14
	Class size	2	Interaction and participation	11
			Class size	3
	Total	27	Total	113

In the research process, the measurement and evaluation course was mainly carried out as a live course over distance education platforms. We made course observations on the same platforms.

The most preferred platforms for live lessons were "Google Meet, Google Classroom, Adobe Connect, and Microsoft Teams," and for recorded lectures, "Microsoft PowerPoint Video." There were differences between universities in the preference for distance education platforms. "University 1" mainly preferred the Google Meet platform, "University 2" Google Meet and Adobe Connect platforms, and "University 3" Adobe Connect and Microsoft Teams platforms. In addition, 97.8% (5895 min.) of the lecturers taught their lessons live and 2.2% (180 min.) over the recording. Moreover, participation was higher in groups where attendance was compulsory.

Table 6

Observation Findings.

University	Groups	Distance Education Platform	Way of Conducting the Course	Attendance	Participation%	Teaching Methods and Techniques	*f*	Assessment Methods: *Midterm Exam* Action	$\bar{x}$	*Final Exam* Action	$\bar{x}$
1	GPC 1	Google Meet Google Classroom	875 min. live lesson	+	85.61	Lecturing Question-answer Discussion Case study	15 15 8 2	Exam	72	Exam	77
	Theology	Google Meet Google Classroom Microsoft PowerPoint Video	760 min. live, 120 min. recorded lesson	+	74.74	Lecturing Question-answer Discussion Case study	15 14 9 2	Exam	60	Exam	84
2	GPC 2	Google Meet Adobe Connect Microsoft PowerPoint Video	695 min. live, 60 min. recorded lesson	-	60.17	Lecturing Question-answer Discussion	14 13 7	Exam	70	Exam	62
3	Science Education	Adobe Connect	1275 min. live lesson	-	58.03	Lecturing Question-answer	14 13	Homework	68	Homework	69
	Music Education	Adobe Connect	1470 min. live lesson	-	58.36	Lecturing Question-answer	16 15	Homework	65	Homework	73
	Special Education and Pre-School Education	Microsoft Teams Adobe Connect	770 min. live lesson	-	62.26	Lecturing Question-answer Discussion	12 12 6	Homework	-	Homework	-

The pre-service teachers and lecturers also presented various views on the online course. Both pre-service teachers and lecturers stated that distance courses limit teaching and assessment efficiency to a large extent compared to face-to-face classes. Although the interviewees identified the distance education processes as inefficient, the instructors tried to make their lessons more productive by using various teaching methods in the live lectures. In the distance education processes, the instructors used lecturing, question-answer, discussion, and case study teaching methods. Apart from these methods, no teaching methods and techniques were preferred in the courses, and there was no remarkable difference in methodical choices among universities. In the interviews, the instructors expressed that the distance education processes and student

readiness level were effective in deciding on teaching methods and techniques. Pre-service teachers, like lecturers, expressed their views that the distance education process was a limiting factor for the teaching methods and techniques. While "University 1" and "University 2" preferred to make exams in measurement and evaluation, "University 3" preferred homework. According to the average scores, the group with the highest midterm exam scores is GPC 1, with a class average of 72, and the theology group has the lowest average with 60 points. In the final exam, inconsistent with the previous findings, theology was the group with the highest average of 84 points, while GPC 2 had the lowest score with an average of 62 points. The instructor did not share the scores of the special education and preschool education groups with the observer due to ethical concerns. This contradictory situation confirmed the necessity of a standard achievement test for all groups.

Quality of the "Outcomes" Dimension of the Measurement and Evaluation Course

In the interviews, the pre-service teachers were asked whether they considered themselves competent in this subject after completing the measurement and evaluation course.

Table 7

Descriptive Statistics on Measurement and Evaluation Opinions of Pre-Service Teachers

		Pre-service Teachers Taking the Course Online																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	f	%
Competence Opinions	Yes	+												+	+		+	+		+		+	7	33.3
	No		+	+	+	+	+	+	+	+	+		+			+					+		12	57.1
	Not Sure											+							+				2	9.5
		Pre-service Teachers Taking the Course Face to Face																					TOTAL	
		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	f	%					f	%
	Yes		+	+	+	+			+	+	+						7	46.6					14	38.9
	No	+					+	+				+	+	+	+		7	46.6					19	52.8
	Not Sure															+	1	6.6					3	8.3

According to the table, 52.8% of the 36 pre-service teachers interviewed consider themselves unqualified in measurement and evaluation, 38.9% competent, and 8.3% did not express any opinion on this issue. In addition, pre-service teachers who took the course online consider themselves less competent. Another instrument for determining pre-service teachers' measurement and evaluation competencies was the achievement test.

The average scores of pre-service teachers who participated in the achievement test differ in terms of some variables.

Table 8

Distribution of MEBC Achievement Test Scores by Department and Gender Variables.

					Gender Variable			
	Department Variable		Normality Tests		Female		Male	
Departments	N	$\bar{x}$	Skewness	Kurtosis	N	$\bar{x}$	N	$\bar{x}$
GPC 1	65	71.31	-.611	.271	54	72.39	11	66.01
GPC 2	30	63.19	-.946	1.405*	19	66.82	11	56.92
Theology	75	56.75	.370	-.714	52	56.27	23	57.84
Science Education	35	58.39	-.738	.298	33	57.97	2	65.25
Music Education	33	51.51	.239	-.841	19	52.63	14	49.99
Pre-School Education	78	62.88	-.249	-.921	67	63.67	11	58.11
Special Education	48	73.47	-.611	-.406	44	73.43	4	73.92
Total	364	63.08	-.443	-.408	288	64.29	76	58.53

The special education and GPC 1 groups attained the top scores on the achievement test, achieving an arithmetic mean of more than 70 points. Specifically, the special education group obtained a score of 73.5, while the GPC 1 group achieved a score of 71.3. Conversely, the music education and theology groups obtained the lowest scores on the achievement test, with scores of 51.5 and 56.7, respectively. Furthermore, the scores on the achievement test varied based on the department and gender variables. We employed the Independent Samples One-Way ANOVA test to ascertain the significance of this difference concerning the department variable.

Table 9

Independent Samples One-Way ANOVA Results for the Department Variable.

	Sum of Squares	sd	Mean Square	F	p
Between Groups	17780.707	6	2963.451	12.313	.000
Within Groups	85921.040	357	240.675		
Total	103701.747	363			

According to the table, there is a significant difference in the scores from the achievement test in terms of the department variable, $F(6.357) = 12.313$, $p<.05$. We examined the Games-Howell Post Hoc Test results to determine which groups had this difference.

Table 10

Games-Howell Post Hoc Test Results Regarding the Department Variable

(1) Department	(2) Department	Mean Difference (1-2)	p	(1) Department	(2) Department	Mean Difference (1-2)	p
GPC 1	Science Education	12.92110*	.003	Special Education	GPC 1	2.16170	.954
	Music Education	19.80023*	.000		Science Education	15.08280*	.000
	Pre-School Education	8.42821*	.012		Music Education	21.96193*	.000
	Special Education	-2.16170	.954		Pre-School Education	10.58990*	.001
	Theology	14.55805*	.000		Theology	16.71975*	.000
	GPC 2	8.12205	.247		GPC 2	10.28375	.078
Science Education	GPC 1	-12.92110*	.003	Theology	GPC 1	-14.55805*	.000
	Music Education	6.87913	.696		Science Education	-1.63695	.999
	Pre-School Education	-4.49289	.845		Music Education	5.24218	.809
	Special Education	-15.08280*	.000		Pre-School Education	-6.12985	.257
	Theology	1.63695	.999		Special Education	-16.71975*	.000
	GPC 2	-4.79905	.914		GPC 2	-6.43600	.576
Music Education	GPC 1	-19.80023*	.000	PRD 2	GPC 1	-8.12205	.247
	Science Education	-6.87913	.696		Science Education	4.79905	.914
	Pre-School Education	-11.37203	.066		Music Education	11.67818	.160
	Special Education	-21.96193*	.000		Pre-School Education	.30615	1.000
	Theology	-5.24218	.809		Special Education	-10.28375	.078
	GPC 2	-11.67818	.160		Theology	6.43600	.576
Pre-School Education	GPC 1	-8.42821*	.012				
	Science Education	4.49289	.845				
	Music Education	11.37203	.066				
	Special Education	-10.58990*	.001				
	Theology	6.12985	.257				
	GPC 2	-.30615	1.000				

* p<0.05

The scores of GPC 1, science education, music education, preschool education, and theology groups from the MEBC Achievement Test differed significantly in favor of the GPC 1, and the scores of special education, science education, music education, preschool education, and theology groups differed in favor of special education. Since the achievement results significantly differed in terms of the department variable, we calculated the Eta square (η2) effect size and found the (η2) value to be 0.171. This result means that the department variable explains 17% of the variance in the scores obtained from the achievement test. After checking the normality scores, we used the Independent Samples t-Test and Mann-Whitney U tests to determine whether the achievement test scores differed significantly according to the gender variable.

Table 11

Independent Samples t-Test Results Regarding the Gender Variable

Departments	Variable / Gender	n	$\bar{x}$	ss	sd	T	p
GPC 1	Female	54	72.39	11.21	63	1.68	.096
	Male	11	66.01	12.42			
Theology	Female	52	56.27	15.15	73	-.39	.695
	Male	23	57.84	17.70			
Science Education	Female	33	57.97	17.04	33	-.59	.557
	Male	2	65.25	6.15			
Music Education	Female	19	52.63	21.09	31	.38	.701
	Male	14	49.99	16.60			
Pre-School Education	Female	67	63.67	16.80	76	.98	.327
	Male	11	58.11	20.15			
Special Education	Female	44	73.43	11.61	46	-.08	.935
	Male	4	73.92	7.94			

There was no significant difference in terms of gender variable in the scores obtained from the MEBC Achievement Test. Since the scores of the GPC 2 group did not indicate a normal distribution, we revealed the circumstance of the achievement test scores of this group in terms of the gender variable with the Mann-Whitney U Test.

Table 12

Mann-Whitney U Test Results Regarding Gender Variable of GPC 2 Group.

Department	Variable / Gender	n	Mean Rank	Sum of Ranks	U	p
GPC 2	Female	19	16.89	321.00	78.00	.251
	Male	11	13.09	144.00		

According to Mann-Whitney U Test results, there was no significant difference in terms of gender variable in the achievement test scores of the GPC 2 group.

Conclusion, Discussion, and Implications

According to the research findings, like current teachers and school administrators, pre-service teachers who took the measurement and evaluation course face-to-face and online did not consider themselves competent in measurement and evaluation. This situation reveals that pre-service measurement and evaluation training provided to teachers in Türkiye may be problematic regardless of whether it is online. From this point of view, it is conceivable to consider the research results in two different contexts. The first is the results regarding the measurement and evaluation program, and the other is the results about the measurement and evaluation training carried out with distance education.

As the relevant programs were developed before COVID-19, the developers of teacher training programs in Türkiye conceivably did not consider the distance education processes while creating the measurement and evaluation course. There are various problems with the programs, both related and unrelated to this situation. The most common ones were the problems in selecting and organizing the objectives and contents of the program. For example, there were problems in preparing the program's objectives regarding compliance with target selection and writing principles, especially in the Bologna information package web pages. This case reminds the opinion that the lecturers edited the related web pages without being taken seriously enough. There are similar difficulties in executing Bologna processes in higher education in different countries (Curaj et al., 2015; Pires Pereira et al., 2021; Valeyeva et al., 2015). In addition, the responsible actors did not sufficiently consider the institutional and individual characteristics in determining and regulating the objectives and contents. All faculties where the research occurred carried out similar processes, especially in determining the contents of the program. Ünver (2016) similarly expressed that they do not consider institutional differences in terms of instructors and opportunities in determining the course content of teacher training programs in Türkiye. In addition, faculties did not arrange these contents according to teaching fields and presented similar contents to all pre-service teachers.

According to the participants, the readiness level of pre-service teachers for measurement and evaluation was low. Various studies have also expressed the inadequacies of pre-service teachers in their pre-learning in Türkiye (Kozikoğlu & Kayan, 2018; Yenen & Durmaz, 2019). At this point, there may be problems regarding the admission of qualified students to teacher training programs. In this context, there are problems in the selection and employment of teacher candidates in Türkiye (Akdemir, 2013; Kutluca Canbulat, 2014).

Pre-service teachers in non-mathematics fields such as theology and music education had fears and prejudices towards the lesson. Güvendir & Özkan (2016) also reached similar findings in their study. In addition, the achievement test scores of pre-service teachers in these departments were lower, and the department variable considerably affected this issue. Ergül (2019) examined teachers' measurement and evaluation literacy and figured that visual arts, music, physical education, and theology teachers scored lower than computation-based departments, such as mathematics

teaching. The first two groups with the highest scores on the achievement test were special education and GPC 1. In GPC undergraduate programs, a statistics course is offered to pre-service teachers before the measurement and evaluation course in Türkiye (CHE, 2018). It is expectable that the groups who have taken the statistics course will get high scores on the measurement and evaluation achievement test. Furthermore, the special education department that received the highest score on the achievement test was the department that accepted students with the highest points in 2018 among the groups in the faculty (OSYM, 2021). This situation indicates that not considering the field variable in teacher candidates' measurement and evaluation training may lead to two problems. The first is that teaching fields with no mathematics background may have difficulties, especially in the statistical dimension of measurement and evaluation. The second problem is the uncertainty of how a statistical-based measurement and evaluation approach will work, especially in sports, art, or preschool fields, where performance-based learning should be evaluated.

Besides the problems related to the program's structure, we reached various positive and negative results regarding the online conduct of the measurement and evaluation course. The faculties conducted mainly the lessons on the "Google Meet and Classroom, Adobe Connect, and Microsoft Teams" distance education platforms, of which 97.8% were live. These platforms have been among the most preferred distance education and online conference platforms in recent years (Hurst, 2020; Koçoğlu, 2020). The pre-service teachers considered the instructors successful in teaching the course in distance education. In the study of Özer & Turan (2021), in which they took the opinions of pre-service teachers about distance education, the participants viewed distance education as successful in transferring theoretical contents. In addition, the participants stated that the online measurement and evaluation course was successful regarding the resources and materials. Different researchers have emphasized the importance of digital content in distance education in learning performance (Bae et al., 2009; Jena & Devi, 2020). This situation may be an indicator that the course was successful in these aspects and that both students and instructors were ready for distance education.

Besides their successful aspects, the online courses had some negative qualities. For example, both pre-service teachers and lecturers criticized the distance education process because of its limitations in terms of communication and participation. Kaysi & Aydemir (2017) noticed that distance education processes negatively affect students' communication with each other and the instructor. Compulsory attendance and computer and internet facilities in distance education processes are among the main factors affecting participation (Aydın & Dalkılıç, 2018; Durak et al., 2020). We observed that the participation level was higher, especially in the groups that took attendance. In addition, the participants think the course duration was too short for completing the contents, including contents specific to the field and practice. The subject of course duration in distance education is an issue that we should not discuss only in terms of time limitations. During the COVID-19 process, some studies emphasized that the course duration is vital in terms of interest and motivation, especially in lessons conducted in an atmosphere independent of the classroom environment (Özkara, 2021; Tiedt et al., 2021).

Participants think that distance education processes are limiting in teaching and assessment processes. However, appropriate teaching and assessment methods are critical for course success (Köse, 2012; Peters, 2013). Remarkably, the limitations in measurement and evaluation are worrisome for a course whose primary purpose is to provide relevant skills. In this context, some faculties made simultaneous exams for measurement and evaluation, while others used housework as a measurement and evaluation tool. Although pre-service teachers consider homework necessary and effective in the teaching process, they think it was not an appropriate method for measurement and evaluation. However, the reason some faculties preferred homework instead of exams might be the difficulties caused by distance education processes. It is because exam applications in the distance education process have problems, especially in ensuring exam security (Al-Shalout et al., 2021; Kınalıoğlu & Güven, 2011). For this reason, instructors may have had difficulties in evaluating student success in going beyond homework.

Not considering different needs and contexts in the measurement and evaluation program development process can make things even more difficult in distance education. Some suggestions that are supposed to contribute to the acquisition of measurement and evaluation competencies in distance education, which might become indispensable in the coming years, are:

1. Responsible individuals and institutions should consider the institutional characteristics and differences in the development and implementation of the programs and should not ignore the possibility of conducting the relevant programs online.
2. There must be clear criteria that do not confuse in determining the objectives and contents of the program, and the instructors who are experts in the field should be more trusted and empowered.
3. While arranging the objectives and contents of the program, those responsible should consider the teaching areas and student characteristics, such as readiness, interest, attitude, and motivation to terminate the fears and prejudices of pre-service teachers in different teaching fields.
4. The course duration should be arranged to allow the presentation and application of field-specific and general theoretical knowledge, considering the dynamics of distance education processes.
5. The lecturers should increase the variety of teaching methods and techniques to ensure communication, interaction, attendance, and participation in both distance and face-to-face courses.
6. Responsible institutions should serve technical support to students with limited technological opportunities in distance education.
7. The lecturers should use measurement and evaluation instruments that will not conflict with what they teach in the lessons.

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Statement of Responsibility

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study. In this context, all ethical and legal responsibilities related to the study belong to the researchers.

Conflicts of Interest

First Author declares that he/she has no conflict of interest. Second Author declares that he/she has no conflict of interest.

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IEP Team Members' Experiences on the Process of Preparing Individualized Education Program in A Secondary School*

Bir Ortaokuldaki Bireyselleştirilmiş Eğitim Programı (BEP) Hazırlama Sürecine İlişkin Ekip Üyelerinin Deneyimleri

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ABSTRACT: Phenomenological design was used in this research to determine the experiences, opinions and suggestions of the stakeholders in the Individualized Education Program (IEP) development team during the IEP preparation process. Nine parents 20 teachers and a school administrator who were in the IEP team and took part in the IEP preparation process participated in the research. Researcher diary, demographic data form, observation and semi-structured interviews were used in accordance with the principle of data triangulation while collecting data from the participants. The data were analyzed with the QSR Nvivo 11 package program. As a result of the research, it was concluded that parents should be involved in the IEP development process, but this would be possible depending on some preconditions, and one of these preconditions was family education. It has been observed that the stakeholders in the team have developed a communication system based on information sharing. It was observed that the stakeholders had difficulties in the IEP preparation process due to reasons such as insufficient training on the process, insufficient knowledge about the process and laws, and inexperience. According to another result of the research, it was stated that it would not be appropriate for individuals with special needs to take part in the IEP preparation process, but they could be included in the process if certain conditions were met. In addition, as a result of the research, various suggestions were presented on deep research and applications for the IEP development process.

Keywords: Special education, individualized education program (IEP), IEP team, IEP preparing process.

ÖZ: Bireyselleştirilmiş Eğitim Programı (BEP) geliştirme biriminde yer alan paydaşların BEP hazırlama sürecindeki deneyim, görüş ve önerilerini belirlemek amacıyla gerçekleştirilen bu araştırmada fenomenolojik desen kullanılmıştır. Araştırmaya katılımcı olarak BEP ekibinde bulunan ve BEP hazırlama sürecinde yer alan dokuz aile, 20 öğretmen ve bir okul yöneticisi dahil edilmiştir. Katılımcılardan veri elde edilirken veri çeşitlemesi ilkesine uyularak araştırmacı günlüğü, demografik veri formu, gözlem ve yarı yapılandırılmış görüşmelerden yararlanılmıştır. Veriler analiz edilirken QSR Nvivo 11 paket programından yararlanılmıştır. Araştırma bulgularına göre ailelerin BEP geliştirme sürecinde yer alması gerektiği, ancak bazı ön koşullara bağlı olarak bunun mümkün olacağı, bu ön koşullardan birinin de aile eğitimleri olduğu sonucu ortaya çıkmıştır. Ekipte yer alan paydaşların daha çok bilgi paylaşımı odağında bir iletişim sistemi geliştirdiği görülmüştür. BEP hazırlama sürecinde paydaşların; sürece ilişkin geçmiş eğitimlerinin yetersiz olması, süreç ve yasalar anlamında yetersiz bilgiye sahip olması ve deneyimsiz olması gibi nedenlerden dolayı zorluk yaşadıkları görülmüştür. Araştırmadaki bir diğer sonuca göre özel gereksinimli bireylerin de BEP hazırlama sürecinde yer almasının uygun olmayacağı, ancak bazı koşullar yerine getirilirse sürece dahil edilebilecekleri ifade edilmiştir. Ayrıca araştırmada katılımcılardan elde edilen bulgulardan yola çıkılarak BEP geliştirme sürecine yönelik ileri araştırmalar ve uygulamalar konusunda çeşitli önerilerde bulunulmuştur.

Anahtar kelimeler: Özel eğitim, bireyselleştirilmiş eğitim programı (BEP), BEP geliştirme ekibi, BEP hazırlama süreci.

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Individualized Education Programs (IEP) is a written document prepared to meet the needs of individuals with special needs such as self-care, communication, academic and social skills, and to ensure that the individual benefits from the best possible educational environments and supports for the individual. As a document, IEP contains the content of the goals determined for the individual with special needs, by whom, in which environments, for how long and with which methods, techniques, strategies and materials the services to be provided will be provided. The process of IEP planning requires a team to work in cooperation. In this cooperation process, the parents or official institution responsible for the care of the individual with special needs, the teachers working in the institution or institutions where the individual receives education, and the field experts who should be involved in the IEP process should take part. However, in this cooperation process, the IEP prepared for the individual should be approved by the parents before it is put into practice (Felix & Tymeson, 2016; Kargın, 2007; Salend, 2007; Vuran, 2006).

The IEP development process plays a key role for the individual with special needs to reach the same level as his/her typically developing peers both in social life and in education and training. Providing the most appropriate education and support services for the individual will only be possible through a functional IEP development, implementation, and evaluation process. Due to this importance in the individual's life, it is imperative to prepare an IEP in accordance with the needs and priorities of the individual immediately after the educational diagnosis and placement in the appropriate educational environment. Preparing an IEP is a process with certain stages. When we look at the stages of the IEP preparation process; (a) forming a team to prepare an IEP, (b) evaluating the individual with special needs and determining the level of functioning, (c) determining the support services and the environments where these services will be provided, (d) determining the appropriate individualized curriculum for the individual, (e) implementing, monitoring, evaluating and making changes in the IEP when necessary, and distributing the duties and responsibilities related to all these processes to the necessary people (Bateman & Linden, 1998; Felix & Tymeson, 2016; Vuran, 2006). IEP development process is of key importance for the individual with special needs and his/her parents. However, it is legally obligatory to prepare an IEP for a student with special needs who is placed in the educational environment not only because of ethical requirements but also because of legal obligations.

Today, IEP has legal foundations both in Turkey and in many other countries. However, IEP is based on the law numbered PL. 94-142, which first came into force in the United States of America (USA). For the first time, the preparation of an IEP became mandatory with this law (CEC, 1999; Özyürek, 2010; Zirkel, 2016; Zirkel & Hetrick, 2017). For the first time in Türkiye, the preparation of an IEP was made compulsory with the Decree Law on Special Education (Decree Law No. 573) published in 1997. In subparagraph f of Article 4 of this decree, it was emphasized that IEPs should be prepared for individuals with special needs and that these programs should be individualized and implemented. However, although the preparation of IEP was made compulsory in this decree, detailed information on how to prepare it and what the definition of IEP is was not included. However, IEP is defined in more detail in the Regulation on Special Education Services, which was first published in the Official Gazette by the Ministry of National Education (MoNE) in 2006 and lastly re-published

and updated in 2022. According to this regulation, IEP is defined as "a special education program that is prepared within the framework of the developmental characteristics, educational performance and educational needs of the individual with special needs and also includes other support services for the individual with special needs". The regulation also mentions the components that an appropriate IEP should include. Accordingly, the IEP should include; (a) long and short-term goals to be achieved annually, (b) by whom and how supportive education services will be provided, (c) the duration, type and frequency of these supportive education services, (d) which tools and materials will be used for assessment and teaching, which methods and techniques will be used, (e) the organization of the educational environment, (f) measures to be taken to prevent problem behaviors, and (g) information about the individual with special needs (MoNE, 2022). When the relevant article of the regulation is analyzed, it is possible to say that for the first time a detailed framework has been officially established regarding the content of the IEP.

According to the Regulation on Special Education Services published by the Ministry of National Education (2022), the IEP should be prepared by the special education evaluation board and the IEP development unit in cooperation. The IEP should also be implemented and evaluated by the team. Before starting the IEP preparation process, the IEP team should focus on the needs and strengths of the student diagnosed with special needs. After the characteristics, needs and strengths of the student are determined, the IEP preparation process should be initiated in collaboration with the team. After determining the special needs of the individual, that is, after receiving an educational diagnosis and placement in the appropriate environment, the team members who will decide on the IEP preparation, implementation and evaluation processes should be determined immediately and an appropriate team environment should be created. The responsibility for the fulfillment of this task lies with the school administration. When forming the IEP team, the school administration should first consider the priority needs of the individual with special needs (Bambara & Kern, 2005; Friend & Cook, 1992). The IEP focuses on the needs and strengths of the student with special needs and their progress is recorded. In this process, the main purpose of the team in preparing the IEP is to eliminate the individual needs of the student with special needs and to ensure that he/she gets the highest efficiency from the educational processes (MoNE, 2022). Legal obligations in our country require a team approach in IEP preparation, implementation, and evaluation processes. Both the educational and other support needs of the individual in the fields of social, emotional, etc. should be met with this approach (Batu, 2006; Friend & Cook, 1992). Information on the composition of the team is also included in the Special Education Services Regulation (2022). According to the regulation, the school principal or a vice principal assigned by the principal forms the IEP team and chairs it. The team should include the teacher who is responsible for preparing an IEP for the individual with special needs (usually the classroom teacher or special education teacher of the individual), the classroom teacher of the individual, the branch teachers who teach the lessons, the psychological counselor (guidance counselor), the special education teacher (if not present at the school, a teacher who provides special education services by traveling), the parents of the individual with special needs or the person or institution responsible for his/her care, and of course, finally, the student for whom the IEP is prepared (MoNE, 2022).

Literature Review

The IEP team has some important goals for the individual and his/her parents. One of these is to develop an education program for the individual and to determine and implement other support services required in this process (Batu, 2006). In this context, the focus of the IEP team is always on the individual and his/her parents. The team makes plans for the areas that the individual needs by focusing on the areas and strengths of the individual (Bateman & Linden, 1998). However, the experiences and expectations of teachers, families and other stakeholders involved in IEP preparation, implementation and evaluation processes that require teamwork may differ from each other (Bacon & Causton-Theoharis, 2013). Initiating and maintaining the IEP process in cooperation with stakeholders who bring all these different experiences and expectations to the team is extremely necessary to provide the most appropriate educational processes and support services to the individual with special needs (Murray, 2000; Winterman & Rosas, 2014). For the process to be carried out in cooperation, it is also necessary to share responsibilities, suggestions, and all kinds of opinions among the stakeholders in the team, to support equal contribution between stakeholders and to develop positive relationships. It is also important to facilitate the participation of team members in decision-making processes (Bambara & Kern, 2005).

When the literature was examined, it was found that the experiences of parents of individuals with special needs regarding IEP meetings were examined (Fish, 2008; Kirksey et al., 2022; Macleod et al., 2017; Zeitlin & Curcic, 2010), parent-expert cooperation in the IEP development process was discussed (Broomhead, 2013; Mereoiu, et al. 2016; Murray, 2000; O'Connor, 2008), studies on the role of stakeholders in the IEP team in the IEP development process (Eratay et al., 2012; Gilliam & Coleman, 1981), and a study examining how the process works in IEP meetings attended by students with special needs (Royer, 2017). In addition, school administrators and classroom teachers (Çuhadar, 2006), Guidance Research Center (GRC) staff and special education teachers (Avcıoğlu, 2011; Öztürk & Eratay, 2010; Bafra Tike & Kargın, 2009), the difficulties faced by school administrators regarding the IEP development process and their suggestions for solutions (Yaman, 2017; Yılmaz, 2013), and the experiences and difficulties experienced by teachers (Akcin, 2022; Kozikoğlu & Albayrak, 2022). However, when the literature was examined, no study was found in which the experiences and opinions of all stakeholders of the IEP team, which directly affect the education and social life of individuals with special needs, regarding the IEP preparation process were determined. Therefore, from this point of view, this study is needed to reveal the experiences and opinions of all stakeholders in the IEP development team regarding the IEP preparation process with a holistic understanding. In addition, it is seen that each of the team members has unique experiences regarding the difficulties experienced in the IEP preparation process of individuals with special needs. The fact that the findings to be obtained from the study in which these difficulties are taken from a holistic perspective will play a key role in the formation of IEP teams and the operation of IEP preparation processes constitutes the need for this study.

It is thought that the findings of this study may shed light on how the IEP development process should be in order to increase the participation of individuals with special needs in independent life. Considering the various needs of students with special needs both in the school environment and in their social lives, it is hoped that this study

will provide a new perspective to all stakeholders who will take part in the IEP team in terms of understanding the experiences of stakeholders in the IEP preparation process carried out with a team approach and putting them into practice at the end of this interpretation process. In addition, it is thought that the experiences of the families in the study can be a guide for the families who will be included in the IEP team for the first time. In addition, considering the positive effect of the IEP prepared for the student with special needs in the process of the individual's inclusion in independent life, it is thought that the findings of the study can be used for the benefit of the society. On the other hand, it is hoped that the results of the study will provide important contributions to the experts who are in the process of forming an IEP team for the first time in terms of creating and guiding ideas. Finally, since there is no study in the national literature that examines the experiences of all stakeholders involved in the IEP team in depth, it is thought that this study may contribute to further research on this subject.

The aim of this study is to reveal the experiences of the stakeholders in the IEP team formed in a middle school regarding the IEP preparation process in an in-depth manner. In line with the research aim, the following questions were sought to be answered:

1. What are the experiences of family members of individuals with special needs regarding the IEP preparation process?
2. What are the experiences of branch teachers who teach the lessons of individuals with special needs regarding the IEP preparation process?
3. What are the experiences of special education teachers regarding the IEP preparation process?
4. What are the experiences of school counselors (psychological counselors) regarding the IEP preparation process?
5. What are the experiences of the IEP team leader regarding the IEP preparation process?

Method

In this study, which was conducted to determine the experiences of all stakeholders in the IEP team regarding the IEP preparation process, phenomenological design, one of the qualitative research approach designs, was used to reveal the experiences of the participants with an in-depth perspective (Creswell, 2016). In the phenomenological design, the researcher understands and explores the life experiences of the participants with an in-depth look (Gay et al., 2012; Merriam, 2009; Smith et al., 2009; Taylor et al., 2015).

Participants

In this study, criterion sampling technique, one of the purposeful sampling types, was used. In the criterion sampling technique, since the number of individuals who have experienced the studied phenomenon may be high, some criteria are determined and, in this way, it is easier to select participants for the study (Saban & Ersoy, 2016). While selecting participants for this study, the criteria determined by the researcher considering the research purpose are as follows:

- Being a middle school with an IEP team.

- Completion of at least one IEP meeting by the IEP team at the school.
- An IEP was prepared by the team for the individual with special needs.
- Families of individuals with special needs are also involved in IEP meetings as a stakeholder.

In the study, nine parents, 16 branch teachers, two guidance counselors (school psychological counselor), two special education teachers, and one school administrator, whose detailed demographic information is given in Table 1 and Table 2 and who met the criteria for participating, were included as participants.

Table 1

Demographic Information about the Families Participating in the Study

No	*Pseudonym*	Age	*Number of Children*	*Educational Status*	*Monthly Income*	*Job*
01	Emel	38	2	Elementary school	1000-1500 TL	Not working
02	Müjgan	48	3	Elementary school	1000-1500 TL	Not working
03	Gülşah	41	4	High School	500 TL	Not working
04	Kadriye	28	3	Elementary school	1500-200 TL	Not working
05	Mine	46	5	Elementary school	500 TL	Not working
06	Nuri	48	3	Elementary school	1000-1500 TL	Not working
07	Büşra	41	4	Elementary school	500 TL	Not working
08	Sude	47	3	Elementary school	500 TL	Not working
09	Sıla	43	3	Elementary school	1000-1500 TL	Not working

Table 2

Demographic Information about the School Personnel Participating in the Study

No	*Pseudonym*	Age	*Experience (Years)*	*Branch*
01	Turan	38	5-10	Math
02	Meliha	33	5-10	Music
03	Rafet	46	12	Physical education
04	Melis	37	14	Science

Table 2 (Cont.)

Demographic Information about the School Personnel Participating in the Study

No	Pseudonym	Age	Experience (Years)	Branch
05	Züleyha	36	13	Social studies
06	Seray	34	5-10	Science
07	Furkan	30	5-10	Physical education
08	Esen	32	5-10	Math
09	Cem	32	5-10	Turkish language
10	Suna	30	5-10	Information Technologies
11	Ferhat	38	14	Religious culture and ethics
12	Asuman	33	5-10	English language
13	Şeyma	29	5-10	Turkish language
14	Remzi	36	16	Social studies
15	Serhat	33	5-10	Turkish language
16	Özlem	30	5-10	Math
17	Figen	50	14	Counseling and gudance
18	Selen	26	1-5	Counseling and gudance
19	Mahir	42	12	Special education
20	Demet	30	5-10	Special education
21	Mehmet	32	1 (as a principal)	School principal

Data Collection, Coding and Analysis

Within the scope of the study, demographic information form, researcher's diary kept by the researcher, observations made by the researcher, and semi-structured interviews with the stakeholders in the IEP team were used as data collection tools to obtain data on their experiences in the IEP preparation process. While a qualitative researcher conducting qualitative research strives to obtain in-depth data on the views and opinions of the participants regarding their experiences through interviews (Bogdan & Biklen, 2007; Gay et al., 2012), he starts the interview with the interview questions he has prepared through semi-structured interviews and elaborates the questions depending on the content of the interview (Gay et al., 2012).

Based on this purpose, interview questions were prepared by the researcher for each stakeholder in the team in line with the literature and research questions. The semi-structured interview questionnaires prepared by the researchers were sent to five experts who have conducted qualitative research and studies on the IEP preparation process. The experts were selected from faculty members working in various universities with doctoral degrees in special education and education of the mentally disabled. The interview questions were finalized by taking into account the feedback from each expert. After this process, 17 questions were prepared for subject teachers, 11 questions for parents and 14 open-ended questions for school administrators.

During the data collection phase, a total of seven observations were carried out over one month, coinciding with the interview sessions. The observations aimed to understand the interaction and communication processes among the stakeholders in the IEP team and to ensure data triangulation. Observation data and the researcher's diary were used as secondary data to support the interview data.

In order to obtain data from the participants in the study, families of students with special needs attending a secondary school affiliated to the Ministry of National Education in Eskişehir, teachers, school counselors (psychological counselors) working in the guidance service and a school administrator were selected as participants and semi-structured interviews were conducted with these participants, a researcher diary was used and observations were made.

The interviews with the teachers were conducted in the school library. The school library was chosen as the data collection environment with the recommendation of the school administration because it provides a quiet environment that allows the interviews to be conducted and has tables and chairs where the participants can sit comfortably. Choosing this environment also made it easier for the participants not to be disturbed by anyone from the outside during the interviews. However, despite this situation, the door was closed during the interviews in case the interviews were interrupted and a sign "There is an interview, please do not disturb" was hung on the outside of the door with the permission of the school administration. The interviews with the families were conducted in the meeting room on the ground floor of the middle school building. This room was named "knitting room" by the families. In the meeting room, families of individuals with special needs knit and have daily conversations with each other. On the days and hours when the meeting room was not suitable, in cases where some of the families were not available to come to the school, appointments were made with the participants and the interviews were held at the participants' homes on

the days and hours determined. Since the school administrator stated that he was very busy, the office of the second researcher was used for the interview with the school administrator.

The observations made to understand and make sense of the interaction and communication processes between the stakeholders in the IEP team were conducted simultaneously during the time interval when the interviews were conducted. Each of the five observations conducted by the first researcher lasted approximately 40 minutes, providing valuable insights into the interaction and communication processes among the stakeholders. The observations were conducted in the teachers' room. Observation data were reflected in the researcher's diary and in the reporting of the findings.

The data obtained in this study were analyzed through inductive analysis. In this analysis technique, the researcher aims to reach concepts and relationships to explain the data collected. As a result of the analysis, it is extremely important for the researcher to consider the literature on the relevant subject (Merriam, 1998).

In this study, the steps stated in the literature were taken into consideration in the process of analyzing the data. The steps followed by the researchers in the data analysis process can be briefly summarized as follows:

- Written transcription of the data obtained by the first researcher
- Listening to and verifying 30% of the transcripts by an expert who has at least a master's degree and has worked in one of the qualitative research methods
- Transferring the transcripts to the Nvivo package program by the first researcher
- Preparation of data for analysis by the researchers
- Coding of data
- Ensuring inter-coder reliability by coding 30% of the data by an expert who has worked in one of the qualitative research methods
- Reaching themes and sub-themes by the researchers
- Presentation of the findings obtained by the researchers under the themes.

Credibility

In this study, the participants of the research were selected through purposive sampling method, and the interview principles and the principle of data triangulation were followed while conducting interviews with the participants. While utilizing the data in the reporting process, the researchers included positive and negative examples in the data set. The data obtained were described in detail. All data obtained during the research process were backed up by the researchers. In addition, the researchers used representative data from the data source while writing the findings in the reporting process.

Although reliability is an expression generally used in quantitative studies, it is also an issue that should be emphasized in qualitative research (Golafshani, 2003). After the themes were reached by the researchers, the data were given to an expert who has worked in at least one of the qualitative research methods in the field of special education in order to ensure inter-coder reliability, and this expert reached some themes by making his own coding. Afterwards, the expert and the researchers came together again and the inter-coder reliability agreement percentage was calculated. This

percentage was determined using the formula "Agreement/(disagreement + agreement) X 100" (Creswell, 2016). Although the inter-coder reliability was determined as 90% before the reconciliation, the inter-coder reliability was determined as 100% after the reconciliation.

Ethical Procedures

This research was conducted in accordance with ethical rules after obtaining the Ethics Committee Approval dated 31.01.2018 and numbered 2739 Protocol No. 2739 by applying to the Anadolu University Social and Human Sciences Scientific Research and Publication Ethics Committee. The purpose of the research was explained by conducting a preliminary interview with the participants, verbal permission was obtained and the principle of voluntariness was followed. After verbal permission was obtained from the participants, they were included in the research process by obtaining their wet signatures through the voluntary participation form. In case they did not want to participate in the interview, the researcher explained to them in a clear and understandable language that they could not participate from the beginning of the study if they wished, or that they could leave the study at any point of the study if they wished. The voluntary participation form included the responsibilities and rights of the participants. Participants' questions about the research were answered openly and honestly by the researchers. Participants were given code names in the reporting part. The findings obtained at the end of the research were then shared with the participants and participant confirmations were obtained.

Findings

In this section, the themes obtained as a result of observations and semi-structured interviews with parents, teachers and school administrators who participated in the study are presented.

Table 3

Themes

No	*Themes*
01	Family Participation
02	IEP Preparation Process
03	Being IEP Team
04	Students With Special Needs

Family Participation

The school administrators and teachers who participated in the study expressed various opinions about parent involvement in the IEP preparation process. For example, Mr. Cem, a Turkish teacher, stated that parents should be given the right to have a say in the IEP preparation process when setting goals for students with special needs and planning for the future as follows

> ...I don't know, we are setting goals for these children and parents should have something to say. I think this is their most natural right. For example, I don't know what my child will be in the future or I don't know, I want my child to be like this, we have to listen to them.

Mrs. Melis, a science teacher, stated that all stakeholders should make more effort than usual in the IEP preparation process and that she believed that parents participation was important in the process, but that mothers were more prominent than fathers as follows

> First of all, the family knows the child best. The mother knows the child, more precisely, the mother knows the child, not the parents. She can tell us better about her child, how to behave and what to do. That's why it's the family's opinion. Of course, let's not deny the fathers here, they also have ideas and things, but it is better for us if the mother and father always come to us with a common opinion. Because how the child is, how he/she grows up, what needs to be done, did he/she have an illness as a child, did other things happen? You know, what is the reason for this mild level? Was it like this from the beginning?.... I mean for those who have IEPs afterwards. We get information about these from the family. Anyway, for a normal student, the school, parents and teachers all have to work together, but for a student with IEP, we have to work together twice as much, so I believe in the importance of the family. When the family is involved, they feel better, they get along better with us anyway, there is no problem, but I mean, of course, it gets better.

Mrs. Esen stated that teachers took a more active role in the IEP preparation process than the families, and that parents unconditionally approved, "...as I said, they don't say much, they approve more, they say okay, they ask how are the lessons?" When Mrs. Emel was asked why the families behave in this way, she said, "they don't have any information, they don't know their children, so they accept what is put in front of them. That's why they mostly ask how are their classes? How are their exams?".

Mrs. Meliha stated that parents have not yet fully accepted the special needs of their children, therefore they cannot look at the process with a professional approach as much as teachers, instead they approach the process more emotionally, which has a negative impact on cooperation and communication as follows

> I think teachers look at it more realistically. The family, of course, looks at it a little more emotionally, inevitably, so sometimes we can get into a conflict with the parents. That's why they can misunderstand what the teacher says. Or sometimes the family may not approach cooperation because of this. I think the problem will continue unless the family accepts it.

Mrs. Emel (mother) stated that they took part in the IEP preparation process for the first time and that they were very pleased with the interest of the school administration in this process as follows

> We participated for the first time this year. I don't want to lie, I didn't know what an IEP was, although I still don't know exactly, but at least I know what it does, why it is applied to my child. God bless my teacher Mehmet. Thanks to him, he took care of everything. We can reach him whenever we call, of course we don't call him all the time, but we call him when it is convenient. He also took care of us during the meetings.

Mrs. Kadriye (mother) emphasized parents involvement in the entire IEP preparation process with the following words:

> Where were they until now? Shouldn't this process have been prepared for my child before? I think this process is too late. Okay, I am a high school graduate, I am not very knowledgeable about these issues, I also have mistakes, I should have researched more, but at least the school knows these things. If it wasn't for Mehmet teacher, we wouldn't be in the process. Forget us, I think they wouldn't have been in the process either, because in the past, we were only asked for signatures, we didn't know the rest, so we didn't participate. So, I made this child, don't we have any rights as parents? I want good things for my child, so I should be involved. This

> process will definitely not work without me. Either the father or me, at least one of us should be involved. I think our opinion should be taken.

Mr. Nuri (father) stated that he was involved in the IEP preparation process with the initiatives of the school administrator and that he was, in his own words, "taken for granted for the first time"

> Hodja, I am a primary school graduate, I am a worker, I am ignorant, in short, but I am worried about the future of my child. These things do not change my thinking. Sometimes they say, "Parents are so ignorant. They don't know anything" and so on. Okay, then teach me, brother, what is your job? You will do what you want with my child and you will not ask me. Can such a thing happen? Of course not. I was taken for granted for the first time this year, teacher. My teacher Mehmet called me and said, "We need to do such and such a process with your child. We have to do it." I was very happy, I said, "OK, hodja, you can do as you wish. I am all for this process. I am for the sake of my child, teacher.". I participated in this process so that my child can get somewhere in the future. Thanks to my teacher Mehmet, he informed us. We informed the teachers about our child as much as we could. They constantly asked us about our wishes. No more or less, but our requests were asked. Apart from that, they should actually always teach us how this process is, and they do, thanks to them.

Mrs. Emel expressed her cooperation in the IEP preparation process and her communication with other stakeholders in the team as follows

> As for communication, as I said, we have no problems with our teachers. We can call and ask questions whenever we want. Especially with my teacher Mehmet, he is always at school whenever we want, we can meet with him as long as he is not too busy. Our guidance counselors are the same way, they never break us when we want to meet, thanks to them.

Unlike Mrs. Emel, Mrs. Kadriye stated that there was no cooperation between herself and the team, and that there was only a unilateral decision-making process as follows

> Yes, everything is good, but no one tells us exactly what we need to do in this process. More precisely, if he says, "These are the characteristics of your child," I will act accordingly. He tells me, "We have made this decision." I say, "OK." Okay, but this is not cooperation. I think this is unilateral decision-making.

IEP Preparation process

The teachers who participated in the study expressed their experiences about what kind of resources they utilized while preparing IEPs. Mr. Cem expressed what kind of resources he used in the IEP preparation process with the following words,

> Honestly, I benefited more from the internet, and I benefited from our assistant principal at work. ...We did not receive any training on how to prepare an IEP before, so I benefited more from the internet...

Ms. Meliha stated that she mostly used rough evaluation forms, the internet and the guidance service in the IEP preparation process,

> There are rough assessment forms that we have done before. We look at the child's competencies and try to prepare a plan accordingly. For example, if the child has speech difficulties, if the child has trouble speaking at work, we cannot expect the child to recite 10 stanzas of the National Anthem by heart at the end of the year. Accordingly, we adjust our expectations accordingly by paying attention to distant and near goals." "...the internet, the resources available to our guidance counselors. I don't think there is anywhere else we can benefit from.

Ms. Seray expressed that she felt inadequate in the IEP preparation process and that she experienced some difficulties due to this, "...I mean, as I said, we were inexperienced at first because it was the first time, we did not know the process

completely, I can say that this was the common difficulty we all had, but I think things will get better gradually.". Mr. Rafet attributed some of the difficulties he faced in the IEP preparation process to his inability to fully predict the behaviors of students with special needs and said,

> ...for example, I learn all the habits of these children in the fifth and sixth grades. In the seventh and eighth grades, I don't interfere. Because I know what the child has. But you don't know these children. Very different things happen. They do things you don't expect.

Mr. Cem expressed the training he had received before regarding the IEP preparation process as follows

> I mean, before I came, if I don't remember wrongly, in my student years, it was either 2nd or 3rd grade, we took a course, it was about children, but how to prepare an IEP? Even what is IEP? We didn't even learn that I learned the definition of IEP later (laughed)", "I mean, we only learned the superficial characteristics of these children in the course.

Mr. Rafet stated that all teachers in the IEP team should be provided with various trainings on IEP preparation through experts working in the field of special education,

> I will make a self-criticism now. Some of us know what IEP is only superficially, let me say most of us. This is where the real problem starts. We are swimming in a sea we don't know, and then we drown. We get overwhelmed. For this not to happen, okay, we have not been trained in the past, but it is not too late. Am I right? We are constantly taking seminars, etc. Let's not let these be idle, someone should come and tell us about these things so that we can learn...

Ms. Emel expressed that she saw her lack of knowledge as the source of the difficulties she experienced in the IEP preparation process in the following words:

> I mean, what is IEP? Thanks to my teacher Mehmet, he gave us a training like a lesson before these processes started, he taught us what to do, he relieved us a little bit, but since our teachers mostly did the IEP preparation part, there was not much, there was no problem, but in general, of course, I personally had difficulties in the process.

Ms. Kadriye, on the other hand, put her inability to be involved in the process as much as she would like at the root of the difficulties she experienced and stated the following

> I don't know what the IEP is. I attended meetings, I don't know much about what it is. I couldn't attend Mehmet teacher's training. Other than that, I come to school all the time, but if I need something, I can do it. But I can't prepare an IEP, I was never involved in that process, so I didn't have any difficulty. Our teachers prepared it and I just signed it.

Being IEP Team

Ms. Esen expressed her communication especially with guidance counselors among the stakeholders in the team with the following words, "We also have guidance counselors, I can't meet with them much. At first, they said, "Do the IEP like this". We were very confused, then Mehmet Hoca said something else and we relaxed and we did it more easily.". In the following part of her speech, Ms. Emel stated that her communication style with other stakeholders, teachers and vice principals, was more positive than that of guidance counselors

> ... I mean, we meet with the teachers in the class on the phone and at meetings in the teachers' room. Apart from that, we mostly meet with other branch teachers in the teachers' room. I don't know, we can meet with Mehmet teacher whenever we want. There is also a whatsapp group, so we can talk there even if there are more announcements. That's it.

Mr. Furkan expressed his experience of using WhatsApp, a phone application, as a means of communication with the IEP team as follows

> You know, while I was sleeping at home at 10 pm, while I was playing with my family and my own child, a message comes. It says here is the guidance counselor: "Friends, let's gather tomorrow on this and that topic." I think it is useful both as a reminder and when it is used for its intended purpose. Because my world is not only here or that child with IEP. Sometimes after working hours, okay, we have 300 children in our heads, but when you are living your own life, after a certain time, there are subjects that you forget or skip. I think it is useful.

Ms. Züleyha expressed her experiences regarding the responsibilities of team members in the IEP preparation process with the following words

> As I said in IEP meetings, there is always the official side, the paper side, the paper side. You know, they talk and talk and talk and talk, and it comes to this: "Okay, which things are we going to fill in, which things are we going to write down? Where are we going to sign? What are we going to do?" It always comes down to the official signature part. What should we do for the child? Where should it be placed in the classroom? I mean, if there are 10 of us, two or three or five or numerically less. Not everyone can do it. They don't want to be so interested or they think, "There are 30 people in the class, I can't deal with him alone". You know, if you don't allocate 40 out of 40 minutes to him, it's not possible anyway. So the way things work for us is like this: the classroom teacher has the most work. If you have a student with IEP in your class, you prepare a thick file for him/her. You fill it in. After the class teacher fills it out, the other classmates prepare a two-page thing as a task. Of course, none of us know who is doing what during the lesson when we do this in the official dimension. We don't know what each other is doing.

The branch teachers in the IEP development team were asked whether they had been involved in a process similar to the IEP preparation process before, and if so, they were asked to compare it with the current IEP preparation process. Mr. Cem stated that he had no previous experience with these processes, "No, only on paper, of course, I don't count that." Ms. Esen stated that it was her first time in such a process with the following experience:

> I mean, the team was formed every year, but not like this. There had never been a meeting before, for example, I don't know, it was the first time.". Ms. Meliha expressed her similar experiences with Ms. Emel with the following words: "Of course, I was in the IEP team before, but we did not do anything as branch teachers in the team. This year was different. This year we had a meeting once. Then we wrote the IEP, but we did it in a logical way.

When the researcher asked a question about the type of communication in the IEP team, Ms. Züleyha made the following statements about the type of communication within the team

> For this year, we already know the characteristics of the child before we enter the class. Whether it is our guidance teacher or us, we ask in which area the child needs support. I mean, our communication is usually in the teachers' room, for chatting. So when we leave the class, if you left the class of the child with the IEP and something happened in that class, we talk about it. But if nothing happened in that lesson, it is never mentioned... Sometimes we talk to find a solution. If there is a problem with that child in that class, it is talked about during the break. If there is someone who was there, we can direct each other in that way, "Oh, look, I did this, it happened like this, it happened like that". So we don't have any extra communication.

In parallel with the experiences of the teachers regarding the communication in the IEP team, the following statement was included in the observation notes of the researcher:

> Mr. Turan, Ms. Özlem and Ms. Emel, who are mathematics teachers at the school, exchanged ideas about which objectives and how they worked on the mathematics course during breaks (Observation No: 1, 01.03.2018).

When Mrs. Emel was asked who she would like to be in the team, she first stated that psychiatrists should be included in the team and continued, "I would like to know who is in the team, there is our vice principal, and there are teachers who teach, there are no others. Other than that, if you say, "Who should be in the team? I think there should be doctors in the team, there should be psychiatrists.".

Ms. Sude expressed that she considered families as the constant stakeholders of the team with the following words, "Naturally, who else will there be? The vice-principal, there were other classroom teachers, there were other parents in our meetings, I think they were also included, of course, everyone's own child is involved, but everyone's own child is involved."

When the participants were asked about the legal responsibilities of the team, Ms. Emel expressed the legal obligations of the team and what they should actually be with the following words:

> What legal duties does the team have? I don't know exactly, but for one thing, these meetings are mandatory, we understood that, I think this is in the law, so they did it. Apart from that, these prepared plans are mandatory, but I wish that the Provincial National Education would also follow up on the education of the children, it shouldn't just be on paper.

When parents were asked about their previous IEP team experiences, they said that they were mostly involved to sign and fulfill procedures.

When asked about communication in the IEP development team, parents stated that there was a positive communication climate. Ms. Sıla expressed that communication in the team was positive with the following words:

> We already talk at meetings, I mean, apart from that, the vice principal and teachers have numbers. When we ask for an appointment, they immediately say "OK". Also, when we come to school when we want, I don't know, we talk at parent-teacher conferences, during breaks, and so on. When we ask questions, they answer. We don't bother them as much as we can anyway.

Mr. Nuri emphasized especially the communication of the vice principal and said the following

> Our teacher Mehmet was always interested, he gave me his number and said, "Look, you may have questions, we are all human beings. Always call, ask questions, let's meet at the school during working hours". This is important for me because it means that the vice principal and teachers care about me. They care about my child. This of course makes us happy. We say, let's do whatever we can together.

In addition to what the families said about the school administrator, the researcher included the following statements in her diary in line with the researcher's observations:

> In the light of my observations and interviews with stakeholders, the role of the vice principal among the stakeholders in the IEP team is both facilitative and supportive. However, it seems that the positive support of the vice-principal has yielded the most results on the families and that there is a concrete effect. I think one reason for this is that the current process requires special education knowledge, and the vice principal is a special education teacher. This situation made me wonder if similar positive situations would arise in other schools if special education teachers were the leaders in the process (Researcher diary, 16.03.2018, p. 41).

Student With Special Needs

Mr. Cem expressed the process of obtaining information about the student with special needs as follows, "Regarding these children, we actually learned something called a rough assessment form this year, and we applied it. That's how we got information about the child, or I don't know, we got information from the family. Apart from that, let me say that we did not receive any information from special education teachers or guidance counselors".

Mr. Ferhat stated that he obtained information about the students from the rough evaluation forms and by communicating and exchanging information with other teachers who were previously involved in the student's lessons.

When the teachers were asked about whether the student with special needs should be included in the IEP preparation process, Mr. Cem stated that it would definitely not be appropriate for the student with special needs to participate in the process as follows, "I don't think so, I mean, what will happen if the child participates, what will he add anyway, I think it will be worse, so it is unnecessary.".

Ms. Seray stated that students with special needs can participate in the IEP preparation process, but firstly, some prerequisites are required as follows

> Piece by piece. Now, in this case, the student can participate in the IEP meeting, but I think he should be aware of himself, just like the family, he should know himself, for example, this can benefit me a lot. For example, if the student tells me, "I understand better when you teach in this way", e... this is a plus for me. I can apply this to involve the student more in the lesson or to increase my ability to learn more, but I think it is not necessary for him/her to hear everything you say about him/her from the beginning to the end of the meeting. I think you can get his/her opinion at a certain point and then inform him/her about the prepared objectives.

Discussion and Conclusion

The aim of this study was to reveal the experiences of all stakeholders in the IEP development team in a middle school during the IEP preparation process. According to the findings obtained at the end of the research, it was revealed that families of individuals with special needs should take an active role in the IEP development process. However, some prerequisites are mentioned for families to participate in the process. The most important of these is to increase the level of knowledge and awareness of the parents about the process. It can be stated that parent trainings are extremely important for increasing parent awareness. In the light of the findings obtained from the families participating in the study, it can be stated that if school administrators and other team stakeholders encourage families by providing parent support, their participation in the process will be easier. In the study, it is thought that the fact that the school administrator was a special education teacher helped families to be included in the IEP preparation process more easily. School administrators and teachers in the IEP development team communicate with families mostly for information exchange. When the results of the research were analyzed, it was seen that not only families but also teachers experienced difficulties in the process. It is seen that teachers' difficulties are based on inadequate knowledge and inexperience in the IEP development process. The fact that teachers and families have insufficient knowledge in terms of laws causes them to experience confusion about their duties and responsibilities in the special education and IEP preparation process.

It is seen that three different views were expressed by the participants regarding the inclusion of the parents and the student with special needs in the process. Although it is known that families are an integral part of the process in the legal sense, some of the teachers expressed the view that the parents and the student with special needs should not be included in the process. Some of the teachers, on the other hand, stated that they should be included in the process when preconditions such as parent education or the low level of the student with special needs being affected by the disability are met. Some of the teachers, families and the school administrator stated that the parents should be unconditionally involved in the process. The participants who advocated for the unconditional inclusion of the parents in the process stated that they have more information about their children than teachers and that the information obtained from them is vital for the healthy progress of the process and to ensure cooperation. Participants also emphasized the importance of equal participation of mothers and fathers in parent involvement. Participants also argued that the low socioeconomic status of parents should not be an obstacle to their participation. The school administrator stated that failure to ensure parent participation would have negative effects on team success and the educational life of the child with special needs in the long term. In addition, the importance of parent participation in terms of the ownership of the process by other stakeholders in the team was also emphasized by the school administrator. When the literature is examined, it is stated that parent participation in the entire IEP development process is extremely necessary for a quality process, but families do not see themselves as equal stakeholders in the process. It has been stated that the reason for this is that families see themselves as insignificant in their children's education (Fish, 2006; O'Connor, 2008; Mereoui et al., 2016). In parallel with the positive experiences of the parents participating in the study, a similar study stated that families of individuals with special needs may have more positive experiences in the process when they are seen as decision-making mechanisms in IEP meetings, when they feel that they are valued and respected (Fish, 2008). It is in line with the findings of this study that in order for families to be involved in the collaboration in the IEP preparation process, they should be treated tolerant by the experts, be understanding and open to communication (Gilliam & Coleman, 1982; Macleod et al., 2017). However, in some studies on the IEP development process, there are also studies in which the cooperation between teachers and families is insufficient and negative. In these studies, the most important obstacle to collaboration is that the parents are not seen as equal partner in the team (Avcıoğlu, 2011; Fish, 2006; Zeitlin & Curcic, 2014).

According to the findings obtained from the teachers in the study, it was seen that they benefited from the documents shared on the internet, the vice principal of the school because they were special education teachers, and the resources published by the Ministry of National Education during the IEP preparation process, but they did not consult academic resources published on this subject. When the literature is examined, similar to the experiences of some teachers, it is seen that special education teachers, other teachers and resources on the internet are consulted while preparing IEPs. However, differently, it is seen that lecturers and academic books can also be utilized (Öztürk & Eratay, 2010). In addition, when the literature was examined, it was stated in one study that teachers found the MoNE resources insufficient in the IEP development process (Eratay et al., 2012). Although MoNE resources were found to be insufficient in

previous studies, it is possible to find new resources in the form of a road map for all teachers in the IEP preparation process in the guide published by the ministry in 2022. in this context, the continuous updating of the ministry has an important role in terms of being a resource for teachers. It is thought that the reasons why the teachers included in the study mostly utilize internet resources in the IEP preparation process are the inadequacy of the MoNE resources and the teachers' not knowing where they should apply in this regard. In addition, the fact that teachers had not received pre-service or in-service training before was also stated by the participants as a reason for the difficulties they experienced in the process. Participants also stated that their level of knowledge about the legal obligations related to the IEP development process was low. Although there are a limited number of studies on this issue in the literature, an international study shows that team members' knowledge of the laws positively affects their participation in the IEP development process (Fish, 2008). Another reason for the participants' lack of knowledge in the process may be the lack of any training on this subject in their pre-service education. The participants stated that staff trainings on the IEP development process are needed as a solution to overcome the problems and deficiencies experienced. When the literature is examined, it is stated that staff trainings are necessary for the IEP development process in parallel with the opinions of the participants (Ayanoğlu & Gür Erdoğan, 2019; Avcıoğlu, 2012; Burunsuz & İnce, 2020 Çuhadar, 2006; Yaman, 2017; Yılmaz & Batu, 2016). However, taking teacher needs into consideration while organizing these trainings will positively affect the quality of the trainings. Considering that branch teachers are inadequate not only in preparing IEPs but also in dealing with problem behaviors, organizing the education to be given, and preparing materials suitable for students during the implementation phase (Çetin, 2004), it can be thought that it would be more beneficial to provide staff training through applied trainings in cooperation with universities instead of just providing information. When the findings obtained from the teachers are examined, it is seen that there is a more positive communication environment among the branch teachers, but there is a more limited communication and cooperation process with the special education teacher and the school guidance service. The reason for this is that the guidance counselor is less willing to be involved in the processes of establishing cooperation. The special education teacher's limited ability to interact with other teachers due to her inability to leave her classroom negatively affected the collaboration process. On the other hand, it was observed that there was a positive cooperation and process between the teachers and the school administration. This is thought to be related to the school administrator being a special education teacher and being open to communication. When the literature is examined, it is seen that to talk about cooperation between stakeholders in the IEP development process, positive relationships and communication should be developed in the IEP development unit (Bambara & Kern, 2005). According to the findings of the study, it is seen that the reason why teachers communicate is to get information from other stakeholders when they do not know what to do. Both parents and other stakeholders expressed that the communication and cooperation between them was very positive. Families stated that they were encouraged to participate in the process when they were communicated with positively and that they felt both themselves and their children more valuable. The literature is similar to the findings obtained in this regard, and it is seen that if positive

communication is established with families, parents participation is ensured positively in all IEP development processes (Macleod et al., 2017).

It is thought that one of the reasons for the lack of cooperation within the team is related to the roles and responsibilities in the team. The school administrator was more active in determining the roles within the team. The reason for this is that he is more knowledgeable than other stakeholders in the process because he is a special education teacher. This research finding is similar to the findings obtained in the literature. When the literature is examined, it is seen that the person who plays a more active role in the IEP development process is the special education teacher (Gilliam, & Coleman, 1981). When the roles of other stakeholders in the team are examined, it is seen that families are more concerned with the work at home, branch teachers prepare IEPs, special education teachers transfer their knowledge and skills to other stakeholders, and guidance counselors share the information obtained by observing the student with teachers.

It is seen that there are differences of opinion between teachers and families regarding the participation of students with special needs in the IEP development process. Some of the teachers and families thought that it was unnecessary to include the student in the process without giving any reason, and some of them stated that the inclusion of the student in the process would cause confusion when the parents had not yet fully participated in the process. Some of the teachers argued that the inclusion of the student in the process could cause psychologically negative effects. Unlike other teachers, the counselor stated that students with special needs could be included in certain parts of the process. One of the teachers who argued that students could participate stated that preparation was required before students could participate. When the Special Education Services Regulation published by the Ministry of National Education is examined, it is seen that students are natural members of the IEP team. The regulation also emphasizes the student's right to express his/her opinion on the decisions taken about him/her (MoNE, 2012). In addition, in the literature, it is seen that in studies where students with special needs are included in the IEP development process, the process is carried out more functionally and more positive results are obtained for students with special needs (Allen et al., 2001; Arndt et al., 2006; Martin et al. 1996; Martin et al. 2006; Mason et al. 2002; Royer, 2017). Considering the results obtained from this study and the findings of the studies in the literature, it is thought that students with special needs should also participate in the IEP development process.

Implications

Based on the findings obtained from the participants in this study, several implications can be made for further research and practices regarding the IEP development process. It can be ensured that IEP development units in schools at all levels are continuously audited by MoNE and staff trainings can be organized to eliminate deficiencies at the end of these audits. In addition, trainings can be organized to involve families, who are natural members of the IEP development unit, in the process. In schools affiliated to the Ministry of National Education where mainstreaming practices are carried out, a supervision unit consisting of relevant experts can be established in order to make the IEP development process more efficient. In order to ensure that the IEP development unit works more functionally, studies can be

conducted in the field through action research, one of the applied qualitative approaches. Research can be conducted at all levels in which students with special needs are included in the IEP development process. Another suggestion is that IEP courses should be taught as a course in pre-service processes to cover all teacher education system.

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Statement of Responsibility

In the introduction and literature review part of the research, the first researcher contributed 50% and the second researcher contributed 50%. The first researcher contributed 60% and the second researcher contributed 40% in the creation of data collection tools. The first researcher contributed to 100% of the data collection processes. The first researcher contributed 50% and the second researcher contributed 50% in analyzing the data. The first researcher contributed 50% and the second researcher contributed 50% in the reporting of the findings, conclusion, discussion and recommendations.

Conflicts of Interest

We declare that there is no conflict situation in any of the stages, especially in writing the research, identifying the participants, applying the research, collecting, analyzing and interpreting the data.

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Evaluating Crisis Management Performance of Turkish School Administrations: Covid-19 Pandemic

Türk Okul Yönetimlerinin Kriz Yönetme Performansının Değerlendirilmesi: Covid-19 Pandemisi

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ABSTRACT: In this study, the crisis management performance of the Turkish Education System and School Administration in the case of the Covid-19 Pandemic was evaluated by considering the importance of post-crisis evaluation and research gap. For this purpose, qualitative (N=17) and quantitative (N=444) data of the experiences and opinions of school administrators working in formal compulsory schools selected by purposeful, random and available sampling techniques from different provinces representing first-level statistical regions were evaluated. Crisis management performance evaluation criteria, which were created by a literature review, were utilized in the evaluation. Semi-structured interviews and questionnaires were used to collect data. We implemented both content analysis and descriptive statistics in line with the mixed method exploratory sequential research design. We first carried out the content analysis then, we investigated the prevalence of the matter by surveying. At the last phase of the analysis, we synthesized the qualitative and quantitative results. At the end of the study, it was observed that the crisis management practices of the Turkish Education System were not based on a long-term foresight, no preliminary preparation was made, and the problems in performing the basic functions during the crisis could not be completely resolved. For this reason, it has been concluded that the performance of the Turkish Education System and school administrations in managing the crisis is low.

Keywords: School administration, crisis management, exploratory sequential mixed method.

ÖZ: Kriz sonrası değerlendirmenin önemi ve araştırma boşluğu dikkate alınarak bu çalışmada Covid-19 Salgını örneğinde Türk Eğitim Sistemi ve okul yönetiminin kriz yönetim performansının değerlendirilmesi amaçlanmıştır. Bu amaç doğrultusunda istatistiki bölge birimleri birinci düzey sınıflamasına göre farklı illerden çoklu örneklemeyle ulaşılan zorunlu örgün öğretim okullarında görev yapan okul yöneticilerinin deneyimleri ve görüşlerinden karma yöntemle elde edilen nitel (N=17) ve nicel (N=444) veriler değerlendirilmiştir. Değerlendirmede, alanyazın derlemesiyle oluşturulan kriz yönetimi performansı değerlendirme ölçütlerinden yararlanılmıştır. Verilerin toplanmasında yapılandırılmış görüşme ve anket kullanılmıştır. Karma yöntemin keşfedici sıralı deseni doğrultusunda hem içerik analizi yapılmış hem de betimsel istatistikler hesaplanmıştır. Önce içerik analizi gerçekleştirilmiş, ardından nitel bulgulara dayalı olarak durumun yaygınlığını gösteren tanımlayıcı istatistikler hesaplanmıştır. Analizin son aşamasında nitel ve nicel sonuçlar sentezlenmiştir. Çalışmada, Türk Eğitim Sisteminin kriz yönetme uygulamalarının uzun erimli bir öngörüye dayanmadığı, ön hazırlık yapılmadığı, kriz esnasında temel işlevlerin gerçekleştirilmesindeki sorunların tam çözülemediği gözlemlenmiştir. Bu nedenle Türk Eğitim Sistemi ve okul idarelerinin krizi yönetme performansının iyileştirilmesi gerektiği sonucuna ulaşılmıştır.

Anahtar kelimeler: Okul yönetimi, kriz yönetimi, keşfedici sıralı karma yöntem.

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Crisis management performance of education systems has been tested with the Covid-19 Pandemic. In this process, school administrators gained significant experience as actors in the field of crisis management. Under the effect of the central organization's directions and interventions, each school had to initiate to educate students and to prevent them from poor learning in line with the basic functions of the education system. This process forced the school administrators to perform leadership. In order to get valid and reliable information about crisis management performance and to take lessons for improvement, the experiences of school administrators should be examined. Taking into account the reflection in the field and the research gap, this study aimed at evaluating the experiences of school administrators in the C19 case in terms of crisis management criteria.

Crisis Management

The crisis is defined as unplanned and unexpected changes that cause disruptions in basic functions. The crisis can occur on a personal, organizational, regional, national or international level. It can transform individuals, institutions, and systems into inability to perform their basic functions for various reasons such as natural disasters, epidemics, wars or fires. In the event of a crisis, it has to be managed effectively to overcome its negative effects (Drucker, 2008; Kıral, 2019; Schermerhorn, 2012).

Crisis management aims to make the crisis-stride organism or organization able to perform its basic functions again. There are three stages of good crisis management before, during and after the crisis. Before a crisis, small signals provide preliminary information about the crisis. Crisis management requires taking precautions by estimating the probabilities of crises before they occur. The most effective way to intervene in the crisis is to prepare before the crisis (Drucker, 2008; Özalp & Levent, 2021). In this context, education administrators have to keep communication channels open and activate the information management system in order to be informed about the events taking place within the education system and the events taking place outside the system. Identifying trends and designing future scenarios by monitoring events inside and outside the organization is a phase of crisis management. In the pre-crisis period, behavioural models should be developed, introduced and practiced according to possible scenarios. When small notifications about the crisis are ignored and no action is taken, the crisis is created. In other words, the crisis is the result of negligence. Drucker (2008) emphasizes that continuing with traditional management approaches and structures in a constantly changing environment will cause crisis. The decrease in the organization's ability to change and adapt is a signal of the crisis.

Crises involve situations of uncertainty that lead organizational structures (units) to act autonomously. For this reason, the ability of the units to act autonomously and lead when necessary in the organizational process constitutes a dimension of crisis management. One of the pre-crisis measures is the transformation of an organizational structure to deal with the crisis. In such a structuring, instead of a rigid, centralized, hierarchical and bureaucratic organization, it is suggested to create an organizational structure supporting multi-directional communication, flexibility, reliability, autonomy, accountability and leadership (Aksoy & Aksoy, 2003; Bıyıkoğlu, 2020; Kıral, 2019; Schermerhorn, 2012). Predefined roles, tasks, workflows can become meaningless during a crisis. On the other hand, in organizations where sharing and cooperation

between units are strong, multi-directional communication takes place, and participatory decisions are dominant, crisis can be managed effectively by recognizing the crisis, eliminating uncertainty and developing appropriate reactions (Kıral, 2019; Schermerhorn, 2012). In the educational crises, school stakeholders, especially school administrators and teachers, should be able to make decisions that will serve to fulfil the basic functions of the education system in their sphere of influence and to reduce uncertainty, they should be able to communicate and lead. This will help the education system overcome the crisis (Yılmaz & Yıldırım, 2019). The pressure to make quick decisions in uncertainty can lead to confusion, along with fear and anxiety. Failure to manage the crisis well can cause severe damage to the structure and basic functions of the system. To intervene quickly in this situation, it is necessary to collect information from very different perspectives, then to analyse them and to lead people. In this context, there are questions to be answered: (*a*) What problems are experienced? (*b*) Where is the source of the problems? (*c*) Who is responsible for solving problems? (*d*) How can problems be resolved? It is important to benefit from different perspectives when deciding on action. An effective communication infrastructure with all stakeholders should be operated for directing. It is critical that directions build trust. For this reason, it is essential to make functional directions that can respond to the need of the real situation (Kıral, 2019; Schermerhorn, 2012). The most basic job after the crisis is to make an evaluation. For a healthy evaluation, measurements, information collection and reporting about the crisis and its effects should be made in various dimensions. By considering eligible criteria, gains, weaknesses and opportunities should be identified, then actions should be designed to improve the weaknesses and strengthen opportunities based on acquisitions without delay (Kıral, 2019; Yılmaz & Yıldırım, 2020).

The criteria pointed out by the literature in evaluating the performance of the education system that has experienced a crisis can be listed as follows: (*a*) Were possible crisis scenarios generated before the crisis? (*b*) Have there been drills on the scenarios designed? (*c*) Has organizational structure (multifaceted communication, participatory decision, autonomy, accountability, leadership) been carried out to deal with the possible crisis? (*d*) Have the basic functions been carried out by solving the problems encountered during the crisis? (*e*) Have uncertainties been resolved during the crisis? (*f*) Could communication be provided in a multi-dimensional way during the crisis? (*g*) Have reliable data-driven directions been made during the crisis? (*h*) Was it allowed sub-units to lead in their own domains during a crisis? (Aksoy & Aksoy, 2003; Baysal & Ocak, 2020; Bıyıkoğlu, 2020; Kıral, 2019; Sarı & Sarı, 2020; Yılmaz & Yıldırım, 2020).

Education System and School Administration

The education system and schools are in incessant interaction with their environment. Therefore, the crisis affects the education system even if its source is outside (Kıral, 2019). Schools should always be ready for unexpected and suddenly developed situations and should be able to continue their teaching-learning activities (Baysal & Ocak, 2020). The crises experienced in different geographies related to education systems and schools serve as signals. For example, schools were closed for eight months due to the Ebola epidemic that spread in Sierra Leone in 2014-15. The

government started a five-day-a week emergency training program. The 30-minute lessons on the radio were not very effective, but such programs prevented children from completely distracting themselves from the learning activity (World Bank, 2018). The Covid-19 Pandemic (C19) has also created a crisis for the Turkish Education System and School Administration (TESSA), (Sarı & Sarı, 2020). The performance of TESSA, which has deep-rooted problems in face-to-face education, in managing the crisis with C19 is worth reviewing. TESSA, which is dominated by a centralized management structure, has problems in terms of both structural and effective use of human resources. Ministry of National Education (MoNE) is the most powerful actor in forming the education services (Turkish Education Association Think Tank [TEDMEM], 2020). In a study examining problems in TESSA based on the opinions of participants from different sectors, frequent political interventions, family apathy, administrative problems, and less qualified teachers were listed (Kara, 2020). The main administrative problems are the selection and training of school administrators and the management of schools with a temporary administrative status (Cemaloğlu, 2005; Gök, 2019). School administrators experience a role ambiguity about their authority and responsibilities due to temporary assignment (Tabancalı & Su, 2021). This situation is considered as a condition that prevents them from leading (Yenipınar, Yıldırım & Tabak, 2020). Exam-oriented teaching disrupts the order of educating people in line with the upper aims (Kutlu Abu, Bacanak & Gökdere, 2016; Yeşil & Şahan, 2015; Yılmaz & Altınkurt, 2011). Significant differences in student learning between districts and schools have been an ongoing problem for years in terms of education quality and equal opportunity (TEDMEM, 2020). Furthermore, accountability and clear functioning have not been operated, yet (Savaş-Yalçın & Akan, 2018; Yıldırım & Yenipınar, 2019)

A significant financial investment has been made for the use of smart boards in classrooms and the presentation of enriched content through the Education Information Network (EIN), within the scope of the integration of technology into education and training processes. On the other hand, the goal of technology integration has weakened because of the inadequate internet infrastructure and the failure in distributing tablets to students (Bozkuş & Karacabey, 2019; TEDMEM, 2018).

Theoretical Aspect and Relevant Studies

There are many studies examining the effects of C19 in the field of education. The most frequently emphasized problems in studies examining the effects of the C19 crisis based on the views of teachers and school administrators are communication problems between school stakeholders, inadequacy of technological infrastructure, insensitivity of parents, inadequacy of technological tools and equipment of families, lack of knowledge and skills of teachers about online teaching, students not attending classes, incomplete curriculum, measurement-evaluation difficulty, and future uncertainty (Baysal & Ocak, 2020; Karakaya, Adıgüzel, Üçüncü, Çimen & Yılmaz, 2021; Keleş, Atay & Karanfil, 2020; Turan, 2020). On the basis of the findings, it was suggested that "all schools from rural areas to the city centre should be digital schools and gain digital literacy skills". Especially when face-to-face education is interrupted due to war or epidemic, technology integration in teaching practices has played a key role (World Bank, 2018). The way of teaching that starts with a bell and is run by teachers has changed in the C19 process (Spencer, 2020). In the C19 process in Turkey,

schools started by using online teaching and tried to maintain educational functions. System-wide efforts were performed such as informing and guiding about C19 via EIN TV, starting live lessons via EIN, providing 8 GB internet access support for accessing lessons over EIN by GSM operators (Sarı & Sarı, 2020).

Examining the problems experienced by teachers during the online teaching process, Çakın and Külekçi Akyavuz (2020) found that there were problems with communication with students, problems with parents and student learning. Among the problems experienced in the online teaching process, the lack of constructive support and attention, especially in the home environment, was emphasized. Students, on the other hand, stated the problems of boredom, unwillingness, ineffectiveness of teaching and inadequacy of technological opportunities in this process (Karakaya et al., 2021). In addition, problems such as adaptation difficulties to the social environment, technology addiction, deterioration of school culture are also listed. In order to solve the problems experienced, the methods of giving warnings for the future, making the lessons fun and giving feedback on the assignments were frequently mentioned. In the C19 process, school administrators made attempts to provide students with technological tools and materials, to provide printed materials to those who do not have internet access, to inform them about EIN, to enable students to participate in online teaching, and to develop teachers' technological skills in order to fulfil the basic functions of the school (Keleş, Atay & Karanfil, 2020; Turan, 2020).

On the other hand, poor learning could not be prevented due to the long-term closure of schools and technical problems encountered in online teaching (Baysal & Ocak, 2020; TEDMEM, 2021). Poor learning stand out as a worldwide problem. There is a significant difference between students supported by their families and disadvantaged students who lack such care (Reimers, Schleicher, Saavedra & Tuominen, 2021). The TEDMEM (2021) report also draws attention to the poor learning of disadvantaged students in Turkey. It was emphasized that approximately five million students could not actively benefit from EIN in this process, and that there were inequalities arising from differences in accessing to the internet and digital devices (AID). In addition to student learning, C19 has also led to uncertainties in terms of exams, curricula, payment of teachers' salaries and wages, make-up training, and working style of administrators (Sarı & Sarı, 2020). On the other hand, Bailey (2020) underlines that despite the measures taken against C19, many countries may face school closures again in the coming months or in the following years. Similar processes have been experienced after the 6 February 2023 Kahramanmaraş earthquakes (Yamamoto & Altun, 2023). Based on the report (The United Nations International Children's Emergency Fund [UNICEF], 2020) that inequalities in education increased in the C19 process, The Organization for Economic Cooperation and Development (OECD, 2020) indicated that after the epidemic, make-up education should be organized at the same time as the transition of schools to face-to-face education. As a prerequisite for this, he recommends designing measurement applications where learning losses can be determined.

The literature review points to studies examining the reflections of the C19 event in different dimensions of the field of education. In related studies, perceptions of school administrators regarding crisis management skills were examined (Bıyıkoğlu, 2020; Karakuş & İnandı, 2018; Maya, 2014; Özalp & Levent, 2021; Özsezer, 2014;

Ulusoy, 2020). In these quantitative studies, the crisis management skills of school administrators are perceived at a moderate level by the teachers, but the administrators perceive their own skills at a high level. Studies have found significant positive relationships between school administrators' crisis management skills and leadership skills (Erdinç, 2018; Keleş et al., 2020; Ulusoy, 2020).

The literature review showed a research gap. Therefore, this study aimed at examining and evaluating the crisis management performance of TESSA in the case of C19. The importance of studying such an issue can be recognized if we consider that approximately one-fourth of Turkey's population is directly related to school education and that decisions and practices related to education affect the whole country. Evaluation of this crisis in different dimensions is a need and problem area in order to prevent possible future crises. School administrators who have experienced this crisis directly are the witnesses and actors of the administrative practices that took place before and during the crisis. Evaluation based on their experiences can contribute to the knowledge of crisis management, which is a field of education management. As a stage of crisis management, post-crisis assessment can enable the recognition and exploration of opportunities that can serve to improve the organization.

Aim

The main purpose of this study, in terms of crisis management, is to discover, describe and examine what problems school administrators have experienced and how these problems are solved during the change process in teaching practices due to the C19 in compulsory formal education. Along with this aim, we identified the following sub-objectives:

a) To find out the problems,

b) To identify the sources of the problems,

c) To explore the responsible bodies for solving the problems,

d) To examine the resolution of the problems,

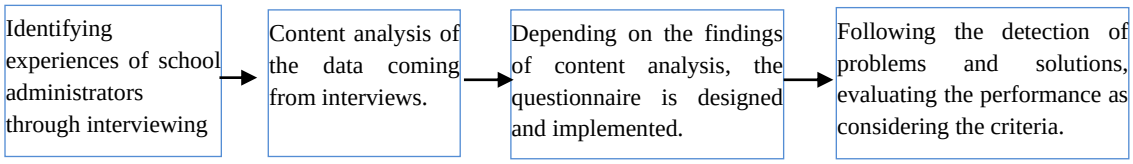
e) To evaluate the situation of handling and solving the problems by crisis management criteria.

Method

This study is a descriptive study conducted in a mixed-method exploratory sequential research design. It was performed in line with the pragmatic paradigm principles. In this context, the researcher, focusing on answering the research question or problem, investigates the problem from multiple views by employing both inductive and deductive reasoning (Mertens, 2023). The research model is depicted in Figure 1. We first found out school administrators' experiences relevant to crisis management during the C19 process by using the qualitative method. Thus, we explored the factual variables. Then, we surveyed to identify the extent to which the matter is widespread. In the last phase, by synthesizing the qualitative and quantitative findings we evaluated TESSA's crisis management performance based on the criteria (Creswell & Plano Clark, 2018; Fraenkel, Wallen & Hyun, 2012).

Figure 1

Research Model



The population consists of school principals working in compulsory formal education schools in Turkey's 2020-2021 school year. Two separate study groups were drawn from the population through a multiple sampling method in considering affordability and accessibility. Teddlie and Tashakkori (2009, p. 166) emphasized that using multiple sampling techniques in mixed methods designs is indispensable. The first study group was obtained by implementing two stages. At first, participants were accessed through snowball and convenience sampling. Then, we drew a study group from them by criterion-based purposeful sampling so they represent gender, position, experience, school size, school location (region, province and settlement). Demographic information of 17 school administrators who were in the first study group and interviewed are shown in Table 1.

Table 1

D*emographic Information about Interviewee School Administrators*

Code	Total Experience	Position	Experience in current school	Education Level	School settlement	Province	School size*
Mr. Ali	14	Principal	3	Undergraduate	Town	Sakarya	40
Mr. Ahmet	5	Vice principal	5	Undergraduate	City	Aksaray	24
Mrs. Ayşe	1	Vice principal	1	Master	Town	Muş	18
Mr. Orhan	5	Vice principal	2	Undergraduate	City	Niğde	33
Mrs. Fatma	1	Principal	1	Undergraduate	Village	Gaziantep	3
Mr. Hamit	17	Principal	3	Master	City	Aksaray	41
Mr. Mehmet	5	Vice principal	2	Undergraduate	Town	İstanbul	70
Mr. Metin	9	Vice principal	2	Undergraduate	City	Şanlıurfa	33
Mrs. Nihal	6	Principal	3	Master	Town	Muğla	25
Mrs. Sevgi	4	Principal	4	Undergraduate	Town	Aksaray	20
Mr. Hakan	4	Vice principal	4	Undergraduate	Town	Hatay	80
Mr. Selim	25	Principal	6	Undergraduate	Town	Kayseri	35
Mrs. Filiz	1	Vice principal	3	Undergraduate	Village	Şırnak	6
Mr. Burhan	5	Principal	2	Master	Town	Ankara	20
Mr. Emin	7	Vice principal	4	Undergraduate	City	İzmir	53
Mr. Erol	2	Vice principal	2	Undergraduate	Town	Antalya	30
Mr. Vedat	5	Vice principal	5	Master	City	Aksaray	32

*: *School size shows the total number of teachers working in the school*

At the second phase of the study, participants were accessed through multistage cluster random sampling. We first randomly selected two provinces from each region classified by The Statistical Units of Regions (12 regions at the first level). Then, two towns were randomly chosen from selected province. Additionally, three villages/settlements were randomly selected from town, too. Finally, three schools representing each educational level were randomly selected in the list of schools in the settlement. Hence, we aimed to reach 66 schools in a region (30 primary, 18 lower secondary and 18 secondary). Totally 759 schools were in the sample. We utilized the service of correspondence information about schools by web site of Ministry of National Education (MoNE) to contact the school administrators (https://mebbis.meb.gov.tr/KurumListesi.aspx). We sent an email informing about the study and a link to the questionnaire designed as Google Form. Table 2 shows the number of participant school administrators in the study by provinces and regions. Mediterranean region had the highest participation rate (12.4%) and Middle East Anatolian region had the lowest (2.9%).

Table 2

Provinces and Regions of Participants in the Quantitative Phase

Code	Region	Provinces	*f*	%
TR1	İstanbul	İstanbul	40	9.0
TR2	West Marmara	Balıkesir. Tekirdağ	31	7.0
TR3	Egea	Denizli. Afyonkarahisar	27	6.1
TR4	East Marmara	Bolu. Eskişehir	43	9.7
TR5	West Anatolia	Ankara. Konya	47	10.6
TR6	Mediterranean	Antalya. Mersin	55	12.4
TR7	Middle Anatolia	Aksaray. Sivas	49	11.0
TR8	West Black Sea	Karabük. Tokat	26	5.9
TR9	East Black Sea	Ordu	22	5.0
TRA	North East Anatolia	Ağrı. Erzurum	43	9.7
TRB	Middle East Anatolia	Elazığ. Van	13	2.9
TRC	South East Anatolia	Adıyaman. Şanlıurfa	48	10.8
Total			444	100.0

Table 3 shows the demographic characteristics of participant school administrators in the quantitative phase of the study. In the TALIS 2018 study, a questionnaire was applied to 815 school principals representing a total of 56180 schools (public and private) in compulsory formal education (TEDMEM, 2019). 444 school administrators participated in this study. Female school administrators were represented with the very small proportion (1/5). This low rate of female administrators in school administration has been subjected in the prior studies. OECD Teaching and Learning International Survey (TALIS) 2018 study, for instance, gives the rate of female school principals in Turkey as 7.2% (TEDMEM, 2019). In this study, principals and vice-principals were represented as nearly the same proportionate (49.8-50.2). Based on the

seniority in school administration, 35% of the participants were in the first four years of experience. 65% of them had at least five-year administrative experience. Nearly one third of participants had been working for five years at the same school. OECD TALIS 2018 informs that total administrative experience and experience at the same schools were 6.7 and 3.2 years, respectively (TEDMEM, 2019).

Table 3

Demographic Characteristics of Participants

Characteristics	*f*/%	1	2	3	4	5	Total
Gender	*f*	74	370				444
1: *Female* 2: *Male*	%	*16.7*	*83.3*				100
Position	*f*	221	223				444
1: *Principal* 2: *Vice principal*	%	*49.8*	*50.2*				100
Total administrative experience (year)	*f*	155	141	63	41	44	444
1: *0-4* 2: *5-9* 3: *10-14* 4: *15-19* 5: *20^{+}*	%	*34.9*	*31.8*	*14.2*	*9.2*	9.9	100
Administrative experience at the same school (year)	*f*	304	116	24			444
1: *0-4* 2: *5-9* 3: *10^{+}*	%	*68.5*	*26.1*	*5.4*			100
School location	*f*	69	184	191			444
1: *Village* 2: *Town* 3: *City*	%	*15.5*	*41.4*	*43*			100
School size (number of teachers)	*f*	112	135	197			444
1: *Small (0-15)* 2: *Medium (16-30)* 3: *Big (31^{+})*	%	*25.2*	*30.4*	*44.4*			100
Education level	*f*	18	348	76	2		444
1:*Associate* 2:*Under graduate* 3:*Master* 4:*Doctorate*	%	*4.1*	*78.4*	*17.1*	*0.5*		100
Socio-economic status of the school	*f*	226	158	60			444
1:*Low* 2:*Medium* 3:*High*	%	*50,8*	*35.5*	*13,4*			100

Depending on the school location, 41.4% of school administrators work in towns and 43% of them work in cities. In this study, school size was measured by the number of teachers in the school. ¼'th of school administrators work in the schools having 15 or fewer teachers. 44.4% of them work in big schools that have at least 31 or more teachers. Socio-economic status (SES) of school was measured by the statement of parents working in a regular job and house income based on the perceptions of participants. Nearly half of school administrators work in schools with low SES parents. The rate of schools with high SES parents was 13.4%. SES proportions from low to high in the Trends in International Mathematics and Science Study (TIMSS) 2019 were 27-28-45, respectively (TEDMEM, 2021).

Collecting Data

Data were collected during November-December 2020, which is a duration after eight months passed over the first Covid-19 case had been seen in Turkey. This length of time can be regarded as adequate to get over the shock and adapt the education system to the new situation, detect the problems and apply the solutions. Data were collected sequentially through two different tools. At the first phase of data collection, we used a structured interview form. This form included information about the study, ethical rules, participant consent, demographic and open-ended questions. Open-ended questions: (*a*) what problems did you experience during the online teaching process because of C19? (*b*) What did you do to solve these problems? Participant school administrators answered the questions by writing, and they sent the response forms through emails.

We developed a three-dimensional measurement tool in the second stage of the study to find out the prevalence of the situation that we explored through the content analysis at the previous stage. The first dimension of the questionnaire had a brief information about the study, ethical rules and consent of the participant. The second dimension asked demographical questions. The last section was designed as the checklist including items to find out how problems are prevalent, who are the responsible to solve these problems and what they do to solve these problems. The instrument was transformed into the "Google Forms" and its link was sent to the participants by email. Two reminder emails were sent by two weeks interval. Two weeks after the last reminder, the feedbacks were combined and the analysis phase was started.

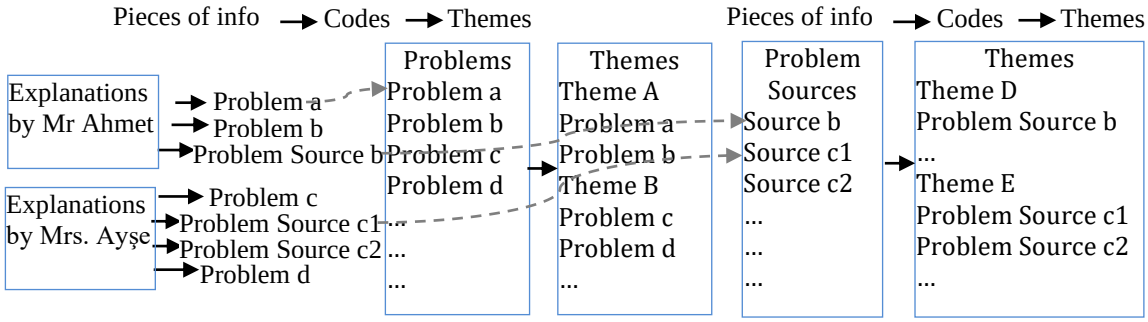
Analysing Data

In data analysis, we used the interlinked analysis strategy proposed by Teddlie and Tashakkori (2009, p. 238). This strategy is based on identifying critical variables through qualitative analysis that shapes the quantitative stage in the exploratory sequential design. Therefore, content analysis is used for qualitative data.

At the beginning of the qualitative data analysis, the response forms were coded (such as Mr. Ahmet, Mrs. Fatma), and the written expressions were transferred to the Microsoft Excel Worksheet. Codes were generated from pieces of information, and themes were created by classifying the codes. Four themes were identified: (a) The problem, (b) The source of the problem, (c) The parties to the problem, and (d) The state of the problem being resolved. Each theme also includes sub-themes. In this context, the procedures shown in Figure 2 were carried out. Frequency is used for repeating pieces of information and codes. For example, 57 problem statements were represented by 39 different problems.

Figure 2

Operations of the Content Analysis



To overcome the problem of bias, the contents generated by the researchers in the content analysis were examined by independent experts. Two independent experts, who had doctorate degree on educational sciences, rated the suitability of coding (1: Suitable, 2: Not suitable 3: Suggestion). Then, the interrater agreement was checked. To compute the consistency between experts, interrater agreement which is recommended by Creswell and Plano Clark (2018) was used. Along with this, we implemented the formula of reliability=the number of agreed items/total number of items. It was computed as r=0.846 (33/39) that refers to high level agreement. Independent experts also made suggestions for generating common items gathering similar contents of the items. For instance, the following items of "Collapsing of EIN system when intensive usage", "Inadequacy of Internet infrastructure" and "Weak functionality of applications in EIN" tapped under the item of "Inadequacy of technological infrastructure". Independent expert opinion was also obtained for other themes generated by the researchers. For instance, the same application was performed for the solution theme. Totally 34 solution items were reorganized under 25 items based on the independent experts' suggestions. Interrater agreement was computed for the suitability of coding of solutions, too. Independent experts agreed on 22 codes-contents suitability (r=0.880 (22/25).

In analysing quantitative data of the study, we carried out descriptive statistics (*%*, *f*, $\bar{x}$ and *S*). Before starting analysis, we checked the questionnaire forms whether they are within the norms. We eliminated three forms because they had nearly half of the items are blank and the same choice is applied for all items. Data that had been recorded into Microsoft Excel Working page by downloading from Google Forms were transferred into IBM SPSS 22 statistical package programme. After the data were screened through missing, duplications and outliers, totally 444 participants' data were analysed.

Integrating Qualitative and Quantitative Results

Various techniques are used to combine qualitative and quantitative findings in mixed-methods research. Creswell and Plano Clark (2018) describe transforming, articulating, blending, weaving, combining, and synthesizing as integration techniques. The researchers who conduct the exploratory sequential design use mostly articulation and rarely weaving and synthesizing. In this study, articulation and synthesis techniques were used. In the synthesis technique, qualitative and quantitative findings are assessed together, and meta-inferences are concluded to answer the research questions.

Validity and Reliability

Explaining the processes followed in data collection and analysis in detail, providing information about the study group, generating data collector based on the literature review, providing a detailed explanation about data gathering procedures, using multiple data sources, and using independent experts are practices that support validity and reliability. In addition, using criteria to assess crisis management performance, fulfilling this research by two researchers with educational experiences related to school management supports the validity (Creswell & Plano Clark, 2018).

Ethical Procedures

The legal requirement of meeting ethical rules was confirmed by The Board of Ethical Rules in Human Researches of Aksaray University with decree of 2021/04-79 numbered decision on 26/04/2021.

Results

This section has mainly three parts. We first give qualitative findings, then quantitative findings. At the last part, we integrated both qualitative and quantitative findings.

Qualitative Results

Results inferred from the structured interview were classified as problems, reasons for problems, responsible people for solving the problems and the statement of resolving the problems. We used both codes (numerical and themes) and direct quotations to present the qualitative results. Quantities were emphasized in brackets.

Problems

Problems relevant to students and parents (1) were detected as unwillingness to take part in online teaching/learning activities (11), students' passive role in courses of online teaching (111) negative attitudes of parents (13) and communication difficulty with students and their parents (14). For instance, Mr. Ahmet explained his relevant experience as "We frequently experienced problems were that students do not take part in the online teaching because of economic reasons and parents' negligence in meeting their needs." He also said that "Students switch off the camera when the course starts and they deal with nonsense things." He added that "Such kind of things weaken the effectiveness of the lessons." Mrs. Filiz shared similar experiences that "Some of our students, though having adequate facilities, do not take part in lessons. I asked teachers to call students' parents for this problem, but this problem still goes on." The most frequently emphasized problems related to the technological facilities (2) are inadequacy of internet facility (21), the inadequacy of system-application infrastructure (221) and lack of AID (23). The direct quotation by Mrs. Fatma can make this problem clearer: "Because of being a village school, we lack internet and families have serious economic disadvantages. Besides the dis-connection via the internet, even the smartphone is not accessible, here." Mrs. Ayşe emphasized students' disadvantages in having the technological facilities by emphasizing the malfunction of internet infrastructure across the country. About this issue, Mr. Burhan shared his experiences as following:

> There are so many problems caused by internet service providers and online teaching practices. There are many students could not attend lessons because of internet problems, or software application problems…Unfortunately we come across lots of problems every day. There are frequent changes in our timetable and EIN (Education Information Network) courses. Because of very frequent changes in EIN, we have to reorganize our course programme quickly, so we are under stress.

Lack of knowledge and ability (31), discordance to online teaching (32) not teaching effectively (331) are stated within the scope of knowledge, skills and attitude (3). Mr. Vedat talked that "Because of teachers who are unaware of EIN and ZOOM, thus the process slowdowns. Then, we provided classrooms for these teachers and they taught face to face." Relevant experiences of Mrs. Nihal are as following:

> Beside the prevalent problems in internet infrastructure and accessing of students, there are more serious problems such as students have disorders of attention and adaptation. Their solutions are not easy. We try to overcome these problems. Within this process, many burden falls on teachers and only two days face to face teaching is not adequate…Pity, but we can do nothing.

Another dimension related to the knowledge, skills and attitudes of school staff is the restricted ability of interacting with students. Online teaching required new communication style different from the face-to-face education (332). In line with this situation, Ms Ayşe emphasized the following: "There were many problems, probably due to the fact that there was a new order for everyone. Teachers accustomed to classical education found it difficult to adapt". Mr. Selim explained this mismatch that: "We informed teachers on the social platforms, but there was no control and some of our teachers were unwilling. There was inexperience in terms of communicating with students, teaching on the internet, and using technological tools. Of course, this inexperience decreased over time. Our teachers started to learn and overcome such problems by trial and error."

Within the scope of the planning of teaching processes (4), problems in the weekly schedule/timetable (41) and problems in the online timetable (42) were frequently emphasized. For example, Mr. Metin said, "We have frequently reorganized the timetable in order to maximize participation in online lessons. Sometimes we noticed that the weekly timetable does not work and it is not efficient therefore we frequently changed to fix it. But I can say that it is on track now." Mrs. Sevgi exemplified the problems experienced in controlling whether timetable does work and online teaching is carried out (44):

> The school administration checks the teachers about fulfilling the online lessons. It can be seen on EIN at what time the teacher starts the online lessons, how many students participate and when they leave. Teachers who do not fulfil the online lessons are asked a justification and they are warned. The administration checks whether the online lessons are fulfilled and records every week.

There are also problems in paying the additional course fee depending on the timetable of online teaching. Mr. Hakan expresses this situation as follows:

> Some practices caused the disturbances. For instance, they obliged teachers to do compulsory online lessons although it is well known that many students could not attend online lessons. Everybody has no equal opportunities of accessing online courses. On the other hand, particularly subject teachers are victims of incessant redesigned timetables. Payment for additional courses on personal declaration instead of formal recording is another issue.

There have been violating attempts (5) such as disruption of online lessons by students who concealed their identities (51) and other people outside the classroom attended the online lessons (52). Regarding this situation, Mr. Vedat explained his experiences: "Because our student and parent profile is low, we experienced financial and moral problems. For instance, some students share IDs and passwords with others and misusing lessons in the Zoom application."

Administrative functioning and governance (6) are other problem most frequently emphasized by school administrators. In this context, sudden decision making (61) and lack of planning (62) are the prominent problems. For example, Mr. Emin described the events as follows:

> I learned most of the developments from television, just as all education stakeholders including parents and students. If we were informed about the things they planned 1-2 days in advance, we could prepare faster. The first problem we experienced was about accessing EIN. Nobody did know that downloading an application, getting a passcode and attending the online lessons. But after a short time they learnt each other and everybody rushed to take the passcode and tried to enter the system, as a result of which the system collapsed. After a few days, system was again fixed, but this time higher administrators decided to start face to face education. It meant that eight graders will come to school the whole week but they will also attend six hours of online lesson, furthermore other graders will be split half and while one group attend a face to face classroom two days of the week and they convene at online lessons on Wednesdays. Therefore, the timetable and assignment of teachers were reorganized frequently. About the additional payment for lesson there are still differences among schools, too.

The unmet expectations from high-ranking executives were among the problems relevant to governance. Mr. Hamit explained his experience that: "Although they demanded and recorded our views and suggestions, we felt trouble about their irrelevant practices. Their decisions on planning the educational infrastructure were problematic". Mr. Erol referred to the governance problems and uncertainty as to the reasons for his stress:

> Inadequate infrastructure, the problems of students in accessing online lessons, most importantly, what will happen and when it will happen have always been uncertain. In addition, there were no timely explanations, we always have to proceed with last-minute explanations, which negatively affects time planning and program designing in practice. The online teaching process and duration have been handled centrally, instead this process should be left to local decision-makers.

Origins of the problems

Based on the experiences of the participants, six themes related to the origins of the problems were inferred:

1. Students and their parents
2. Technological devices and applications
3. School staff
4. Planning teaching processes
5. Disruptive attempts
6. Managerial function and governance

Responsible bodies for solving the problems

Another dimension of the phenomenon is that who are the responsible for solving (7) problems experienced by school administrators. Based on the content

analysis, we detected these solvers as parents (71), school administrators (72), and higher managerial bodies (73). They also indicated the conjoint responsibilities. These parties are parents-school administrators (74), school administrators-higher managerial bodies (75). These parties are parents-school administrators (74), school administrators-higher managerial bodies (75). In addition, solving some problems requires coordination of all parties (76).

Resolution of the problems

Findings about the resolution of the problems and solution practices are summarized in Table 5. The table also includes the contents of the solution and their codes. The participants also declared the unresolved problems coded by 8. Within this theme, some participants' direct quotations are that "we can't do anything", "our technical knowledge is insufficient", and "anything couldn't be done due to legal regulations and instructions".

The code of 9 indicates the kind of solutions. Some prominent solutions are that providing information, arranging the timetable, establishing EIN support points, checking whether the lessons are held, warning for disrupters, distributing tablets, donations for people in need, and making use of the school's facilities.

Table 5

Content Analysis Findings about the Resolution of Problems

Code	Theme	Sub-code	Content
8	Unresolved	80	They reasoned for unresolved problems as those "We couldn't do anything, we were helpless, lack of technical facilities and knowledge, legal regulations and Ministry instructions (right to absenteeism etc.). In addition, the internet quota supplied by the service providers could not be utilized for online lessons on ZOOM etc."
9	Solution Practices	90	Establishing support points for EIN
		91	Communicating with parents and informing them.
		92	Making use of schools' facilities.
		93	Improving the infrastructure of EIN by MoNE
		94	Online teaching on alternative applications for instance ZOOM instead of EIN
		95	Providing statistics about the current situation to MoNE and high-rank administrators
		96	Using internet for EIN supplied by GSM service providers
		97	Students were supported with material, homework, videos and other compensations.
		98	Checking online lessons by attending like a student and warning for the violators
		99	Announcing to distribute tablets for students
		100	MoNE supplied tablets for some students.
		101	Providing tablets, computers, TV by donations
		102	Teachers and students were informed (MoNE, school counsellors and technical staff)
		103	Reorganizing timetable, limiting durations, changing time, assembling classes

104	Emphasizing the importance of participating online lessons and announcing to check it
105	Sharing homework, subject contents etc. by establishing social media network (whatsapp)
106	Leading students to EIN TV
107	Enriching the type of questions and assessment techniques
108	Self-adapting in time
109	Sharing the ID knowledges just before starting lessons, keeping class from outer violators
110	Demanding and taking help from expert technical persons

Quantitative Results

Problems

The first item of the measurement tool applied to school administrators was “Did you have any problems in performing the education-training service in the C19 process?” Nine out of 444 participants stated that "there was no problem", while 19 participants stated that they "partially" experienced a problem. 96.6% (f=416) of the school administrators reported that they had problems in performing the education service during the C19 process. This situation confirms the criterion of “problems in the execution of basic functions occur” of crisis management.

The frequency of the problems experienced in the delivery of education and training services is shown in Table 6. The most frequently reported problem is AID that “the students need to attend online classroom at home” (*f*=145, 33.7%). The second most frequently reported problem was “lack of technological infrastructure” 19.1% (f=82). In the third place, the problems of “teachers' adaptation and effective teaching” (*f*=48, 11.2%) were reported. On the other hand, 45 participants (10.5%) reported the problems experienced in “organizing the timetable and defining the lesson duration in online teaching”. 39 (9.1%) participants stated the problem of “students' reluctance and not participating in lessons”. The “decision-making, planning and communication problems” attributed to the senior management units, including the central organization of the Ministry, were emphasized by 32 (7.4%) participants. “The indifference of the parents, their negative attitudes and the inconvenience of the home environment” were stated by 22 (5.3%) participants. The problem of “violating teaching by hiding identity or entering the system instead of someone else” was mentioned by eight participants. Eight administrators stated the problems such as “checking the online courses, recording additional lessons, increasing the paperwork due to the information and statistics demanded by the high rank managers, finding the necessary financing to ensure the hygiene of the school”.

Table 6

Frequency of Problems Experienced during the C19 Pandemic

Problems	*f*	%
AID	145	33.7
Inadequacy of technological infrastructure	82	19.1
Teachers' adaptation problems and inefficient teaching practices	48	11.2
Frequently redesigning timetable of online lessons and time limitation	45	10.5
Students' unwillingness and skipping online lessons	39	9.1
Problems related to making decisions, planning, communication	32	7.4
Parents' negative attitudes, inconvenient home environment	22	5.3
Violating the online lessons	8	1.9
Problems of school maintenance and governance (check online lessons, hygiene, report)	8	1.9
Total	444	100.0

Responsible bodies to solve the problems

The answer to the question of who should solve the problems or whom the problem concerns are important in terms of crisis management. Thus, it is revealed which problems should be dealt with at which managerial level in terms of organizational structure. Table 7 produced by cross-table analysis shows which administrative unit should deal with which problems. Within the table the following abbreviations are used: F (Family), S (School), and H (High rank managers)

The most striking finding is that the school administration did not consider itself as the direct responsible body to solve any problem. This situation can be associated with the limitation of school administrators' leadership role. School administrators stated that the problem of AID should be solved in cooperation with family, school and higher managerial units. They expressed that the problem of insufficient technological infrastructure should be solved by the higher managerial units. They reported that the problems of teachers' adaptations, lack of knowledge-skills and pedagogical inadequacy in online teaching should be solved by the school and senior management units. Similarly, it is thought that the problems of designing timetable, limitation and duration relevant to the online lessons should be solved by the school and higher managerial units.

Table 7

Who Should Solve the Problems?

Problems		Responsible parties to solve the problems					Total
		F	H	F+H	S+H	F+S+H	
Students' unwillingness and skipping online lessons	*f*	0	0	35	0	1	36
	%	*0.0*	*0.0*	*8.2*	*0.0*	*0.2*	*8.5*
Problems related to parents and home environment	*f*	10	0	10	0	1	21
	%	*2.3*	*0.0*	*2.3*	*0.0*	*0.2*	*4.9*
Inadequacy of technological infrastructure	*f*	0	81	0	0	0	81
	%	*0.0*	*19.0*	*0.0*	*0.0*	*0.0*	*19.0*
AID	*f*	0	0	0	0	143	143
	%	*0.0*	*0.0*	*0.0*	*0.0*	*33.6*	*33.6*
Problems related to teachers' adaptation and teaching effectiveness	*f*	0	0	0	47	0	47
	%	*0.0*	*0.0*	*0.0*	*11.0*	*0.0*	*11.0*
Problems related to the timetable and limitations in designing online lessons	*f*	0	0	0	44	0	44
	%	*0.0*	*0.0*	*0.0*	*10.3*	*0.0*	*10.3*
Economic cost of keeping hygiene. supplying the mask etc.	*f*	0	0	0	8	0	8
	%	*0.0*	*0.0*	*0.0*	*1.9*	*0.0*	*1.9*
Violations targeting the online lessons	*f*	0	0	0	0	8	8
	%	*0.0*	*0.0*	*0.0*	*0.0*	*1.9*	*1.9*
Problems related to making decision. planning. communication	*f*	0	0	0	33	0	33
	%	*0.0*	*0.0*	*0.0*	*7.7*	*0.0*	*7.7*
Protecting the health of school staff and preventing the pandemic	*f*	0	0	0	3	0	3
	%	*0.0*	*0.0*	*0.0*	*0.7*	*0.0*	*0.7*
Problems about deciding EIN support points	*f*	0	0	0	1	0	1
	%	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.2*
Difficulties in assessment and examination in online courses	*f*	0	0	0	1	0	1
	%	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.2*
Total	*f*	10	81	45	137	153	426
	%	*2.3*	*19.0*	*10.6*	*32.2*	*35.9*	*100.0*

Table 7 shows who is responsible for the solution of education-related problems in the C19 process according to the opinions of school administrators. School administrators mostly emphasized the cooperation of "family, school and higher managerial units" (36%). The joint responsibility of the "school and higher managerial units" in solving the problems is weighted with approximately 32%. While the weight of the solution parties in which the *school* is involved is 78.7%, the place of the solution parties in which the *higher managerial units* is involved is 87.1%. Based on the finding, the main responsible to solve the problems is the higher managerial units and then the school administrators.

Attempts to solve the problems

We examined the attempts for solving the problems. These attempts are detailed in Table 8. 41% (*f*=180) of 435 participants did not report any solution to the problems. Establishing EIN support points (*f*=39, 9%), informing parents (*f*=35, 8%), redesigning timetable (*f*=26, 6%) and using alternative applications (e.g. ZOOM) instead of EIN (*f*=23, 5.3%) are the featured initiatives.

Table 8

Attempts for Solving the Problems

Attempts	*f*	%
Unresolved	180	41.4
Establishing support points for EIN	39	9.0
Communicating with parents and informing them.	35	8.0
Reorganizing timetable. limiting durations. changing time. assembling classes	26	6.0
Online teaching on alternative applications (e.g. ZOOM) instead of EIN	23	5.3
Providing statistics about the current situation to MoNE and high-rank administrators	23	5.3
Making use of schools' facilities.	21	4.8
Sharing homework. subject contents etc. by establishing social media network (whatsapp)	19	4.4
Improving the infrastructure of EIN by MoNE	12	2.8
Self-adapting in time	11	2.5
Checking online lessons by attending like a student and warning for the violators	10	2.3
Students were supported with material. homework. videos and other compensations.	6	1.4
Using internet for EIN supplied by GSM service providers	5	1.1
Teachers and students were informed (MoNE. school counsellors and technical staff)	5	1.1
Providing tablets. computers. TV by donations	4	.9
Leading students to EIN TV	4	.9
Announcing to distribute tablets for students	3	.7
Emphasizing the importance of participating online lessons and announcing to check it	3	.7
Demanding and taking help from expert technical persons	3	.7
Sharing the ID knowledge just before starting lessons. keeping class from outer violators	2	.5
Enriching the type of questions and assessment techniques	1	.2
Total	435	100.0

By considering the problems, attempts for solving these problems and responsible parties for solving these problems together, we found out crucial findings in terms of crisis management. While AID which is detected as the most prevalent problem, has a share of 33.6%, for the solution of this problem, establishing EIN support points, making use of school facilities, calling students to school, giving homework and materials, Internet support by Global System for Mobile Communication (GSM) operators, tablet and computer donations supply and directing to EIN TV has a

share of 18.1%. It is understood that the aforementioned problem has not been fully resolved. The share of problem of "inadequacy of technological infrastructure" has a 19% among the problems, but the share of attempts to solve it that consisted of utilizing alternative applications, using social media, improving the EIN infrastructure, and demanding experts' help is totally 14.2%. It can be said that the inadequacy of technological infrastructure has not been fully resolved, too.

The problem of teachers' adaptation to the process and effective teaching has a share of 11%, the share of all attempts for solving this problem is only 5.9 %. It is understood that the problem of teachers' adaptation in online lessons and teaching effectiveness has not been fully resolved. The timetable of online lessons and quota problem has a share of 10.3%, the share of rescheduling the weekly lesson program and holding the lessons at other times is 6% to solve this problem. In this regard, it can be said that a complete solution has not been reached. The weight of the problem including the negative parental attitude and home environment due to the unwillingness of the students and their failure to attend the online lessons is 13.4%, the share of solution of this problem is 8.7%. The problem of decision making, planning and communication has a share of 7.7%, the share of providing statistical information and reports to the units in line with the request of the central government for the solution of this problem is 5.3%. Although this practice is not a direct solution, it can be considered as an indication that information exchange is being made between the central government and schools. On the basis of the experience of school administrators, although the school and higher managerial units were indicated as the solution party in most of the education problems (89.1%), the fact that almost half of the problems remain unsolved. Therefore, the crisis management by TESSA was not success.

Discussion

The crisis management performance of the Turkish education system was evaluated based on the experiences and opinions of school administrators participating in this research from different regions and provinces of Turkey during the Covid-19 pandemic. The results obtained by integrating the qualitative and quantitative findings that form the basis of the evaluation are given in Table 9.

The most prominent problem is AID. Then, the problem of insufficient technological infrastructure follows. Another common problem is that teachers cannot teach effectively. These problems are also identified in previous studies (Baysal & Ocak, 2020; Karakaya et al., 2021; Keleş et al., 2020; Turan, 2020). The fate of the FATIH project in terms of the integration of technology into teaching-learning processes (Bozkuş & Karacabey, 2019; TEDMEM, 2018) explains some of the problems experienced with C19. 32% of the 18 million students in formal education are not able to actively use the EIN (TEDMEM, 2021b). The school administrators who participated in this study emphasized that the most important problem identified in the study, online access (the students' AID) can be solved with the joint responsibility of the family, school and senior management. Considering its prevalence among disadvantaged groups (Karakaya et al., 2021; TEDMEM, 2020), can be inferred that the problem of accessing to online classroom cannot be solved by disadvantaged parents. Therefore, to include parents as an agent of solving this problem is the imaginary expectation. On the other hand, the need of improving teachers' pedagogical skills of

online teaching was identified. It can be said that support services to enable teachers to teach effectively in digital environment is not sufficient (Çakın & Külekçi Akyavuz, 2020; Keleş et al., 2020; Sarı & Sarı, 2020; Turan, 2020). The lack of technological opportunities and the pedagogical limitations of online teaching bring up the deep-rooted social and political consequences of poor learning, especially in terms of its relation with equal opportunity (Reimers et al., 2021; OECD, 2020; TEDMEM, 2021; UNICEF, 2020; World Bank, 2018). The prominence of problems in terms of both dimensions indicate the poor performance of the education system in crisis management.

In this study, eight evaluation criteria within the scope of pre-crisis management and crisis process management were taken into account (Table 9). Depending on the evaluation, it has been observed that TESSA's crisis management practices are not based on a long-term prediction, there is no preliminary preparation, and the problems in the implementation of basic functions during the crisis cannot be fully resolved. For this reason, it has been concluded that TESSA's performance in managing the crisis due to the Covid-19 outbreak is low. This result contradicts with the high perceptions of school administrators regarding crisis management skills reached in previous studies (Erdinç, 2020; Ulusoy, 2020). School administrators find their own performance high (Bıyıkoğlu, 2020; Karakuş & İnandı, 2018; Özalp & Levent, 2021; Ulusoy, 2020). The source of this contradiction may be related to the method of the studies. For example, Sarı and Sarı (2020), by a compilation-type study, concluded that the C19 crisis management process was implemented effectively despite its shortcomings. Yılmaz & Yıldırım (2020) found the crisis management scores of school administrators to be high. In quantitative survey-patterned studies, besides the power of identification of Likert-type items in the measurement tool, perceptual differentiation depending on the positions of the participants in the workplace (teacher-school principal) can also be taken into account. Another result that can be discussed within this framework is that school administrators do not see themselves as directly responsible for the solution of any problem. School administrators stated the higher management units as the main responsible body to solve the problems. This situation suggests that the entrepreneurship, problem-solving and leadership aspects of school administrators are limited. Although there are lots of research results that support this inference (Cemaloğlu, 2005; Gök, 2019; Tabancalı & Su, 2021; Yenipınar et al., 2020) but contradictory result is also exist (Yılmaz Fındık & Kavak, 2017). In preparation for the next possible crises, one of the things that needs to be improved in order to make these aspects of school administrators functional is to organize in a wide area that covers organizational structure, training, selection, regulation of work powers and responsibilities and accountability.

Table 9

Integrating Qualitative and Quantitative Results: Management of the C19 Crisis

Criterion	Observation	Evaluation
Design possible crisis scenarios before the crisis	In this regard, the strategic plans of the MoNE were examined, but the risk situations and crisis scenarios for them could not be reached. This situation was not included within the scope of risk perception in the strategic plans covering years after 2014-2015 period, when epidemic examples were observed in the world.	Needs improvement
Conduct drills for designed scenarios	Based on the experiences and opinions of the school administrators, the scenario and the drill information related to these scenarios could not be reached. Also; The MONE administrative activity reports (http://sgb.meb.gov.tr) between the years 2014-2019 were examined by content analysis, but any practices related to the crisis scenarios including the online teaching could not be reached (*).	Needs improvement
Organizational structuring (communication, participatory decision, autonomy, leadership, accountability)	The heavily hierarchical and centralized organizational structure of the MoNE restricts the accountability and leadership aspects of school administration. Also, the initiative of data-based decision making could not be placed into the system. Collecting statistical information by the central government was assessed as disfunctional. Because participants stated that there was no improvement despite collection of the statistical information and reports.	Needs improvement
Carrying out basic functions during a crisis	Poor learning is prevalent especially among disadvantaged students. This problem stays unresolved. Particularly AID remained as problem.	Despite good practices, they are not inclusive and comprehensive.
Eliminating uncertainties in the crisis	Although there are information-based guidance attempts to eliminate uncertainties, but it is not resolved completely. Uncertain situations decreased in time by the school stakeholders' trial-error initiatives.	Systematic and well-organized information mechanism should be established.
Multi-sided communication during a crisis	Despite the existence of effective but one directional communication from higher managerial units to schools, but students and their parents are out of this communication network. Therefore, inclusive and effective communication network should be established.	Inclusive, multi-faceted communication is a necessary aspect to be developed.
Governance and decision-making	Frequent and sudden directions by the central government to design online courses caused adaptation difficulties and uncertainties in particularly EIN timetables and limitations. Including the school members in process of making system-wide decisions can alleviate such problems.	Including the school members in making system-wide decisions.
Leadership of school members in their sphere of influence during the crisis	Despite the restrictive central directions, some school members initiated to donate disadvantaged students with digital devices and the internet. But it was not adequate to solve the problem. Although the school is the responsible agent for most of the problems, school administrators do not perceive themselves as problem solvers.	Despite good examples, there is no systemic infrastructure encouraging school members to commit to leadership.
Performance in managing the crisis	It has been observed that the practices of the TESSA in managing the crisis, in general, are not based on a long-term foresight, there is no preliminary preparation, and the problems in providing education during the crisis are not fully resolved.	The crisis management performance of TESSA is low and it needs improvement.

(*)The keywords "crisis", "scenario", "drill" were used in the content analysis of these documents. Contents accessed include writing scenarios for EIN modules, conducting disaster-emergency-civil defence and security exercises and training, providing psychosocial support for refugees coming from Syria and Iraq crises, and teaching Turkish.

One of the striking results *in terms of the resolution of the problems* is that school administrators reported that 41% of the problems could not be solved. The most mentioned solution is the establishing of EIN support points. It is understood that students' accession to the online classroom, which is the main problem, could not be fully resolved. The major responsibility to solve that problem is largely attributed to (89%) the school and higher management units. Thus, the proportion of unresolved problems refers that TESSA admits its low performance in fulfilling responsibility. Considering the unresolved problems in the C19 process (Gök, 2019; Kara, 2020; TEDMEM, 2020) can be inferred that the problem-solving aspect of TESSA is limited. This result also refers that problem-solving-oriented rearrangements should be made in multidimensional aspects including organizational structure, human resources management, accountability and leadership (Kutlu et al., 2016; Tabancalı & Su, 2021; Yenipınar et al., 2020; Yeşil & Şahan, 2015; Yılmaz & Altınkurt, 2011). The imbalance between the authorities and responsibilities of school administrators in the centralized organization is emphasized as a major limitation in committing leadership required especially in crisis (Sayın, 2008; Tabancalı & Su, 2021; Ulusoy, 2020; Yenipınar et al., 2020). To mitigate the basic problems including specifically disadvantaged students' poor learning, organizational enhancements should be made depending on C19 experience (Baysal & Ocak, 2020).

In the case of C19, the low performance of TESSA's crisis management is a worrying situation for the future. In order to learn the presence of preparations for other crises that may occur, no indication has been reached that TESSA is preparing for future possible crises based on review of high-level plans (strategic plan, 2023 vision documents, and activity reports). However, the most important stage of crisis management is pre-crisis preparation, planning and training stakeholders according to possible situations (Özalp & Levent, 2021). The common crisis perception (earthquake, civil defence) has been overcome and the perception of crisis has expanded by C19. (Bıyıkoğlu, 2020). In this respect, it is necessary to identify risk situations that can create a crisis and prepare for each situation. These preparations must be carried out with comprehensive, valid, reliable and sustainable mechanisms. In this framework, TESSA should run a versatile communication network; review information obtained through communication to achieve findings and make initiatives based on evidence-based decision-making mechanism. These initiatives should include strategic plans and crisis scenarios and exercises. (Kıral, 2019; Schermerhorn, 2012). The organization's versatile, powerful communication network and trust environment before the crisis are a possible way to identify potential crises (Aksoy & Aksoy, 2003). In the studies, pre-crisis preparation, creating a crisis plan, practicing and providing professional training on crisis management have been identified as the weakest aspects in crisis management. (Bıyıkoğlu, 2020; Erdinç, 2018). It is recommended that school administrators and teachers receive professional training on crisis management as one of the pre-crisis preparations. (Bıyıkoğlu, 2020; Özalp & Levent, 2021).

Another significant problem identified in this study is the decision-making, planning and communication problem of higher management units. The participants reported that the instant requests and regulations of the central organization of the Ministry adversely affected the functioning of the schools and caused stress. Although centralization of decision-making processes is an expected response in times of crisis, it

is more appropriate for crisis management to put this form of decision-making, planning and communication into practice within the scope of alternative plans that have been created and implemented before. In order to carry out the basic functions of the education system with the least damage in possible future crises, it is suggested that the organizational structure should be able to act autonomously, to overcome uncertainties, to make evidence-based decisions and to take initiatives. (Çalışkan, 2020; Drucker, 2008; Yılmaz & Yıldırım, 2019). Such a structure is one in which leadership is supported. In previous studies, it reported that leadership, accountability and trust environment are the critical qualities that need to be put into practice rather than rhetoric for TESSA (Aksoy & Aksoy, 2003; Bıyıkoğlu, 2020; Kıral, 2019).

Conclusion and Implications

At the end of the study, it was concluded that TESSA's crisis management was not successful in the C19 example based on the experience and opinions of school administrators. In order to better manage possible future crises, the following aspects need to be improved: (*a*) Taking into account the international developments in the risk definitions of high-level plans, (*b*) defining crisis scenarios and making preparations required by these scenarios, (*c*) making the organizational structure enabling accountability, leadership, and functional communication (*d*) ensuring equality of opportunity and justice for the disadvantaged in times of crisis, (*e*) ensuring communication with family and student, (*f*) refraining from centrally generated fast decisions making style. The most important limitation of this study is that the findings and results are limited to the answers of the participants. It may be possible to obtain different answers in other participant groups and, accordingly, to reach different results.

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Statement of Responsibility

This research was carried out by authors who have equal contribution in both researching and writing the research report.

Conflicts of Interest

There is no conflict of interest by the authors.

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The Alignment between The Official Physical Education Curriculum and The Taught Curriculum*

Resmi Beden Eğitimi Öğretim Programı ile Öğretilen Program Arasındaki Uyum

Gonca EREN** **Dilek YALIZ SOLMAZ***** **Dilruba KURUM YAPICIOGLU******

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ABSTRACT: Although the written physical education curriculum is the same throughout the country, the implementation phase in schools differs from each other. Hence the purpose of this study is to examine the implementation process of the 5th-grade physical education and sports curriculum (2018) in different school contexts. Case study pattern was used. The participants of the study are two physical education teachers in Eskisehir. The data collection process consisting of observations, interviews, and field notes was completed in the fall semester of the 2018-2019 academic year. As a result of the analysis, the implementation process of the curriculum sub-theme which is related to the main theme of "taught curriculum", was reached. In conclusion, it can be said that the implementation process in schools is mostly teacher-centred, including the teaching of sports techniques and evaluating the psychomotor domain. It was observed that the game-based and student-centred structure of the updated curriculum was not sufficiently implemented by the teachers in the study. Also, it can be stated that the sufficiency of physical education course materials and the suitability of the areas used in physical education lessons are important factors in the implementation process of the curriculum.

Keywords: Case study, curriculum alignment, physical education, taught curriculum, teacher implementation.

ÖZ: Ülke genelinde geçerli tek bir resmi beden eğitimi öğretim programı olsa da bu programın okullardaki uygulama süreçleri çeşitli nedenlerle birbirinden farklılık göstermektedir. Bu çalışmanın amacı, 2018 yılında güncellenen 5. sınıf beden eğitimi ve spor dersi öğretim programının farklı okul bağlamlarında uygulanma sürecini incelemektir. Durum çalışması deseninin kullanıldığı bu çalışma, Eskişehir'de iki farklı ortaokulda ve bu ortaokullarda görev yapan gönüllü iki beden eğitimi öğretmeninin dersinde yürütülmüştür. Gözlem, görüşme ve saha notlarından oluşan veri toplama süreci 2018-2019 Eğitim-Öğretim Yılı Güz Dönemi'nde tamamlanmıştır. Yapılan analizler sonucunda "öğretilen program" ana temasına bağlı olan "öğretim programının uygulanma süreci" adlı bir alt temaya ulaşılmıştır. Sonuç olarak, okullardaki uygulama sürecinin çoğunlukla öğretmen merkezli olduğu, spor tekniklerinin öğretimi ve psikomotor alanın değerlendirilmesini içerdiği söylenebilir. Güncellenen programın oyun temelli ve öğrenci merkezli yapısının, araştırmadaki beden eğitimi öğretmenleri tarafından öğretim süreçlerine yeterince yansıtılamadığı gözlemlenmiştir. Ayrıca beden eğitimi ders materyallerinin yeterliliği ve beden eğitimi derslerinde kullanılan ders alanların uygunluğunun programın uygulanma sürecinde önemli etkenler olduğu ifade edilebilir.

Anahtar kelimeler: Beden eğitimi, durum çalışması, öğretilen program, öğretim programı uyumu, öğretmen uygulaması.

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Curriculums are frequently updated in order to keep up with the age and time we live in. It is important that the implementation processes of these updated curricula are quickly assimilated by teachers. The implementation process is seen as one of the key points of reforms (Tang, & Ma, 2002). Curriculum implementation can be expressed as the processes of teachers to actualize the written curriculum (Glatthorn, 2000, p. 83-84) in schools. Updated curriculums generally provide new instructional suggestions, lesson plans, and assessment alternatives to the teachers for the implementation process related to a set of objectives (Nevenglosky et al., 2019). There is a consensus in the literature that reforms in curriculums seem simple on paper but quite difficult to implement and maintain (Fullan, 2001; Jin, 2013; Macdonald, 2003; Rink & Stewart, 2003; Ward et al., 1999; Wright et al., 2006). The results of Hardman's (2008) compilation also support this consensus. After the UN declared 2005 as the International Year of Physical Education and Sports (UN, 2004), Hardman (2008) stated that the reforms could not be implemented at the desired level and speed, also he stated that the developments coexist with many adverse situations. Stating that especially underdeveloped and developing countries have a more negative picture in this process, Hardman (2008) stated that situations such as teaching time, sports facilities, teaching materials, crowded classroom sizes, unqualified teachers, equal service, and access for each student are common obstacles to reforms.

There are various actors and variables that have the power to affect the success of the implementation processes of the updated curriculums. While students, teaching materials and facilities, learning environment, and school context can be counted among the actors and variables that affect this process, it is stated that the most important actor in this process is teachers (Rogan & Grayson, 2003). Although the curriculum is presented to teachers as a ready-to-use program, this official program may differ due to the individual differences and working conditions of the teacher during the implementation process. At this point, it is stated that the components arising from the teacher, which are thought to have a direct impact on the implementation process, are teacher's attitudes and beliefs, teacher's past education, and teacher's ideas about the innovations in the curriculum (Roehrig et al., 2007). Besides, in the implementation process of the updated physical education (PE) curriculums the most difficult situations for teachers are lack of time, inadequate sport equipment and sport facilities, large classes, and lack of professional development (Fraser-Thomas & Beaudoin, 2002). Especially when it comes to PE lessons, it is stated that the importance of the lack of sports facilities and sports equipment used during the lesson has increased significantly and therefore it might be difficult to reflect the innovations in the program to the implementation processes (Hardman, 2008).

Parallel to the reforms at the international level, the Turkish PE curriculum at different education levels underwent some changes (MoNE, 2007; MoNE, 2013; MoNE, 2018). It can be said that the theoretical framework and the changes included in the curriculum, which was last updated in 2018, are based on the current international PE literature, and a continuation of the previous programs that were updated in 2013 and 2007. Accordingly, it is emphasized that the program, which was updated in 2007, contains radical changes with a constructivist approach towards improving health rather than teaching sports branches and sport techniques compared to the previous program (Ince & Demirhan, 2011; Ince, 2019). Program updates in 2013, embraced health-

related parameters and the concept of fitness is concentrated in this curriculum (Ince, 2019). Within the scope of the 2018 program which is still in effect, the development of fundamental movement skills in individuals was targeted, regular physical activity behavior, healthy life, and values education were highlighted (MoNE, 2018).

When the implications of the curriculum are examined in the Turkish context, it is seen that these studies are heavily shaped around stakeholder views and perceptions (Demirhan et al., 2008; Erdogdu & Ocalan, 2009; Gulum & Bilir, 2011; Havadar & Taşdan, 2015; Ozcan & Mirzeoglu, 2014). Moreover, Varol and Imamoglu (2014) stated that in the implementation of PE curricula, which have been radically changed since 2007, teachers who have been trained according to the behavioral approach may have difficulties, and these difficulties are mostly experienced in assessment and evaluation activities. Also, studies showed that health-related physical fitness information (Hunuk et al., 2013; Cengiz & Ince, 2014) and regular physical activity habits (Kin-Isler et al., 2009) could not be adequately taught in PE classes and therefore could not be transferred to daily life (Ince, 2019). It is stated that there are positive developments regarding values education, which is another focal point of the renewed program, according to the opinions of teachers (Kolukisa et al., 2015; Ince et al., 2018).

Ward and Doutis (1999) argue that curricula are a living experience that comes to life in classrooms through mutual interactions. Within the scope of this research, two of these program types described by Glatthorn, et al. (2016) are written curriculum prepared by the government and taught curriculum, as applied by teachers in schools are included in the scope. However, Ward and Doutis (1999) emphasized that there is a need for studies to reveal the application processes of the curriculum and learning-teaching activities in depth. When the national literature is examined, there is no comprehensive study that reveals the practices of PE curriculum in schools. Based on the need in the literature, it is seen as an original and important research subject to put forward the practices that have been diversified by the teachers and to describe the reasons. As a result of the deeper examination of the implementation processes of the curriculum, it is thought that it might have a positive effect on the teachers and students, especially the curriculum developers. In addition, it is possible to contribute to raising healthier and physically active generations by performing the necessary interventions for the desired implementation of PE curriculum in early school ages. Hence the purpose of this study, considering the alignment of PE teachers is to examine the implementation process in the 5th-grade which is the first education step of the PE and sports curriculum (updated in 2018).

Method

Research Design

Since the research focuses on the implementation process of the PE and sports lesson curriculum in different school contexts, based on in-class teacher activities, case study design was used within the scope of qualitative research methods. Case studies allow for in-depth investigation of various real-world phenomena or contexts with specific boundaries and conditions to be investigated (Yin, 2013), and provide rich data about these phenomena or contexts (Recker, 2013). In this context, the implementation process of the updated PE curriculum was determined as a case to be investigated.

However, in this single case, since it was decided to examine the implementations of more than one teacher in line with the possibilities of the researcher, the research type was determined as a single case study with two embedded analysis units. These types of case studies involve a single case design with multiple units of analysis (Yin, 2013, p. 50). In our research, two embedded units of analysis were chosen: Teacher Meltem and Teacher Cigdem.

Participants

The research participants are two physical education teachers working in the 5th grade of different secondary schools in Eskisehir in the fall semester of 2018-2019. Before selecting physical education teachers for the study, it was deemed important to select research schools. As stated in more detail in the research schools' section below, physical education teachers working in schools with various contexts were contacted. Participants have bachelor's degrees in PE and sports teaching. Teacher Meltem's school, where she has been working for 10 years, is the third school where she has worked in her professional experience, she taught in secondary schools for 4 years in the eastern, and 6 years in the western part of Turkey. Teacher Cigdem spent 7 years of experience in the secondary school where she still works.

Criterion sampling (Fraenkel et al., 2018), one of the purposeful sampling methods, was used when determining the participants. The criteria were that the participants were studying in the 5th grade, which is the grade level where the students first met the physical education teacher, that they were working in one of the schools where the teaching internship was carried out, and that they volunteered for the research. The criterion that the participating teachers work in the schools where the teaching internship practice was carried out was chosen because it was thought that it would naturally result in the researchers and teachers knowing each other well, thus reducing the difficulties experienced in the entry stages of qualitative research and facilitating the establishment of communication-based on mutual trust. In addition, the location of the schools where they worked (one school in the city center, the other school far from the center) was also taken into account when determining teachers. Three physical education teachers working in the 5th grade at the central secondary school were interviewed and Teacher Meltem was included in the study because she was a volunteer. Similarly, although two Physical Education teachers teach 5th grade in a suburban secondary school, only Teacher Çiğdem was included in the study voluntarily. 5th graders have a special place in Turkey in terms of Physical Education lessons. Students encounter the Physical Education teacher and the official Physical Education curriculum for the first time at the 5th-grade level. In addition, the curriculum was updated in 2018 and the data of this research were collected during the first time the curriculum was implemented.

In addition, among the 5th-grades of the teachers to be observed, care has been taken to select the equivalent classes in terms of factors such as class size and student characteristics. 5th-grades were selected by the opinions of the researcher and PE teachers. Teacher Meltem's 5-A class with 23 students was observed on Tuesdays and Teacher Cigdem's 5-B class with 22 students was observed on Fridays during the fall semester.

Research Schools

While selecting the research schools, the administrators of six secondary schools in the city center, and three secondary schools in the in the suburban area were interviewed in line with the time and transportation facilities of the researcher who collected the data. These schools are also among the schools where pre-service physical education teacher candidates' teaching internship practices are carried out and whose context is well known and recognized by the researchers. Schools of administrators who agreed to conduct the study in their schools were included.

In addition, while selecting the two implementation schools of the study, it was considered important to diversify the main factors such as the condition of the lesson area and the richness of the lesson materials, which were thought by the researchers to be reflected in the implementation phase of the physical education lesson and thus in the adoption of the renewed curriculum. It can be said by the authors that physical education lessons have more financial needs, such as a gym, materials, and equipment for various sports branches, compared to other theoretical courses. Therefore, in a country like Turkey, which has a wide variety of public-school contexts, some variations were made in line with the research and researcher conditions that could affect the implementation of the central program.

Central secondary school: The school where Teacher Meltem works is a public school located in the central district of Eskisehir province with 978 students. Because of the location, there is no transportation problem to the school. The school has five PE teachers and physical activity areas are the school garden with concrete floors and an 18 square meter indoor, low-ceilinged multi-purpose hall that allows lessons in cold weather conditions. The sports equipment in the school is basketball, football, volleyball and handball balls, badminton rackets and nets, table tennis equipment, gymnastics mats, training funnels, and slalom bars.

Suburban secondary school: The school where Teacher Cigdem works is a public school located in the suburb of Eskisehir province with 429 students. The school is located outside the city center, in an area where urban transformation projects are carried out. Due to its remote location from the city center, there are fewer public transportation networks to reach the school. The school has two PE teachers. Physical activity areas are a school garden and also a concrete floor and a low ceiling multi-purpose hall of 25 square meters where PE classes are held especially in winter. The main sports equipment at the school is a few soccer and volleyball balls, one tennis table, and a gymnastics mat.

Data Collection Tools and Process

The research process started in May 2018 with the document review of the PE curriculum. Simultaneously, the literature review process to form the basis of the research and prepare the data collection tools has begun. Necessary permissions were obtained from educational institutions. With the research permissions, interviews were started with the schools in the neighborhoods that the researcher could easily reach. The administrators and PE teachers at the schools that allowed the research were informed about the research aims and process.

Afterward, data collection tools were prepared by the first researcher and presented to the field and language experts' opinions. In line with the opinions, semi-structured interview forms and course observation forms were finalized, and pilot interviews and observations were made in another secondary school.

Document review of the teachers' annual plans and the researcher's diaries started in September 2018. The first semi-structured interviews were held with the teachers one week before the start of the fall semester. When the fall semester started, the observation process was started simultaneously. In addition to the observations every week, researcher diaries were conducted regularly by the first researcher. At the end of the fall semester, the data collection process was terminated by conducting second semi-structured interviews with the teachers. Detailed information on the data collection process is given in Table 1 below.

Table 1

Data Collection Process

		Starting Date	Due Date	Duration (week/hour)
Participant observations		17.09.2018	18.01.2019	18 weeks / 3.240 hours
Document review		01.05.2018	18.01.2019	35 weeks
Researcher diaries		11.09.2018	18.01.2019	18 weeks
1. Interviews	Teacher Meltem	20.09.2018	20.09.2018	29 mins
	Teacher Cigdem	18.09.2018	18.09.2018	31 mins
2. Interviews	Teacher Meltem	08.01.2019	08.01.2019	59 mins
	Teacher Cigdem	17.01.2019	17.01.2019	66 mins

Data Analysis

In the study, the thematic analysis approach suggested by Braun and Clarke (2006) was used. The structure of thematic analysis, which provides flexibility to researchers, has a wide range of uses, from qualitative research with many participants to case studies with 1-2 participants (Clarke & Braun, 2017). In this research, the flexible structure of thematic analysis has been utilized, since there was no code or theme predetermined by the researchers, and the themes related to the implementation process were reached through the codes assigned by the researchers from the collected data.

Firstly, verbatim transcripts of semi-structured interviews were made. After, transcripts of interviews were coded by the author. In addition to the interviews, research diaries and document review were also started to be analyzed and coded as they were collected in the process. All the coding processes were carried out under the supervision of the field experts. On the way from codes to themes, all the data obtained in the research were brought together, synthesized for research purposes, and the themes were finalized. Accordingly, the main theme reached in the research is the taught curriculum. One sub-theme related to this main theme were also revealed: the implementation process of the curriculum. In addition, sub-theme have various categories within themselves.

Credibility and Ethics

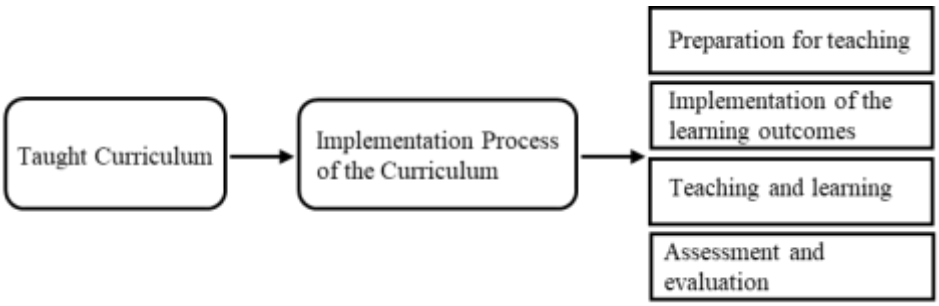
First of all, expert opinions were sought at every stage to ensure credibility in the research. Triangulation was made in data collection methods. Also, the researcher has developed safe and positive relationships with the participants by staying in research areas for a long time. In order to ensure transferability, the research process, and the collected data were tried to be described in detail. The participants were informed about the research purposes, process, and their rights. Their voluntary approvals were obtained. All names in the study have been replaced by nicknames. Before the data collection process, ethic approval was obtained from Anadolu University Scientific Research and Publication Ethics Committee.

Results

The findings obtained as a result of the analysis of the data are themed as given in Figure 1 below.

Figure 1

Research Theme



The Implementation Process of the Curriculum

Preparation for Teaching

In the implementation process, the preparations of the teachers before and during the semester were examined. It has been observed that the preparations before the semester consisted of the compulsory seminars offered by the Ministry of National Education (MoNE) during the summer term and the preparation of annual lesson plans. Teachers stated that they did not make any individual preparations for their teaching apart from these preparations: *"As preparation for the semester, I only attended the mandatory seminars given by the ministry in the summer months."* (Teacher Meltem – 1. Interview) and *"I did not have any extra preparation for the semester, I followed the compulsory seminars in the summer months."* (Teacher Cigdem – 1. Interview).

In the preparation of the annual lesson plans, it can be said that teachers made some changes specific to their schools by downloading the annual plan samples, which are mostly available on the Internet*: "While preparing the annual plans, I choose a plan from the Web according to our school's facilities and materials are."* (Teacher Meltem – 1. Interview).

It can be said that the preparations during the semester are similar: *"Sometimes downloaded plans have some techniques that I don't have much knowledge such as table tennis, so I search the teaching techniques on the internet before the class."* (Teacher Cigdem – 2. Interview).

Learning Outcomes

Achieving the aims of the curriculum is related to how much the learning outcomes in the curriculum can be implemented in the lessons. In Table 2 and Table 3 below, 12 weeks are presented during the 18 weeks, selected among the outcomes that were not realized in the lessons, although they were included in the teaching plans of the teachers.

Table 2

Teacher Meltem's Learning Outcomes, Subjects of Annual Plan and Taught Curriculum

Learning Outcomes	Subjects of Annual Plan	Taught Curriculum
Measures the level of physical activity in the activities.	Physical fitness test measurements should be done.	Introduction, informing about the course and rules.
Measures the level of physical activity in the activities.	Physical fitness test measurements should be done.	Practicing for parades on national holidays.
Explains the fundamental movement concepts used in games and activities.	Concepts of body and area awareness, effort, and movement relations used in fundamental movement skills should be addressed.	Practicing for parades on national holidays.
Applies displacement movements by showing awareness of area and effort.	Walking, running, jumping, jumping-leaping, step-taking, gallop-slip, etc. movements.	Physical fitness measurements were done.
Realizes strengths and needs to be improved in participating in games and events.	In the activities, by making self-assessment, they become aware of strengths and aspects that need to be developed and self-esteem is emphasized.	Practicing for parades on national holidays.
Applies the movements that require balancing by showing body-area awareness.	Bending, stretching, rotation-oscillation, weight transfer, jump-landing, start-stop, dynamic-static balance, stance-sit, push-pull, etc. movements.	Practicing for parades on national holidays.
Applies movements that require object control by showing body awareness and movement relations.	Ball-handling; throwing-holding, catching, kicking, rolling, stop-control, dribbling, racket hitting, long-handled hitting, etc. movements.	National holiday: October 29 Republic Day
Does basic gymnastic movements.	Postures, rolls, body transfer and change of direction, transitions, and connections, etc. in gymnastics.	Chest pass practice was done in basketball.
Knows the general aims and applications of first aid in physical activities.	The definition, importance, general purposes, basic rules of first aid, and the first aid kit materials discussed.	Fundamental gymnastic postures were practiced.
Knows the Olympic concepts.	Concepts and symbols related to the Modern Olympic Games (Paralympic, Olympic, etc.) are emphasized.	The topic of the week was not taught.
Measures the level of physical activity in the	Assessment-evaluation (mid-term): pre-prepared fundamental movement skills	Instead of fundamental movement skills, students took

activities.	tests are applied to the students. After the skill test, the mistakes made by the students are indicated.	an exam on layout exercises (turning right-left, marching in review, etc.).
Measures the level of physical activity in the activities and explain the effects of physical activities on physical fitness.	Assessment-evaluation (end of term): pre-prepared fundamental movement skills tests are applied to the students. After the skill test, the mistakes made by the students are indicated.	Students took an exam on basic gymnastic poses.

Table 3

Teacher Cigdem's Learning Outcomes, Subjects of Annual Plan and Taught Curriculum

Learning Outcomes	Subjects of Annual Plan	Taught Curriculum
Demonstrates combined movement skills in a variety of games and activities.	Service in volleyball should be explained to the students and practice with activities.	The topic of the week was not taught.
Demonstrates appropriate behaviors regarding losing and winning in games and activities.	A mini volleyball tournament should be organized in the class.	The topic of the week was not taught.
Aware of individual differences in games and activities.	Fundamental gymnastic postures should be practiced.	Forehand and backhand hit, service shots skills, and game rules were measured and evaluated in table tennis.
Understands the importance of cooperation in games and activities.	Exercises should be done about backhand shot in table tennis.	The topic of the week was not taught.
Evaluates the performances of herself/himself and her/his friends.	Physical fitness test measurements should be applied.	Physical fitness test measurements were done.
Applies the movements that require balancing by showing body-area awareness.	Overhand passes in volleyball should be explained to the students and practice with activities.	Overhead pass practices were done in volleyball.
Applies movements that require object control by showing body awareness and movement relations.	Bump pass in volleyball should be explained to the students and practice with activities.	Bump pass practices were done in volleyball.
Assessment-evaluation	Assessments-evaluation should be done (mid-term)	Evaluation on practices about parades on national holidays and exercises of turning right, left, and back in parades.
Realizes strengths and needs to be improved in participating in games and events.	Basic posture position and racket handling exercises should be done in table tennis.	Racket handling exercises were done in table tennis.
Does basic gymnastic movements.	The forward and backward rolling techniques should be explained and shown to the students.	The topic of the week was not taught.

Assessment-evaluation	Assessments-evaluation should be done (end of term)	An exam was held on bump and overhead pass technical skills in volleyball.
Measures the level of physical activity in the activities.	Explain the effects of physical activity on healthy life.	The topic of the week was not taught.

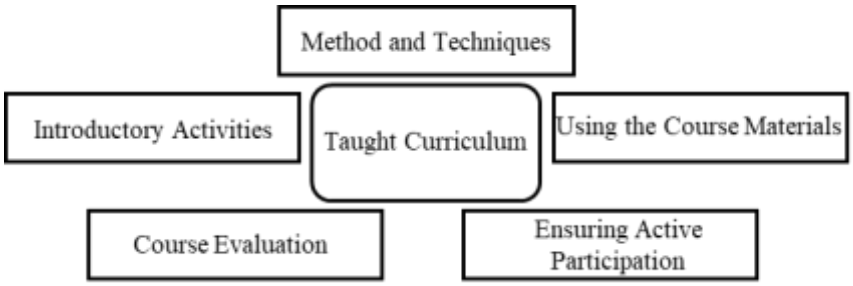
It can be said that most of the period, teachers did not teach their lessons in line with the outcomes in their plans.

Teaching and Learning

Topics within the scope of the sub-theme of learning-teaching practices are presented in Figure 2 below.

Figure 2

Teaching and Learning Sub-theme and Related Topics



Introductory Activities. In the introduction activities, it was observed that the data of the teachers differed from each other: *"Teacher Meltem checked the sportswear at the beginning of the lesson and wished good lessons with the command of 'be ready' by taking attendance."* (Observation diary) and *"Teacher Cigdem came to the lesson and told the students to play by themselves by giving the materials. Later, she took attendance by identifying the students with her eyes."* (Observation diary).

Teacher Cigdem said that *"The lesson time ends before the children can get enough of the game, if we lose time by taking attendance or something else, there is no time left to play or teach."* (2. Interview).

In addition, it can be said that both teachers didn't include motivational activities in their lessons. Teacher Meltem said that *"Students come to class highly motivated, we usually don't even need to do introductory activities, we spend more of our time on games."* (2. Interview).

Method and Techniques. While it is seen that Meltem Teacher preferred two methods (command and game-based) throughout the term: *"After setting up the running station for the flag run, she trained the skill to each partner by commanding the whistle."* (Observation diary) and *"She brought two pieces of blue cloth to the class, she said they would play the tail grabbing."* (Observation diary), Teacher Meltem said about her methods and techniques*: "In this age group, we can teach them with the best command method. They both have fun and learn when we give the commands in the games."* (2. Interview).

It has been observed that Teacher Cigdem teaches her lessons only with the demonstration technique throughout the semester: *"She asked the students to form a*

circle. Then she moved to the middle of this circle, showed with her arms how the bump pass should be, and wanted everyone to do it as they showed them." (Observation diary). Teacher Cigdem has used the following expressions about the demonstration technique: *"I think it is much more rational to present the subject with the demonstration method to the 5th-graders and to explain what will happen and how. This is the most suitable for their age levels."* (2. Interview).

Using the Course Material. It has been observed that Teacher Meltem does not have any problems in terms of the number and variety of course materials. On the contrary, it is seen that Teacher Cigdem has problems in terms of the number and variety of materials due to the disadvantages of financial inadequacy of the school budget.

Ensuring Active Participation. It can be said that teachers prefer different ways to ensure active participation in the lesson: *"Teacher Meltem determined the playgrounds for everyone, distributed materials, and stated that everyone has to participate in the games."* (Observation diary) and Teacher Meltem also said: *"We already have enough equipment, when we give equipment to all class, they already actively participate in the lesson."* (2. Interview).

On the other hand, Teacher Cigdem has been observed to work with students one-to-one on technical skills to ensure active participation in her lessons: *"Students enjoy playing and competing with the teacher rather than playing with their friends, so they participate enthusiastically in the lesson."* (2. Interview).

Course Evaluation. According to the lesson plan guidelines prepared by the MoNE, it was observed that Teacher Meltem had a course evaluation in only one week of the 18-week observation period, while Teacher Cigdem didn't include any. The observation data of Teacher Meltem is as follows*: "She put the students in line at the end of the lesson and asked them to make self-evaluation about their mistakes in the lesson today."* (Observation diary).

When Teacher Meltem was asked about her opinions on a course evaluation, she said: *"I watch all students in each lesson and evaluate each one separately, I don't just waste time putting it down on paper in each lesson."* (2. Interview).

When asked why Teacher Cigdem was not evaluating the course, she said: *"We don't understand when the lesson is over while playing the game, I evaluate them in my mind during the lesson anyway."* (2. Interview).

Assessment and Evaluation

In the assessment process both teachers consider similar factors in the process. When the teachers' assessment-evaluation practices were examined, it was seen that both teachers similarly made evaluations on a single physical skill test for all students: *"Teacher Cigdem called students one by one to the exam. Each student demonstrated their table tennis technical skills in front of her. After the psychomotor skills, each student was asked a verbal question about the table tennis rules."* (Observation diary) and *"During the assessment week, Teacher Meltem had the students individually complete a psycho-motor skills test on gymnastics and asked them one verbal question"* (Observation diary).

After the exams, both teachers completed the evaluation processes by giving all students a minimum score of 95 out of 100 in the E-School system. As seen in the assessment-evaluation activities given above, it can be said that teachers don't include student-centred and process-based assessment-evaluation activities recommended in the curriculum during the semester. Both teachers were asked their opinions about these approaches and the reasons for not choosing them in their lessons. Teacher Meltem's answer on this subject is as follows: *"This is the European system, but I think there is no infrastructure for this in Turkiye. As a teacher, I can see that in the process, the students were not like they did in the first weeks, they learned something."* (2. Interview).

Teacher Cigdem's comments on student-centred and process-based approaches are as follows:

> I didn't reflect anything on their grades by making student-centred assessments, but while I was teaching, I tried to evaluate the students in my mind and discover their abilities throughout the process. The curriculum wants alternative assessments, such as portfolios, peer, or group assessments. I mean, these are good things, but if some students don't like or are angry with their classmates, they may give a low score, I think that some emotions can come into play here. (2. Interview)

Discussion and Conclusion

The research focused on how the curriculum is implemented in the selected schools. At the beginning of the implementation phase, teaching preparation activities were examined. Chatoupis (2016) argued that a systematic preparation and planning process before the lesson is the key to effective teaching. In addition, Chatoupis (2016) also stated that the process of preparation for teaching increased confidence in the course content by reducing the anxiety of teachers, facilitating the organization of the course materials, and preparing a draft for assessment-evaluation. It can be said that the teachers apart from attending the compulsory seminars organized by the MoNE, didn't have a specific preparation activity at the beginning of the semester and they only conducted research on some subjects in the annual plans during the semester. Therefore, it can be stated that teachers don't have a planned and systematic preparation process as stated in the literature. It can be emphasized that this situation may create an obstacle in achieving the aims of the curriculum by negatively affecting the teachers to carry out an effective learning-teaching process.

McNeill et al. (2018) explain that teachers create teaching plans compatible with the curriculum with the concept of "fidelity." In other words, the concept of fidelity indicates the harmony between the official curriculum and the taught curriculum on paper and in practices. When the teaching plans and outcomes of the teachers are examined, it is seen that they are mostly compatible with the curriculum on paper. Therefore, it can be stated that teachers are committed to the outcomes of the program. On the other hand, it is also important to implement these outcomes in the lessons and to integrate them into daily life. To this end, it was emphasized that teachers teaching in line with the program's outcomes and engaging in activities aimed at realizing the outcomes is a factor that supports students' achievement with their active participation (McNeill et al., 2018). When the status of the teachers to achieve the outcomes is examined, the findings show that both teachers didn't depend on the outcomes in the plans in their lessons to a large extent. In light of the information presented in Table 2

and 3, it can be said that teachers perform activities that don't comply with the outcomes in many weeks of the semester. It can be stated that it is difficult for students to develop behavior in line with the curriculum, especially since teachers don't teach her lessons for many weeks. Glatthorn et al. (2016) also emphasize that teachers usually use the curriculum at the beginning of the semester to look at what they will teach while preparing their plans, but they don't pay much attention to the official curriculum and outcomes in the rest of the year. Similarly, Ozturk (2012) stated that the outcomes in the curriculum and plans are basically binding, but teachers mostly use their powers in following these instructions and make many changes in practice. The findings also parallel to the literature.

It is seen that introductory activities increase students' interest and motivation levels toward the subject to be learned and remind them of pre-learning (Fink, 2005). It's possible to say that the introductory activities of teachers are not compatible with the literature. It was observed that the teachers didn't include any motivational and preparational activities within the scope of introductory activities. The fact that teachers don't include introductory activities in their lessons is seen as an obstacle to effective and permanent learning (Ozturk, 2001). Providing PE teachers with current information in terms of issues to be considered effective lesson planning may play a key role at this point.

According to the PE curriculum, the learning-teaching process should be model-based and technology-based, which includes student-centred methods specific to the school, associated with daily life, in cooperation with stakeholders, affecting all learning areas, flexible, innovative, sensitive to individual differences with special needs, paying attention to the participation of each student and inclusive for all students equally (MoNE, 2018). Considering these principles, it is seen that the teachers' teaching methods and techniques are teacher-centred and insensitive to individual differences that make students passive. Studies in Turkey reveal that PE teachers mostly use the "command" and "practice" methods in their lessons, and they highly value teacher-centred methods (Demirhan et al., 2008; Ertan & Cicek, 2003; Ince & Hunuk, 2010). The findings regarding the methods and techniques used by the teachers parallel the literature. From this point of view, it can be said that the implementation principles offered by the curriculum and the learning-teaching processes carried out by the teachers are not aligned. Besides, the curriculum emphasizes that the most appropriate models among individualized, cooperation, sports education, peer education, tactical games, and individual and social responsibility models should be used (MoNE, 2018). Unfortunately, in the learning-teaching processes, it was seen that teachers didn't perform a model-based education as suggested by the curriculum. Lack of theoretical and practical knowledge about models can be shown as the underlying reason for this situation. In addition, Mirzeoglu (2017) stated that teaching models are not well-known both in teacher education institutions and PE teachers in Turkey.

The curriculum recommends that students be as active as possible and interact intensely with various course materials in PE classes (MoNE, 2018). When the student participation and the material interaction were examined, it was seen that they were limited in both teachers. In both classes, students were waiting in line to participate in the activities in their lessons, and they talked or lost interest in the subject during the waiting period. Practices such as teachers setting rules for active participation or

participating in activities one-to-one with students didn't change this result. It can be said that the main factors that reveal this situation are teacher-centred teaching methods and teaching through a single activity during the lesson. As teachers didn't include more than one activity simultaneously during the lesson, active participation, and material interaction were limited for many weeks throughout the semester. Moreover, although there was no deficiency of course materials in Meltem Teacher's school, it is obvious that the active participation and interaction of the students remained limited. Similar to this result, Powell et al. (2018) reported that school-age children were at a level lower than the physical activity and material interaction level recommended by the curriculum in PE classes. The results are thought to be due to a lack of the teacher's professional knowledge and skills in the field of PE. Based on this, there is a need to update the theoretical and practical knowledge of teachers on related subjects.

The course evaluation activities also were examined, and it was observed that Teacher Meltem had only one lesson evaluation, Teacher Cigdem didn't evaluate any lesson during the semester. While Chng and Lund (2018) emphasized the importance of end-of-course evaluation, they state that the observational evaluations made by PE teachers without keeping any records and without giving feedback don't contribute to learning.

Afterward, assessment-evaluation activities were observed and the teachers made teacher-centred and summative assessments instead of the student-centred and formative assessment approach suggested in the curriculum. In addition, it can be said that assessment-evaluation activities were mostly aimed at psychomotor goals. Accordingly, it can be stated that the practices of the teachers were not aligned with the curriculum. On the other hand, when the opinions of the teachers about the process-based approach were examined, they expressed their negative opinions about the process-based approach. These negative opinions may be due to their insufficient theoretical and practical knowledge, learning experiences in the past, and personal characteristics for process-based assessment. In recent years, it has been frequently emphasized in the literature that the concept of "assessment for learning" has increased in importance in PE with current and alternative methods and that teachers and teacher training institutions should address these issues (Hay et al., 2015; Leirhaug & MacPhail, 2015; Moura et al., 2020).

In the research, although the teaching experiences are different from each other, the procedures for implementing the curriculum, teaching methods and techniques of teachers' use, the forms of assessment, and in-class activities are mostly similar. Among the reasons for this, it can be said that the fact that the teachers completed their undergraduate education in the period before the updated curricula in the framework of the constructivist approach (MoNE, 2007) in the field of PE may have an effect. Even though teachers graduated from different universities, the education they receive in the field of teaching may be based on similar ecoles.

The findings show that the alignment of the participating teachers with the updated secondary school PE curriculum could not be achieved sufficiently. In particular, there are some points that don't align with the curriculum within the scope of learning-teaching and assessment and evaluation practices. Regarding learning outcomes, it has been observed that the teachers' annual plans are aligned with the curriculum on paper. But it can be emphasized that there are some problems with

transferring learning outcomes from paper to life. In addition, it can be said that the teachers didn't read the new curriculum and didn't have sufficient information about the curriculum concept. Similar to this research, studies conducted after curriculum updates in the United States and Ireland report that teachers' curriculum alignment could not be achieved at the desired levels (Chen, 2006; Coulter et al., 2020; Rink, 2013). Chen (2006) mentions that there is a disturbing gap between the standards in the United States K-12 PE curriculum and the taught curriculum. In addition, Bulger et al. (2008) state that although learning outcomes and instructional practices are clearly stated in accordance with the PE curriculum, neither expectations from teachers are clearly defined nor there is evidence of what students learn. This situation is interpreted in the literature as teachers don't sufficiently integrate curriculum updates and requirements into their practices (Oh & Graber, 2017). Bulger et al. (2008) also attributed this misalignment to teachers' low proficiency in the field and emphasized that becoming a physically educated student and living a healthy active lifestyle requires more than a collection of teaching sports techniques with short team-sport units designed to keep students busy and happy. Thus, supporting PE teachers with in-service training on the scope of the PE curriculum and how it can be used effectively is important for the success of the curriculum. Also, this research was carried out in two different school settings. It can be suggested that similar studies with both qualitative and quantitative data can be carried out in different provinces and school contexts with different teachers.

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Conflicts of Interest

The authors declare no conflict of interest.

Statement of Responsibility

All authors contributed to the study. Firstly, Eren contributed to the identification of the idea and need for research. Initial conceptualization and drafting of the original manuscript were carried out by Eren, Solmaz, and Yapicioglu. Methodological design and analysis were carried out by Eren and Yapicioglu. Solmaz interpreted the data and helped with the manuscript's editing, and reviewing processes. Writing, revision, and editing were performed by Eren, Solmaz, and Yapicioglu.

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A Qualitative Analysis of Pearson-Assured Accreditation Processes in Schools of Foreign Languages in Türkiye*

Türkiye'de Pearson Assured Tarafından Akredite Edilen Yabancı Diller Yüksekokullarının Nitel Analizi

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ABSTRACT: The purpose of this study is to find out the views of a group of instructors and the administrators of the School of Foreign Languages (SFLs) on the Pearson Assured (PA) accreditation process in terms of the quality management of their institutions. To achieve this purpose, we employed document review and semi-structured interviews. To analyze the data; therefore, we used both document analysis and content analysis. The document analysis showed that the PA accreditation provides basic quality measurements with examples so that institutions can present their quality performances with evidence in order to ensure that the requirements in several headings are met. The qualitative content analysis of the verbal data captured in interviews revealed a change in the participants' views in time. Despite the partially negative opinions on the process held before and during accreditation, the high workload and immense amount of time required to provide necessary evidence, the participants generally had favorable opinions of PA accreditation and stated their wishes for it to continue, believing that accreditation process contributes to the quality management of their institutions as a whole.

Keywords: Accreditation, quality management processes, Pearson Assured (PA) accreditation, Schools of Foreign Languages (SFL).

ÖZ: Bu çalışmanın amacı, Yabancı Diller Yüksekokullarında (YDYO) görevli bir grup öğretim elemanı ve yöneticisinin Pearson Assured (PA) akreditasyon sürecine ilişkin görüşlerini kurumlarının kalite yönetimi açısından ortaya çıkarmaktır. Bu amaca ulaşmak için doküman incelemesi ve yarı yapılandırılmış görüşmeler kullandık. Bu nedenle, verileri analiz etmek için hem doküman analizi hem de içerik analizi uyguladık. Doküman analizi, PA akreditasyonunun, kurumların çeşitli başlıklardaki gereksinimlerin karşılanmasını sağlamak ve kalite performanslarını kanıtlarla sunabilmeleri için temel kalite ölçümlerini örneklerle sağladığını göstermiştir. Görüşmelerde toplanan sözlü verilerin niteliksel içerik analizi, katılımcıların görüşlerinde zaman içinde bir değişiklik olduğunu ortaya koymuştur. Akreditasyon öncesi ve sırasında sürece ilişkin kısmen olumsuz görüşlere, gerekli kanıtları sağlamak için gereken yüksek iş yüküne ve çok uzun süreye rağmen, katılımcılar genellikle PA akreditasyonu hakkında olumlu görüşlere sahiptiler ve akreditasyon sürecinin bir bütün olarak kurumlarının kalite yönetimine katkıda bulunduğundan bu sürecin devam etmesini istediklerini belirttiler.

Anahtar kelimeler: Akreditasyon, kalite yönetim süreçleri, Pearson Assured (PA) akreditasyonu, Yabancı Diller Yüksekokulları (YDYO).

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In 2022, the latest statistical data from Statista (2023) indicated that approximately 1.5 billion individuals across the globe utilized English either as their primary language or as a secondary language. This unequivocally underscores the indisputable prominence of English as the predominant global language. Notably, the language has risen to prominence in concordance with the development of new technology, functioning as the spearhead of modern vocabulary. In line with this, Kırkgöz (2005) emphasizes that "English serves an instrumental value, a means of gaining access to better education and a more prestigious job with good benefits and prospects for promotion" (pp. 10-11). As a result, a growing number of people show a growing desire to study English, as seen by the constant increase in the number of English learners. Since "the impact of globalization and economic development has made English the language of opportunity and a vital means of improving an individual's prospects for well-paid employment" (British Council, 2013, p. 3), it has evolved into a language that everyone wishes to study and communicate in.

Türkiye is one of the countries that is actively working to improve the quality of its English language education. Notably, in its pursuit of European Union (EU) membership, Türkiye aligns its educational reforms with EU directives. Türkiye has been a full member in the Bologna Process and the European Higher Education Area (EHEA) since 2001, demonstrating its dedication to this critical educational framework (EHEA, 2022). "The Bologna Process seeks to bring more coherence to higher education systems across Europe. It established the EHEA to facilitate student and staff mobility, to make higher education more inclusive and accessible, and to make higher education in Europe more attractive and competitive worldwide" (The Bologna Process and the European Higher Education Area, 2022, p. 1). Knowing English in this sense is also extremely important for the Turkish educational system, as it is for all EU members and membership candidates, in order to ensure coherence, mobility, and accessibility.

Since English has grown in importance, "...continuing demand for English education has led policymakers in Türkiye and several countries in the Middle East region to appropriate English as the medium of instruction (EMI) in higher education in the interest of the country" (Kırkgöz, 2019, p. 9). Thus, at tertiary level in Türkiye, there are some departments where the EMI is entirely either in Turkish or English, and others where it is split between Turkish and English, "and others where the medium of instruction is split between Turkish, English or other languages for some lessons" (Language Education, Council of Higher Education, COHE, 2022, p. 1). If students' English skills are below pre-intermediate level (B1), they must study English in preparatory programs until they reach that language level. Preparatory programs provide intensive English instruction to tertiary-level students prior to their enrollment in specific faculties for their chosen fields of study (Arslan, 2020). Preparatory programs are the language programs of the SFLs that have all the necessary curricula, teachers, and evaluation processes in place and aim to get students ready for their particular departments. Being the most qualified school and providing the best language education are highly crucial for SFLs in Türkiye when assisting students in meeting the language demands of their departments. The reputation of SFLs as 'the best and the most qualified' has an impact on families' and students' preferences for these schools.

In the context of 'quality' within educational institutions, the foregrounding themes frequently include quality management, which has its roots in Total Quality

Management (TQM) principles, as well as accreditation. Within the academic sphere, a substantial body of literature comprising journal articles, books, book chapters, as well as master's and doctoral theses has been dedicated to these topics. This intense academic interest demonstrates the importance of quality in the globalized and intensely competitive world of the twenty-first century. In Türkiye, all the universities are obligated to COHE which places a high value on the quality of education at Turkish universities, as well. Hence, within the setting of Türkiye, academic initiatives in the realms of 'educational quality' and 'accreditation' have taken relevance and have gradually increased over time.

In a quick glance over the recent research studies on PA accreditation processes undertaken in tertiary level institutions, we see that there is an increasing interest in years. In 2007, Uçar and Levent for instance published an article detailing the successful PA accreditation process in a preparatory school dedicated to foreign language instruction at a foundation university in Türkiye. Also, Karaferye (2017) investigated accrediting institutions, notably the Commission on English Language Program Accreditation (CEA) and PA in this study and explained the steps for getting accreditation certifications from these entities. In 2019, Kalaçay (2019) completed his master's thesis with the primary goal of determining whether accreditation has had a positive impact on the quality of English education provided by these institutions from the perspectives of directors and managers overseeing preparatory schools and programs affiliated with foundation universities in Istanbul. Furthermore, Sarı examined the application of accrediting procedures within a language program located inside a university context in her master's thesis in 2019. Additionally, as part of his doctoral thesis in 2021, Ataman (2021) inquired about the viewpoints of 31 academics from 12 different universities that had been evaluated by PA, CEA, or Evaluation and Accreditation of Quality in Language Services (EAQUALS). Furthermore, Doğan (2022) examined both national and foreign quality assurance companies working in the sector of language instruction in Türkiye in his study completed in 2022.

Indeed, the issue of quality and accreditation within SFLs has gained significance and evolved into a key research topic in recent decades. COHE itself has also carried out studies on this subject of interest. First of all, to ensure quality in all universities, there is a specific organization created by COHE which is called The Higher Education Quality Council of Türkiye (THEQC). Specifically, to increase and ensure the quality of education in SFLs, COHE and THEQC hold an agreement with the British Council, and they have been conducting some pilot studies in terms of quality management in the SFLs. While the pilot studies are still ongoing, there is not a specific organization or committee to guide and inspect specifically the language education of SFLs by COHE itself yet. Because of this, several SFLs have started to submit applications to accreditation organizations for their SFLs in an effort to raise their quality and educational standards or to demonstrate that the language education they offer is of an international standard.

However, a word of caution is due here about the importance of accreditation in relation to the EMI practices followed in Turkish universities. Although accredited status is a strongly wished entity, there are not many accreditation bodies available to provide it. "Accredited status is a signal to students and the public that an institution or program meets at least minimal standards for its faculty, curriculum, student services,

and libraries" (Obadara & Alaka, 2013, p. 39). CEA, EAQUALS, and PA are some of the accreditation organizations that SFLs in Türkiye have been accredited or in the process of being accredited by. Since especially the initial stages in accreditation process mainly depend on a careful analysis of requirements and standards emphasized in the websites of the accreditation organizations and providing evidence for these requirements, in this study we decided to delve into both the document side of the PA accreditation process and also the views of the two main stakeholders involved (i.e., instructors and administrators). Taking these two aspects into account and following the line of thought in earlier studies (Ataman, 2021; Doğan, 2022; Kalaçay, 2019; Karaferye, 2017; Sarı, 2019; Uçar & Levent, 2007), this study aims to address the following research questions:

1. What does the document analysis reveal for the matches/mismatches between the documents which the selected SFLs shared publicly, and the standards specified in the PA Handbook 2021 under the headings of managing the organization, managing learning/training, and managing assessment?

2. How do the participating instructors and administrators employed in a selected group of SFLs in Türkiye view the PA accreditation process?

    2.a. What are their views about the assessment procedures of the accreditation process (i.e., documentation process about quality management and its requirements)?

    2.b. What are their views about the effects of the accreditation process on the quality of their work?

3. What are the participants' views about how this accreditation process could be improved?

Literature Review

Accreditation

Since the introduction of quality management into the field of education, accreditation has developed into one of the necessities for offering and improving the quality of educational institutions. Accreditation has a long history that extends back to the 1800s in the United Kingdom (UK). "The quality assurance system in higher education has emerged by engaging external examiners. The University of Durham, UK engaged Oxford examiners in the year 1832 to assure the public that the standard of its degree programs was equivalent to Oxford" (as cited in Kumar et al., 2021, p. 2). On the other hand, during the 1800s within the United States of America (USA), it was evident that numerous colleges and universities existed, each characterized by distinct admissions criteria, academic curricula, and degree completion durations, lacking uniform standards. This scenario posed considerable challenges for institutional administrators in discerning between educational institutions and their respective programs. Due to the discrepancies in academic programs and degree requirements, institutions encountered challenges in facilitating credit transfers for transferring students. Moreover, colleges and universities faced difficulties in assessing the equivalency of qualifications for international students seeking admission to college or graduate school. Consequently, accrediting bodies were instituted by colleges and universities as voluntary associations to offer transparency and set benchmarks for

curricula, degrees, and credit transfer protocols via a peer evaluation mechanism (Flores, 2015). "Accreditation, in education, is the process by which an association or agency evaluates an educational institution or program of study and formally recognizes it as having met and satisfied, or exceeded, certain predetermined requirements and criteria or standards of educational quality" (Al-Haj Ibrahim, 2014, p. 106).

Figure 1

Establishment of accrediting bodies, accords, and agreements, and regulatory/statutory bodies (as cited in Kumar et al., 2021, p. 3)

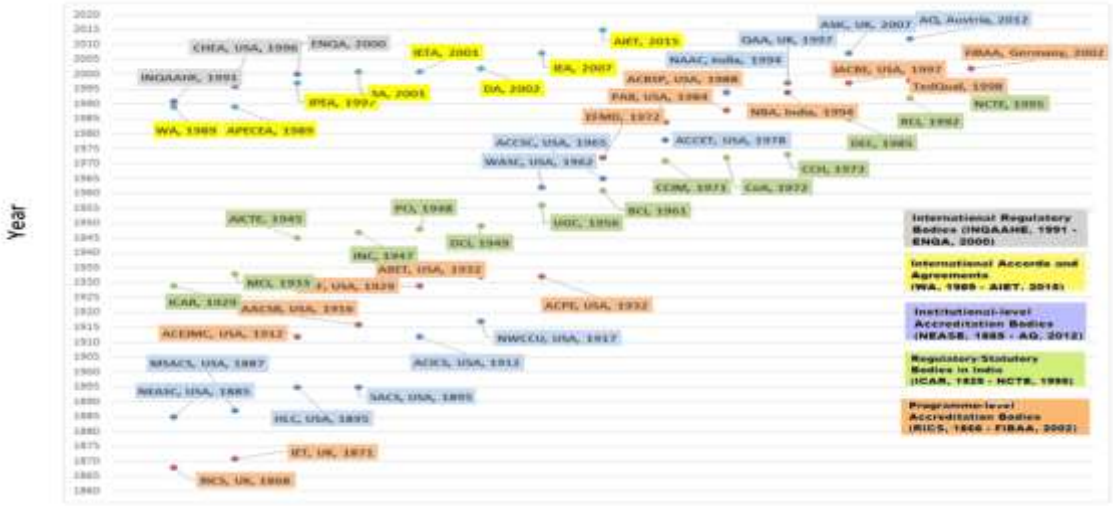


Figure 1 by Kumar et al. outlines the historical evolution of accreditation. The significance of accreditation is growing in parallel with its importance during the 1880s for similar reasons. In line with this, accreditation has grown in significance in Türkiye since "[t]he Turkish Council for Higher Education believes that the most important factors needed to prepare university graduates for effective practice are an assessment and evaluation mechanism leading to an accreditation system and flexible financial and administrative decision-making powers" (as cited in Akduman et al., 2001, p. 232). For institutions and their clients, such as students and parents in the case of educational institutions, accreditation brings a number of benefits. When a school or program receives accreditation, it indicates that it satisfies the standards set forth by the accrediting body and that the instruction provided to students adheres with those standards. The countability of the education offered at a given school or program is enhanced by accreditation authorities' monitoring, assessment, and evaluation of the standards and quality of education obtained there. Since the accreditation agency recognizes and upholds certain criteria, certified institutions permit its students to transfer their credits, and their degrees are recognized nationally or worldwide.

Although there may be a few small variations depending on the accrediting body, the general accreditation process includes the steps of application, peer review, visit and examination, reach a decision, and continuous review. Agencies expect accurate, verifiable reporting. Institutions that are attempting to earn these agencies' standards have to fulfill all requirements. Several SFLs have begun to apply to accreditation institutes for their SFLs in an effort to raise their quality and educational standards or to demonstrate that the language instruction they offer is recognized globally. "Accredited status is a signal to students and the public that an institution or

program meets at least minimal standards for its faculty, curriculum, student services, and libraries" (Obadara & Alaka, 2013, p. 39). Some accreditation bodies by which SFLs in Türkiye have been accredited or have applied to be accredited include CEA, EAQUALS, PA and DEDAK. Among these accreditation bodies, PA is the most frequently consulted, Because it is known that of the 210 universities operating in Turkiye, 168 have Foreign Language Schools (SFL) or Foreign Language Departments, and 48 of them are accredited for preparatory programs. 40 of these SFLs are accredited by PA, five by Eaquals, and four by CEA (Cinkara & Evişen, 2021). Additionally, one university holds DEDAK accreditation (DEDAK, 2024). Thus, this study examines PA accreditation process and some of the lived experiences stated.

Pearson Assured (PA) Accreditation

PA is a service that objectively evaluates and validates training given by diverse institutions and organizations. PA Handbook 2021 states that "[t]he Pearson Assured service provides a framework for you to develop policies and procedures that help you to offer high quality training programs, maintain their content and professionalize your delivery" (PA Handbook, 2021 p. 2). Essentially the PA accreditation procedure requires candidates to fill out an application form and pay for the PA service. The form demands the applicant institutions' current quality assurance policies and methods. The institutions must explain how each of the Quality Measures relates to the Quality Objectives, whether they are satisfied or how they are intended to be met. To get PA accreditation, all Quality Measures must be demonstrated; otherwise, PA cannot be awarded (PA Handbook, 2021). After submitting the application, a Quality Advisor visits the institutions. Finally, the Quality Advisor makes one of the following decisions: "all quality processes are in place and effective" or "all quality processes are in place but there are areas for improvement" or "there is insufficient evidence that effective quality processes exist" (PA Handbook, 2021, p. 10).

Methodology

Since information provided in PA Handbook (2021) is highly crucial for SFLs throughout their preparation for the accreditation process, we decided to analyze the content of this information supplied and how these requirements are met and shared online by SFLs which have been accredited. Besides a careful analysis of the document side of the PA accreditation (i.e., both on the PA Handbook on their website and on the online postings of the SFLs' related to their accreditation processes), one purpose of the current study is to learn how a group of instructors and administrators of SFLs view PA accreditation. According to Lambert and Lambert (2012, p. 255), "…qualitative descriptive studies tend to draw from naturalistic inquiry, which purports a commitment to studying something in its natural state to the extent that is possible within the context of the research arena." In line with this principle, this qualitative research study aims to examine accreditation experiences actually lived in the selected SFLs.

Participants

In this qualitative study, purposive and convenient sampling was used. According to the information acquired from COHE's website under the title of our universities, there are 55 universities in Istanbul, 11 of them are state universities and 44

of them are the foundation universities. Among those universities, only 12 foundation universities and two state universities' SFLs have been granted PA Accreditation. Among these 14 universities that fell within the scope of this study, only four of them responded positively to our request for data collection and thus provided the participants who were the instructors and the administrators in these four PA accredited universities (U1, U2, U3 and U4), all in Istanbul, Türkiye.

18 participants from four different SFLs agreed to contribute to the study voluntarily. Specifically, the administrators and the instructors both in the accreditation department and also the ones working as teaching staff in these SFLs formed the participants. Each interviewee and university were assigned a number instead of their actual name in order to preserve their privacy. The first set of questions (i.e., background information) focused on the participants' positions in their SFLs, their years of teaching experience, majors, and degrees. In the distribution of these titles, we also reflected frequency and percentage distribution. The initial data collected from the participants within this scope is shown in Table 1 below.

Table 1

General Information about the Participants

Variables	Answers	Frequency	Percent (%)
Positions	Administrator	4	22.22
	Instructor	5	27.78
	Both (instructor & unit member)	9	50
Years of Experience	1-5 years	1	5.56
	6-10 years	10	55.55
	11-15 years	3	16.66
	16-20 years	1	5.56
	21-25 years	1	5.56
	26-30 years	2	11.11
Major	ELT	8	44.44
	ELL	8	44.44
	Translation Studies	2	11.11
Degree	BA	2	11.11
	MA	16	88.89
	PhD	0	-

Data Collection Methods and Procedures

We gathered the data for this study through document collection and semi-structured interviews. As Bowen (2009) stated "[d]ocument analysis is a systematic procedure for reviewing or evaluating documents—both printed and electronic (computer-based and Internet-transmitted) material" (Bowen, 2009, p. 27). Thus, for the documentation of this study, we scanned the relevant literature and examined the PA Handbook (2021) which is the latest one published online on PA website. In addition, we also collected and examined the documents that were prepared by the SFLs that were within the scope of this research and that were shared publicly. To support the

document analysis which is frequently used as a triangulation tool in conjunction with other qualitative research techniques (Bowen, 2009), this research study essentially employed semi-structured interviews to gather the views of the participants since communications frequently reveal the conscious and unconscious attitudes, values, and ideas of an individual or group (Frankel et al., 2011).

"A semi-structured interview is a data collection method that relies on asking questions within a predetermined thematic framework. However, the questions are not set in order or in phrasing" (George, 2022, https://www.scribbr.com/methodology/semi-structured-interview/). For the data collection with interviews, firstly, we formed the interview questions after a perusal of the relevant literature. There were 13 questions prepared at the beginning. Later, we asked for the thoughts, criticisms, and feedback of three experts who are all colleagues of the second author. There were ultimately 15 interview questions to be used after receiving feedback from each academician and making the required edits and revisions. The interviews with the participants were conducted via Zoom. The first interview was done for piloting purposes, and it was not included in the analysis of the actual data. The piloting interview lasted 15 minutes and yielded no problems with the questions. All the interviews were done in English, and there were 15 questions in total to be answered. All the interviews were recorded, and they generally took 15-20 minutes. When the interviews were completed, the first author transcribed them. After the transcriptions of the interviews, we started to analyze the findings considered vital for interpretation and discussion.

Data Analysis

In this study, we analyzed both the written data obtained from PA and SFLs' websites, and the verbal data collected during semi-structured interviews considering the purpose of the study and then interpreted the findings through qualitative content analysis which is a qualitative data analysis method. Firstly, we carried out the documentation analyses to better understand the nature of PA accreditation. As stated by Bowen (2009) "[l]ike other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge" (as cited in Bowen 2009, p. 27). To do that, we analyzed both the PA Handbook 2021 which was published publicly and also the documents, which were allowed to be shared as they were online, gathered from the participating universities.

Secondly, to analyze the qualitative data gathered through semi-structured interviews we performed qualitative content analysis. "Content analysis is a technique that enables researchers to study human behavior in an indirect way, through an analysis of their communications" (Frankel et al., 2011, p. 478). First of all, all the verbal data were transcribed verbatim and prepared for the content analysis. In essence, following the steps of qualitative content analysis suggested by Hsieh and Shannon (2005), the first author transcribed the interview data verbatim, and conducted the conventional type of qualitative content analysis on the whole data to build themes and categories. The second author analyzed a quarter of the data to see the matches and mismatches between the themes and the few mismatches were resolved. In sum, the conventional type of qualitative content analysis was shaped with several readings of the whole transcribed data.

The themes obtained through these repeated readings were categorized in light of the interview questions. The participants' statements in the oral interviews revealed 12 main themes and their opinions were then categorized according to these 12 themes. While doing the analysis, we took stability, repeatability, and accuracy aspects into account to increase the credibility of the content analysis. In the last stage of analysis, we examined the findings several times in terms of consistency and correctness. In order to support the emerging themes and establish the validity of the qualitative data, participants' own statements were reflected directly in quotations.

Ethical Procedures

Ethical approval and written permissions were obtained from Pamukkale University Social and Human Sciences Ethics Committee with the decision dated 13.10.2022. Additionally, written permissions of each participant university's ethical board were provided. Every step of the research was conducted in accordance with ethical norms. The candidates gave their consent to participate voluntarily in the study.

Findings

This section described the findings of the data analysis. The research findings regarding the related documents and the administrators' and instructors' views on PA accreditation were presented.

Document Analysis

The results of the document analysis related to the PA Handbook were presented in this part. The PA Handbook is a resource for institutions seeking accreditation so that they can build a framework and understand the fundamental ideas behind the accreditation procedure. The PA establishes some quality measurements for attaining PA certification, and there are three key quality measurements that candidate institutions must meet. Those three measures are 'managing the organization, managing learning/training, and managing assessment (if applicable).'

Table 2
PA Quality Measurements

Managing the organization	Managing learning and training	Managing assessment (if applicable)
● The organization structures ● Staff resources (roles and team working) ● Physical resources ● Administrative systems	● Design of education/training ● Maintaining and improving quality ● Learner / Trainee recruitment ● Malpractice, appeals, and complaints	● Assessment practice

(PA Handbook, 2021, p. 12)

The PA handbook provides these three headings with subheadings and offers possible examples for the candidate institutions. It is said that an organization is not

necessary to provide instances of every item in those lists, but proper documentation must be provided in order to show that a 'Quality Measure' is being satisfied. In order to see the matches and discrepancies between the requirements of PA and the actual practices of the SFLs, possible evidence from the chosen institutions is to be provided. This match and mismatch analysis was done as part of the document analysis phase. Four universities' SFLs agreed to take part in this study, as was noted earlier. Since it is known that each SFL prepares three handbooks in their PA accreditation process—the 'student handbook, staff handbook, and quality handbook'—the documents given by these SFLs to PA were also requested in order to complete the documentation analysis portion of this research. To support the documentation process with examples from the participant SFLs, only the publicly shared data and documents from these institutions' websites and the papers shared with the researcher permitted to be used in the document analysis were focused on. The SFLs of three of the four participating universities' handbooks were accessible. The student handbooks for U1, U2, and U3 were posted on their public website, and the researcher also had access to the staff handbook for U3. These three universities' documents were mostly used as examples for how the PA Handbook requirements were realized.

Managing the Organization

There are five subheadings under the 'managing the organization' title, including 'the organizational chart,' 'staff resources,' 'physical resources,' and 'administrative system.' These subheadings each contain quality objectives, and the manual explains and provides examples for each of them. The objectives and examples are presented in this section.

Quality Objective O.1: Organization Structure

This section requests precise information on the SFLs' organizational structure, which must be supported by documentation from institutions that include an 'organizational structure, clear lines of communication, meeting schedules and minutes, and all reports and documented proofs related to those mechanisms.' In light of the examples from that manual, the researcher's document collection from the chosen SFLs showed that the participating institutions generated their pertinent documents, shared them with PA authorities, and made some of these documents available to the general public on their websites.

Figure 2

Timetable for 2022-2023 Education Year in U1

SCHOOL OF FOREIGN LANGUAGES ACADEMIC CALENDAR – ACADEMIC YEAR 2022-2023 (ENGLISH PREPARATORY CLASSES)					
Re-registration for Continuing Students	To be determined depending on the dates announced by ÖSYM				
Placement Test (For Students Admitted through Central Placement)	To be determined depending on the dates announced by ÖSYM / University Registration Week				
[redacted] (For Students Admitted through Central Placement)	To be determined depending on the dates announced by ÖSYM				
Placement Test (For Students Admitted through Extra Quota	To be determined depending on the dates announced by ÖSYM / University Registration Week				
[redacted] (For Students Admitted through Extra Quota)	To be determined depending on the dates announced by ÖSYM				
School of Foreign Languages Student Orientation	3 October 2022				
Terms	Fall Term		Spring Term		Summer Term
Modules	Module 1	Module 2	Module 3	Module 4	Module 5
Classes Begin	3 October 2022	28 November 2022	6 February 2023	3 April 2023	5 June 2023
Classes End	18 November 2022	13 January 2023	24 March 2023	18 May 2023	6 July 2023
End of Module Exam	21-22 November 2022	16-17 January 2023	27-28 March 2023	22-23 May 2023	7 July 2023
[redacted] Language Exemption Test)	24 January 2023		30 May 2023		12 July 2023

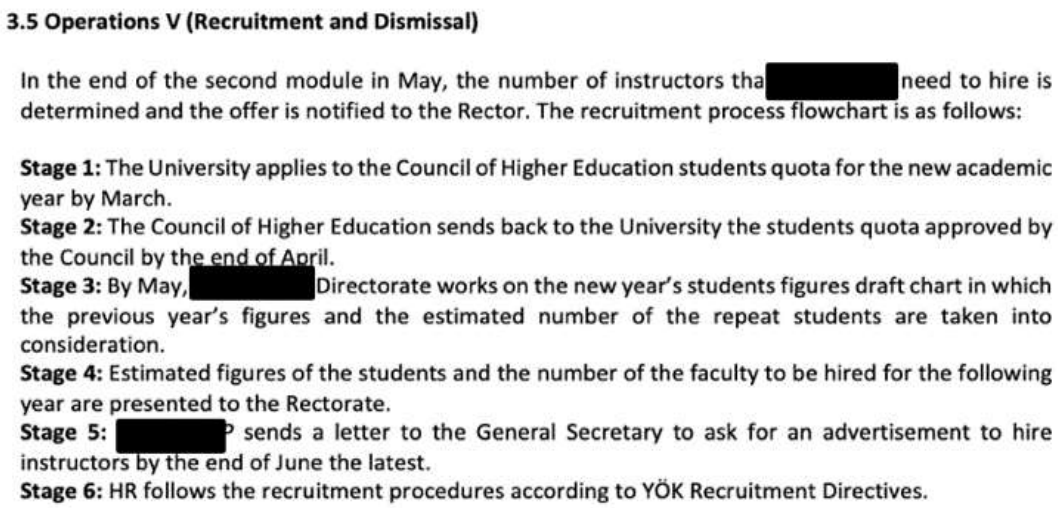
As it can be seen in the Figure 2 above, there is a detailed and clear description of the timetable of U1. All the dates from pre-registration to the start and end of the modules and also the dates of important exams are provided both for the students and instructors and also open to public access.

Quality Objective O.2: Staff Sources (Roles and Team Working)

This quality assessment is focused on 'the staff recruitments, trainings, staffs' observations, and developments.' It is acknowledged that instructor development and recruitment processes have a particular role in the PA process. Figure 3 below in the U3 staff handbook contains an example relating to 'staff recruitment.'

Figure 3

Staff Recruitment procedures in U3



3.5 Operations V (Recruitment and Dismissal)

In the end of the second module in May, the number of instructors tha[redacted] need to hire is determined and the offer is notified to the Rector. The recruitment process flowchart is as follows:

Stage 1: The University applies to the Council of Higher Education students quota for the new academic year by March.
Stage 2: The Council of Higher Education sends back to the University the students quota approved by the Council by the end of April.
Stage 3: By May, [redacted] Directorate works on the new year's students figures draft chart in which the previous year's figures and the estimated number of the repeat students are taken into consideration.
Stage 4: Estimated figures of the students and the number of the faculty to be hired for the following year are presented to the Rectorate.
Stage 5: [redacted] sends a letter to the General Secretary to ask for an advertisement to hire instructors by the end of June the latest.
Stage 6: HR follows the recruitment procedures according to YÖK Recruitment Directives.

Quality Objective O.3: Physical Sources

This quality assessment focuses on the physical sources. The standards for this assessment overlap with university facilities generally. The student services offered to students, including as libraries, computer and internet services, are illustrated in the example from the U3 student handbook below.

Figure 4

Students' Services in U3

VIII. SERVICES PROVIDED TO STUDENTS
a. Academic Counselling Unit (ACUT)
b. Health, Culture, and Sports (SKS) Directorate Activities
b.1. Sports and Social Life
b.2. Registration to Student Clubs
b.3. Food and Beverage
b.4. Health Services
b.5. Insurance
b.6. Disabled Student and Special Needs Support
b.7. Library
b.8. Psychologic Guidance and Counselling (PDRM)
b.9. Accommodation
b.10. Computers and Internet
b.11. Photocopy

Quality Objective O.4: Administrative Systems

The 'accurate, current, and safe and secure maintenance of the documents', such as 'registers and attendance' of the students, is the main focus of quality evaluations of administrative systems. It can be inferred that the PA compels all officially recognized institutions to maintain their records in a safe and secure location with the necessary dates and signatures, all while being under the control of a document manager from a SFL.

Managing Learning/Training

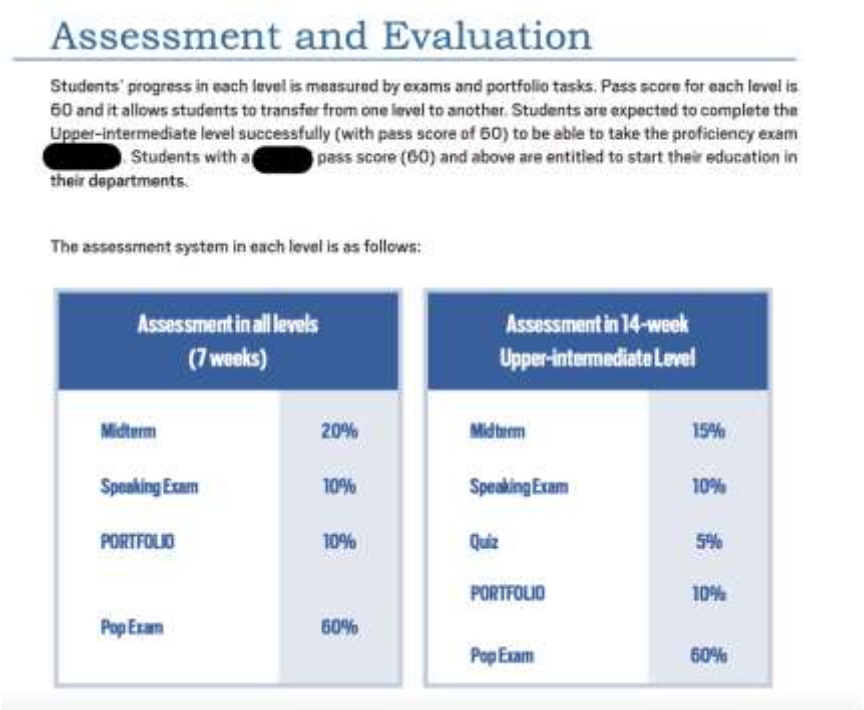
Four 'quality objectives' related to 'design of education/training, maintaining and improving quality, learner/trainee recruitment and malpractice, appeals and complaint, and managing learning/training' must all be supported by evidence. The manual provided an explanation and illustration of each of these quality goals. The tables in this section contain the objectives and examples.

Quality Objective L.1: Design of Education / Training Programmes

This heading makes it apparent that specific details on the educational and career goals of both teachers and students are needed. This quality measurement's key components include 'needs analysis, training programs, questionnaires, stakeholder participation, review meetings after trainings, and proper evaluation technique.' To meet these requirements, here is the assessment design of U2 in the example below:

Figure 5

Assessment Metrix Chart in U2



Assessment and Evaluation

Students' progress in each level is measured by exams and portfolio tasks. Pass score for each level is 60 and it allows students to transfer from one level to another. Students are expected to complete the Upper-intermediate level successfully (with pass score of 60) to be able to take the proficiency exam [redacted]. Students with a [redacted] pass score (60) and above are entitled to start their education in their departments.

The assessment system in each level is as follows:

Assessment in all levels (7 weeks)	
Midterm	20%
Speaking Exam	10%
PORTFOLIO	10%
Pop Exam	60%

Assessment in 14-week Upper-intermediate Level	
Midterm	15%
Speaking Exam	10%
Quiz	5%
PORTFOLIO	10%
Pop Exam	60%

Quality Objective L.2: Maintaining and Improving Quality

For this heading, it is necessary to provide systematic justifications and explanations of the SFLs' quality management procedures. It's obvious that 'feedback' from the teachers and the students has a big impact in this situation because they were meant to be considered as 'suggestion boxes' in the instances. The exact composition of the quality circle must be established in order to reach that quality measurement. When the participant universities were assessed, it was found that they had 'student representatives' and a related section to manage their students' offers.

Quality Objective L.3: Learner/Trainee Recruitment

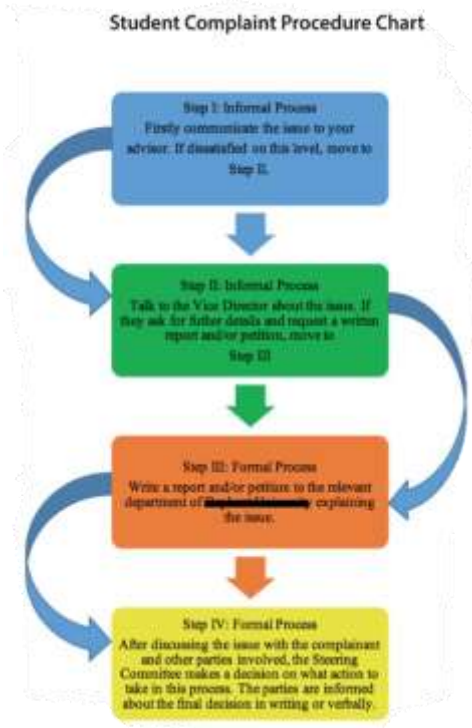
This section primarily focuses on the 'accurate' data released by the SFLs. Here, emphasis is placed on the school websites. According to the statement, all webpages should be 'correct and updated.' Along with that information regarding students and trainees, it is also expected that the SFLs' plans and timetables be created and communicated.

Quality Objective L.4: Malpractice, Appeals and Complaints

The majority of the information under this topic relates to the SFLs' 'malpractice, appeals, and complaints procedures, both for instructors and students.' Under this topic, it is intended that the details, steps, and records of these processes will all be displayed and supported. The student handbook of the U1 also includes an example of the complaint procedure as seen below:

Figure 6

Student Complaint Chart in U1



Quality Objective L.5: Alignment to Global Scale of English

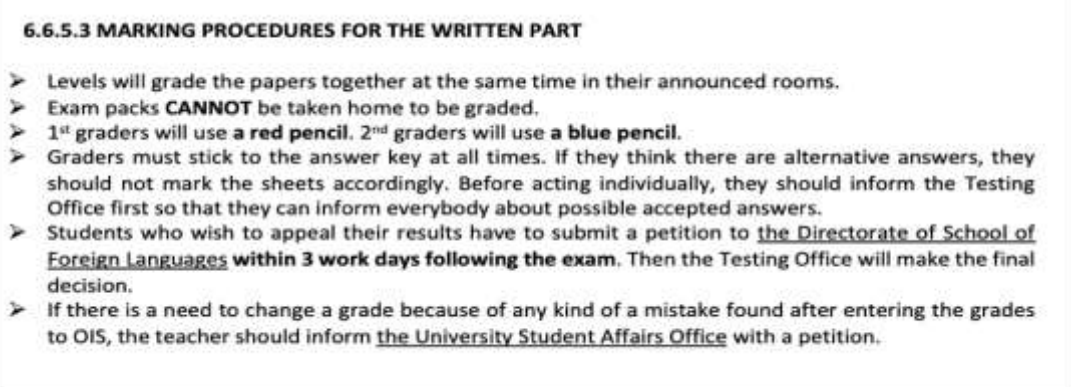
The institutions are expected to provide a clear statement of the 'learning objectives' under this subject. Prior to the start of the academic year, all institutions prepare their learning objectives, and they have a specific unit called a 'curriculum unit' that all participating universities have.

Managing Learning/Training

As this section states, 'clear assessment procedures, valid and reliable assessment methods, standardized assessment procedures, accurate marking, safe and secure storage of the tests, and the rules of invigilation' are required. The U3 staff manual provides the example below, which satisfies the quality aim of managing evaluation measure.

Figure 7

Assessment Procedure for the Written Part of the Exams in U3



6.6.5.3 MARKING PROCEDURES FOR THE WRITTEN PART

- Levels will grade the papers together at the same time in their announced rooms.
- Exam packs **CANNOT** be taken home to be graded.
- 1st graders will use **a red pencil**. 2nd graders will use **a blue pencil**.
- Graders must stick to the answer key at all times. If they think there are alternative answers, they should not mark the sheets accordingly. Before acting individually, they should inform the Testing Office first so that they can inform everybody about possible accepted answers.
- Students who wish to appeal their results have to submit a petition to the Directorate of School of Foreign Languages **within 3 work days following the exam**. Then the Testing Office will make the final decision.
- If there is a need to change a grade because of any kind of a mistake found after entering the grades to OIS, the teacher should inform the University Student Affairs Office with a petition.

Administrators' and Instructors' Views on PA Accreditation

In order to elicit experience-related data and enable a range of responses that fell within the parameters of the study, we used semi-structured interviews in addition to the document analysis. For this reason, the participants were invited to give their open and frank opinions about the PA accreditation process they had undergone during the interviews. Throughout the interview, 15 questions were posed to the participants.

The themes obtained via conventional type of qualitative content analysis were created based on the information provided in the interviewees' responses. The statements made by the participants during the oral interviews revealed 12 key topics, and the opinions of the participants were reported in accordance with these themes. In sum, using content analysis techniques, the researchers identified the following themes, which were informed by the participants' responses and shaped by the interview questions:

1. The meaning of the PA accreditation.
2. Previous ideas about the PA accreditation
3. The effects of the PA accreditation
4. The challenges of the PA accreditation
5. The benefits of the PA accreditation
6. National and international recognition provided by the PA accreditation

7. The role of the PA accreditation on commitment and institutional belonging of the instructors
8. Securing the future by the PA accreditation
9. The reasons of the PA accreditation preference
10. Suggestions for improving the PA accreditation process
11. Wishes to be accredited in the following years
12. General comments for the PA accreditation process

Following a thorough analysis of the participants' background data, the following sections present an analysis and cite quotes from the participants' actual utterances to substantiate their opinions on the themes that were presented.

The Meaning of the PA Accreditation

The participants' perspectives on 'what PA accreditation means' are covered in this section. For the majority of the instructors, there was no clear definition of PA accreditation because they had no prior knowledge of it. On the other hand, the administrators from the participants claimed that it implied 'quality, standardization, and paperwork.' Below are participant quotes that serve as illustrations of what it meant to them:

> I had no idea what it was, what accreditation meant but after that process, yes I know that it means a lot for a university. It provides you some documents. (P1, Instructor & Testing and Assessment Unit Member)
>
> To me it means quality of course. The quality that we have in our SFL, the system if the system is working well or not. (P4, Vice Director, Administrator)
>
> It means a lot of paperwork. To me personally, it means a lot of not boring but repetitive paperwork but at the end it provides I think a good perspective to our institution. (P6, Instructor & Administrator)
>
> I can say it is a form of verification that shows our education program meets certain quality standards so it's kind of a quality control so that all the systems necessary for providing high quality of education are working effectively. (P16, Instructor & Administrator)

As can be seen from the quotations, all participants viewed accreditation primarily in terms of fostering quality in their SFLs, and they had a favorable attitude toward what certification means.

Previous Ideas about the PA Accreditation

This section discusses how the participants interpreted their earlier perceptions of PA accreditation. It is obvious from the statements made by the participants that they had a vague understanding of both the PA accreditation and accreditation in general. The following quotes from the participants serve to show their viewpoints:

> Actually, at first I did not have any ideas. I was the head of the testing and assessment unit; that is why I was involved in this process. We had a consultant, we had meetings and then things started to get clearer to me. After these meetings, some of my ideas changed of course in a positive way. (P4, Vice Director, Administrator)
>
> To be honest, I didn't know anything about PA before so there was no chance, but a little new information showed up in my mind. (P5, Instructor)
>
> Before I start doing this, I did not know very much but I thought that it must be a very very difficult process. But after I got involved in it, I saw that if you do stuff regularly and if you keep up to date with your handbooks and your proofs etc., it is not very difficult. I thought that it was much more difficult than it actually is. (P6, Instructor & Administrator)

The Effects of the PA Accreditation

In this section, the participants' opinions on the impact of PA accreditation on 'quality management, administration, and quality of education' are discussed. The participants discussed these themes, starting with how PA affected their SFL, moving on to how it affected them as instructors, and concluding with the benefits they saw in their SFLs generally during and after the process.

The Effects of the PA Accreditation on the SFLs

The participants defined the effects of PA accreditation on their SFLs mostly as follows: having certain standards, increased workload, causing a lot of paperwork and creating a new insight. The majority of the instructors thought that these consequences improved the institutions. Only paperwork was viewed negatively as a time-consuming task, but it was also seen as a useful tool for the institutions to create an archive and have all the necessary documentation. Overall, the PA accreditation had a favorable effect on both the administration and the instruction as expressed by the participants, especially in terms of establishing a standard in their SFLs. The following quotes from participants serve as examples:

> It gave us a standard I mean provided us with some standardization about all the levels, all the issues for all students and also administration and the instructors because we have to follow some rules and we have to be more creative in teaching and we can improve our techniques, methods also. It gave us standardization in fact shortly. (P3, Instructor & Previous Digital Learning Unit Member)
>
> I think even starting to get accredited and that process helps a lot and then after you get your accreditation, it helps the school with keeping records of everything. So, when you keep those records to be used as proofs or as an application material for another accreditation process, it provides the institution a great resource of insight again. (P6, Instructor & Administrator)
>
> One of those effects I believe is the awareness of actually being standard, being transparent and actually we learnt how to categorize everything we learnt how to collect proofs. (P15, Instructor & Testing and Assessment Unit Member)

The Effects of the PA Accreditation on Instructors

Participants were also asked what they thought of how the PA accreditation process affected them as instructors. The effects were commonly described by the participants as 'a way of boasting, self-assessment, an opportunity for personal development, having better and clearer goals, standardization in teaching, feeling more secure, and a strength to improve their belonging to their SFLs.' Some instances that support this are the following:

> It was a kind of self- assessment process for me. So, accreditation criteria are very useful for teachers so we can see ourselves from a different point of view. So, we can see our pros and cons. We can evaluate ourselves much better by using such kind of accreditation instructions. (P2, Instructor)
>
> After PA accreditation, we have more opportunities to improve ourselves for example our institution has provided us with more professional development seminars or conferences, or some trainings and they all helped me to improve myself as an instructor. (P3, Instructor & Previous Digital Learning Unit Member)
>
> As an instructor, it provides great standardization because it focuses mainly on how everything is done in your school. Does each and every instructor in your school know this process? Are things done in the same way throughout all the steps? So, I think it provides great standardization among instructors and in their teaching eventually. (P6, Instructor & Administrator)

> It gives a sense of security for me to know everything is conducted according to a set of principles and I know that each and every student goes through the same processes like nobody plays it by ear everything has to be documented if my student is late to class 10 minutes and if I don't allow him in my class or if I mark him absent in my class and I know that another student in another class also goes through the same so students cannot come to me and complain about this and that. So, there's like a fair approach I can say. I feel safe and I am being fair.. (P16, Instructor & Administrator)

While the majority of the participants thought that the impact of the PA accreditation on instructors was beneficial, a small number of them thought that the accreditation was a burden and an unnecessary workload. The quotes that follow can help to support this assertion:

> I don't think it has individual benefits other than unnecessary workload. (P5, Instructor)
>
> Everybody is waiting for higher salaries but nothing like that. Most of the time to be honest it is a burden actually it seems like a burden it is important for the institutions not for the instructors I think. (P14, Instructor &Education Manager)

The Effects Observed in General During and After the PA Accreditation Process

In addition to the effects of the PA accreditation process on the SFLs and the instructors, the consequences of the PA accreditation process both during and after this procedure in general in the SFLs were also questioned. The participants primarily used the words 'intense, stressful, busy, hectic, and nervous' to describe the consequences they saw during PA certification. Additionally, they described the post-accreditation impacts as being happy, proud, and in a better situation. Some instances of these viewpoints are the statements that follow:

> During the accreditation process, everybody was in panic, and they got some training about how to get accreditation, how to follow and how to go on the process but then everything started to be recorded and before that similar issues were done in fact, but they hadn't been recorded. So, everything started to be recorded during the process so when we saw the written form of everything, we understood as an instructor and also as a unit member in that time that we did everything in fact but now we can see, and we can prove what we had done already. (P3, Instructor & Previous Digital Learning Unit Member)
>
> I have to say that I am proud of our academic units and in our school it was the academic units which were all involved in this process. We had the handbooks to write, and we had to put everything that we had been doing on paper, so it made me proud of what we already had. Because after we wrote the handbooks, we just looked at the handbooks and we said, "everything is real, we are not lying, we are doing all these things" As an example I can give double marking system. It is in the handbook and yes we are doing it. And we have been doing it for so long and it is part of the quality assurance, this is just one example. So, it is like you are testing yourself, too. Do we really do all these that we have written in the handbook? And if you can say yes then you should be proud of yourself. And after the accreditation process, we always tried to stick to our quality measures. The handbooks are the holly books for us, so we always try to follow what we promised so this means that you don't want to lose this accreditation, yes but also you have to do something for the quality enhancement. We always try to make it better and we show everything in our action plans, and we have some short-term goals and long-term goals, and we have very regular quality meetings and now it has been 4 years since we got the accreditation, and we still continue with everything as if it were new. We update everything, we modify, we make new changes, so we are still in this process. We just continue moving forward. (P4, Vice Director, Administrator).
>
> During the process we were crazy busy, it was real hard work and after that it becomes easier because once a year you are being audited. Once you have it everything is okay for the school but during the process it was so hard for the administrators and the instructors as well. (P14, Instructor & Education Manager)

The Challenges of the PA Accreditation

As evident in the statements above, most of the participants valued the experiences they gained during the accreditation process. This section however outlines the participants' perspectives on the difficulties they had encountered with regard to the administration, testing, teaching, and paperwork-related issues during the PA accreditation processes in their SFLs. The most commonly cited difficulties among the participants were the high amount of paperwork, the increased amount of workload, providing the proofs of all the work they do in their SFLs, and organize and prepare the archives of their SFLs. Following are some quotes that shed light on how the participants described their difficulties:

> The most significant part here as far as I know is that we needed to get good education or training about the PA accreditation and what should be done to get it. This was the first step, and it was a little bit challenging at first but when they informed us about the process in detail properly, then it became better and easier. As I told you earlier, writing everything in some cases or recording everything or putting all issues in the written form were a little bit difficult but after doing it we saw that it was worth doing. (P3, Instructor & Previous Digital Learning Unit Member)
>
> I don't remember having any difficulties in the teaching process but there were some factors affecting the assessment and the evaluation process and these brought us too much paperwork. (P5, Instructor)
>
> Organizing and preparing archives was a bit more troublesome because it was a retrospective task. Think about it, I fulfilled my responsibilities as a teacher who gave lessons before. But then I became the assistant manager, and I had a hard time because the follow-up of these works was not done well before us, the dates were not documented properly. (P18, Vice Director, Administrator)

The Benefits of the PA Accreditation

While the participants stressed several major challenges embedded in the accreditation process, they also emphasized the specific benefits earned. In this section, the participants' opinions on the advantages they had encountered during the PA certification process in their SFLs with regard to their concerns with instruction, testing, administration, and paperwork were discussed. The participants listed some concepts such as being more standardized, being more organized, having the clear job descriptions, having handbooks which clearly states every detail for everyone in SFLs, creating an awareness, and feeling more organized as the benefits. Here are a few examples of participant statements:

> For example, in terms of teaching, we created level objectives, teaching objectives, teaching outcomes for each and every level. So that helped me when I was working in the curriculum and material unit. As an admin, I mean or as a member of a unit or as a teacher, it helped me become more organized because I keep in mind the process all the time. When I am doing something, I always think that I can use this as a proof in the future and I am much more organized and systematic now. (P6, Instructor & Administrator)
>
> I can say this is beneficial for the new instructors, to the newly hired instructors actually because they can learn many things if they read by the way. When they read the handbooks, they can learn many things about the process and the procedures of our SFL. (P14, Instructor &Education Manager)
>
> The creation of units was, in my opinion, the most beneficial activity. Description and foundation of Testing and Assessment, Level Coordinators, PDU… and their duties. In the past, the tasks were done by sharing the workload- that is, we used to take turns in preparing exams and so on. These things prevented a standard job and were incompatible due to differences in interpretations. But now it's better. (P18, Vice Director, Administrator)

National and International Recognition Provided by the PA Accreditation

Besides the potential challenges and benefits embedded during accreditation, the participants were also questioned about their opinions on the regional, national, and global respect that the PA accreditation confers. Some participants expressed doubt about international recognition, even though the majority of participants thought that PA accreditation leads to national recognition.

> As far as I know it is also valid in some European countries and internationally recognized. In current issues PA accreditation is well-known now in Türkiye, in national universities, even in state universities and it will spread the world I think because it has some really valuable principles and if you follow them you will get the accreditation, you will be a recognized institution and your students will get all the benefits about it. So, it provides both national and international recognition. (P3, Instructor & Previous Digital Learning Unit Member)
>
> Well, it has a credit of course, nationally we can say that but internationally maybe it facilitates but I don't know because as far as I know the students can benefit from it but not the instructors, students have the certificates for their academic lives. And nationally the other schools of course know you, they are aware of you as an PA accredited foreign language school but internationally I don't know. (P14, Instructor & Education Manager)

The Role of the PA Accreditation on Commitment and Institutional Belonging

The opinions of the participants regarding how the PA accreditation impacted their feelings of commitment and institutional belonging toward their SFLs are covered in this section. Some participants claimed that PA accreditation had no bearing on their commitment to teaching or their senses of belonging to their SFLs; however, most participants, especially those who worked in academic units and had administrative responsibilities, claimed that PA accreditation increased their commitment to and sense of belonging to their SFLs. To demonstrate their points, the following quotes are provided:

> I think there are other sources of motivation for instructors like financial benefits, salaries, other benefits that the school has to provide. I wouldn't say it is the priority right now. There is no doubt that it increases the level of commitment. (P1, Instructor & Testing and Assessment Unit Member)
>
> I think my respect level to my institution has increased. Whenever I talk to someone else outside I can say my school has the PA accreditation and our students get education according to these principals, so I feel myself more honored than before that means it increased my institutional commitment and institutional belonging. (P3, Instructor & Previous Digital Learning Unit Member)
>
> I think no. If better conditions are provided, I can work in a non-accredited institution. I don't think anyone would feel a sense of belonging just because of the quality of education. (P5, Instructor)

Securing the Future by the PA Accreditation

As a related theme to sense of commitment and belonging, the participants also revealed their views on the future of their institutions with PA accreditation. In this section, specifically the participants' opinions on how PA accreditation safeguards their SFLs' futures, their careers, and the careers of their students were reflected. None of the participants had a unified opinion on this issue. Although some participants believed that PA accreditation secures their future, others believe that it secures only the students' future, and yet others believe that it does not secure anyone's future at all. The participant quotes are as follows:

> In terms of securing a future, yes, definitely I can agree with this idea as I just told. If I talk about myself, I can tell that I worked in a university which has the PA accreditation so for my students it is the same and valid for all the member of the SFL I think. So, it affects my school, me as an instructor and my students also. (P3, Instructor & Previous Digital Learning Unit Member)
>
> I think PA does not guarantee a future for instructors. Similar to instructors, I don't think this document provides a guarantee for students to find a job or when they apply for a higher degree or something. Employers don't ask for a PA document when they look for someone. (P5, Instructor)
>
> For students I can say yes because although the institution I work at is one of the old universities in Türkiye when they go abroad, they may have problems with the recognition of the diplomas or the certificates we provide. But if they see PA that person at least thinks 'oh they are assured by Pearson' so that is not a clown factor at least. (P6, Instructor & Administrator)
>
> Yes, it secures the future of our school, and it secures the students' career but not the instructors' because I mean the only thing is that when you want to go somewhere else, I mean when we had to go somewhere else so other universities, you tell the others that you worked in PA accreditation, and it may boost your reputation maybe. It is a nice judgment actually, I mean you can prove that you can handle this hectic business, hectic duration actually it is a proof. (P14, Instructor & Education Manager)

The Reasons of the PA Accreditation Preference

The participants' justifications for choosing the PA to be accredited are explained in this section. Most of the participants claimed they were unaware of the cause and just offered their personal opinions on the matter. According to the participants' perspectives, it is clear that instructors were not aware of the basis for that preference; yet most of them believe that PA was picked because it is well-known. However, individuals who held administrative positions in their SFLs expressed a preference for PA accreditation by stating that PA creates a framework and provides consultancy. Following are some comments made by the participants:

> I have no idea about it. Maybe it is because it is the most recognized one in the world. (P1, Instructor & Testing and Assessment Unit Member)
>
> In fact, it is about the administration, but I think that they know all the advantages of PA accreditation, so they most probably preferred it because of that reason. (P3, Instructor & Previous Digital Learning Unit Member)
>
> I think we saw this as a first step. As a first step, this was the right accreditation. Others may be more demanding; they are more into what is happening in the classrooms, and they are more focused on learning. PA is different from them, at least I think so. It is more interested in the system, how the system works. Of course, they are interested in what is happening in the classroom but the questions like 'How do your academic units work? Do you have handbooks? Do you follow the rules?' so I think this is a first step. (P4, Vice Director, Administrator)

Suggestions for Improving the PA Accreditation

The suggestions made by the participants to improve the PA accreditation process were also requested and recorded. Most of the participants were silent on this subject. However, when some of the participants discussed their proposals for improving the accreditation process for PA, it became clear that they were more focused on their own universities and how those institutions handled the process in general rather than on PA in particular. The following quotation serves as an example:

> Instead of increasing the workload to achieve a certain quality, maybe both the quality of education and satisfaction of teachers and also that of students can be checked and considered further. (P5, Lecturer)

As can be seen, the PA does not prescribe standards for the institutions; rather, they only conduct audits when the institutions are able to manage their own standards, systems, proofs, and organizations, and to demonstrate this to the PA. PA evaluates the quality management system of the institutions as a whole. However, as the participants noted, teacher satisfaction is not a purview of any accrediting body. We can therefore draw the conclusion that the instructors in the institutions are misled about the PA accreditation procedures since not enough information regarding the PA accreditation is provided at the outset within the SFLs. Other participants, on the other hand, suggested that the PA accreditation procedure include classroom activities. This could appear to be an institutional idea as well. Here's a relevant quotation:

> Maybe the criteria may be modified a bit. There can be some items about what is happening in the actual classroom. For example, there is no classroom observation in this PA accreditation. They don't observe classes. So, I can say that they can add some more items in the criteria. (P4, Vice Director, Administrator)

Wishes to be Accredited in the Following Years

This section is devoted to the participants' goals and aspirations for having an accredited SFL in the next years. Most participants said they intended to pursue accreditation in the upcoming years. They intended to continue the certification procedures because they did not want to lose the accreditation, the habits they earned during this process, and the standardization within their SFLs that accreditation had brought to them. Additionally, the participants felt that it should continue despite the difficulties they had previously noted because it was an ongoing process. They claimed that being accredited aided them in exercising self-control and self-examination as well as in taking appropriate precautions. The following are relevant comments made by some participants:

> Yes, sure because it will cause us to be always ready to improve ourselves because if some time passes, as human beings it is our nature if we do the same thing, we get used to doing it continuously so if we are accredited again, it will make us alive again and we will improve ourselves better, I guess. (P3, Instructor & Previous Digital Learning Unit Member)
>
> Yes because like I said thanks to PA accreditation we keep ourselves in check so that accreditation process although it has become a routine for us now, still keeps us in check in terms of organizing, getting the data and everything else. (P6, Instructor & Administrator)
>
> Of course, to prove that we are a standard school, we have a very transparent policy to prove that. (P14, Instructor & Education Manager)
>
> Of course, we would. In this way, it takes root even more with the habits and principles it has brought to institutions. It becomes the culture of institutions. (P18, Administrator)

General Comments on the PA Accreditation

The further remarks made by the participants on the PA accreditation were presented in the last section. The participants were given the opportunity to add anything else they felt was important in addition to the researcher's questions. In general, there were no further remarks, and the participants said they covered everything because the interview questions were in-depth. On the other hand, a few administrators spoke up. A participant said that institutions should be curious about accreditation processes to create an insight, while another participant commented on the importance of teamwork in PA accreditation process. The following quotes from the participants can be used to highlight these views:

> I think institutions should be interested in it because it really shows what you are actually as an institution. You see your weaknesses and your strengths. It opens new horizons. Being in this process is also fun, yes it is hard, tiring but it is also fun. You can take this as a recommendation. (P4, Vice Director, Administrator)
>
> We needed the team very much during the preparations. The collection of the documents, the evidence, preparing the presentations, and advertising the importance of accreditation were done by a few people. When those few people put a lot of effort into the subject, they also took ownership of the issue, but it will take time to corporate this culture in the institution. As a foundation university member, I can say that it is necessary that senior management should also value this issue, otherwise you cannot receive support. (P18, Administrator)

The results of the semi-structured interviews were, in general, given in this part. Following the presentation of the themes that developed from the remarks made by the participants during the interviews, the key conclusions in each theme were stated and supported by participant citations. The discussion and conclusion will be offered in the next section.

Discussion and Conclusion

The goal of the current study was both to perform a document analysis on the online information provided on PA Handbook website and on the SFLs' PA related sharings online on their websites; and also to gather a group of instructors' and administrators' views on PA accreditation and to discover how they view the accreditation process in relation to the quality control of their institutions. Document analysis and semi-structured interviews were employed in the current study to collect the qualitative data. Through document analysis and content analysis, the findings were achieved. For the document analysis part, firstly PA handbook was evaluated and reflected with the tables, charts, and then to be able to see the matches and mismatches between the requirements of PA and the actual practices of the SFLs, possible evidence from the selected universities was collected, analyzed and shared directly from their websites. Our analyses of these documents have revealed two main factors: (1) the PA Handbook is highly explicit providing necessary guidance for the SFLs applied and (2) the website sharing of the SFLs analyzed and the requirements stated by the PA website were compatible. For the semi-structured interviews 18 participants from four SFLs voluntarily joined the interviews. As a result of verbal data analysis, the opinions of the participants produced 12 key themes. For each theme, participants' views which highlighted some crucial and common points were documented and supported with the relevant quotations of the participants. Most of the participants although they acknowledged that they had had very limited idea and knowledge about PA at the beginning were observed to favor the accreditation process, the required preparation and paperwork, and saw all these as rewarding and edifying not only for their institutions but for their students and for themselves.

As previously noted, there is fierce competition among the growing number of higher education institutions today. Institutions prioritize their efforts to improve quality, seeking authorization and validation from independent organizations to remain competitive. Teaching a foreign language and ensuring a high standard of foreign language education are key characteristics that distinguish institutions in the globalized world of the twenty-first century. Therefore, in the context of quality studies, 'accreditation,' the focal point of this study, holds significant importance. Accreditation is perceived as a means to elevate schools' quality standards, approved by an authorized

organization, enabling schools to reap the benefits of accreditation processes and gain approval from the accrediting organization. As indicated by Karaferye (2017), the rise in school accreditations was a result of the implementation of English education in accordance with internationally recognized standards. Given the growing importance of accreditation, Ataman (2021) and Doğan (2022) also focused on international accreditation institutions, including PA. Ataman (2021) explored instructors' opinions on PA, CEA, and EAQUALS, concluding that opinions varied based on how prepared their universities were for accreditation rather than the quality assurance agency itself. Doğan (2022) studied both national and international accreditation agencies, including PA, and compared them in terms of general information and requirements such as procedures, goals, evaluation criteria, and fees.

Considering all the aforementioned points, this study aimed to shed light on the views of instructors and administrators on accreditation to reveal how they perceived the quality improvement efforts of their schools through accreditation. As Gidey et al., (2014) stated, quality management is a 'holistic philosophy,' and thus, the views of both instructors and administrators carry great importance, being crucial components of quality management in their SFLs. Gidey et al., (2014) also emphasized that quality management entails continuous improvements and structural problem-solving in response to constant feedback from customers. Therefore, the participants in this study provided feedback on quality management processes, even though they were not the 'customers' but crucial role players in their institutions' quality management processes. Besides, Kalaçay (2019) highlighted that accreditation is more than just a certificate; it is a comprehensive process that focuses on improving the applicant institution under the guidance and experience of the accreditor, ultimately resulting in the institution acquiring a renowned brand. In that sense, even receiving praise from a reputable and respected educator regarding the caliber of an institution's curriculum might be viewed as a form of accreditation. Kalaçay emphasized that receiving praise or criticism from educators are all milestones in the accreditation process since it involves and provides a continuous quality improvement cycle.

Therefore, accepting the views of educators is both important and guiding. Also, 'leadership, engagement of people, process approach, improvement, evidence-based decision making, customer focus, and relationship management' were the seven quality management principles of ISO 9001:2021 (ASQ, 2022). Thus, receiving feedback from educators was part of both engagement of people and relationship management. These pieces of feedback provided insights into whether these principles of quality management were applied during the accreditation process. Consequently, the results of the interviews and the analysis of the criteria revealed some matters that need highlighting, derived from the views of both instructors and administrators of the SFLs that received accreditation.

Overall, in the light of the research questions of the study, the findings of the current study reveal that most of the participants of the study had positive attitudes about the accreditation process in their SFLs. They perceived this process as an advantage since they believed it made their institution more organized, set standards within the institution for everybody and ensured that all the procedures in the school are performed in line with the accrediting process rather than the administrators' or anybody else's personal preferences. Similar results were also reported by Sarı (2019),

who identified positive effects of accreditation, defining them as a “better system in the organization, assessment of performance, change in teaching materials, increased teamwork spirit, better quality in education and professionalism resulting from standardizations, counseling sessions, use of original books, CPD units, and new documentation policies” (p. 65). Furthermore, the current research revealed that the accreditation process helped the participants to be more organized because they had to create the archives of everything they did which helped them to keep the documents of everything with the proofs. This documentation and proving everything helped them to control and check all their works although they stated that it was hard for them to create all the written documents and proofs of everything in the beginning. In line with his study, in addition to the previously mentioned points, the participants of the current study also emphasized the awareness and self-reflection that they earned via accreditation processes.

Furthermore, ‘teamwork, standardization, and documentation’ were some of the concepts used by the participants in this study. Some participants also mentioned that accreditation requires good organization within institutions, given its busy, intense, and tense nature, necessitating teamwork and team spirit to effectively manage the process. Additionally, the study by Uçar and Levent (2007) arrived at a similar conclusion, emphasizing the importance of managing significant organizational change through teamwork during the accreditation process. Furthermore, the current research revealed that the accreditation process helped the participants become more organized since they had to archive everything they did, aiding in document retention. This documentation and record-keeping helped them monitor and assess all their work, although they initially found it challenging to create all the required written documents and proofs. This aligns with the findings of Uçar and Levent's (2007) study. Kalaçay (2019) also reported similar results in his study, stating that “universities that were accredited experienced significant changes not only in terms of the predetermined categories but also in terms of awareness of quality and ability to self-reflect” (p. 66). In line with his study, the participants in the current study also emphasized 'awareness' and ‘self-reflection’ gained through the accreditation processes.

On the other hand, despite the predominantly positive attitudes of the participants, the findings revealed that since they were not a member of any academic units in their school, the instructors felt a bit excluded from the accreditation processes. In addition, some actions as having regular meetings, scheduling meeting minutes, having standardization sessions, collecting the proofs of their actions looked like a burden for them since they weren’t informed about the accreditation process requirements in detail in the beginning. Sarı (2019) also reported similar negative findings, stating that “the accreditation program brought about unnecessary or excessive workloads for them, which decreased their motivation” (p. 66). The concern with paperwork was another prevalent theme, the administrators and the instructors in this study mentioned the significant quantity of paperwork they had to complete, which made the procedure somewhat monotonous and exhausting for them. In summary, based on the research questions, in terms of the quality management of the SFLs, both instructors and administrators held mostly positive views of the accreditation process. It can be noted that even if some of the participants were dissatisfied with the additional paperwork, in terms of observational responsibilities and standardization tasks that the

accreditation process entailed for them, they generally had a favorable attitude toward taking part in this process.

Implications

In conclusion, this study attempted to provide an insightful assessment on the PA accreditation process within SFLs by gathering the viewpoints of both instructors and administrators while also reviewing relevant documentation. An appreciable outcome of this research is the overwhelming expression of gratitude from nearly all participants for the opportunity to voice their insights on this subject. This shows that the researcher was successful in extracting frank and honest perspectives from all participants, which shed light on both good and negative perceptions of the certification process and provided helpful ideas.

The insights gained from the participants' comments could be a source of illumination for those in charge of educational institutions and accreditation agencies. For example, accreditation authorities may consider including instructors and students in the accreditation process, as indicated by some participants. Additionally, school administrators are encouraged to increase accreditation awareness through workshops and thus improve communication within their institutions. However, significant limitations in this study must also be recognized. It was done in a small number of universities in Istanbul, focusing only on the opinions of administrators and instructors. Furthermore, the interviews were conducted via remote communication means such as Zoom. Future research could include a broader range of universities as well as SFL students to gain a more comprehensive picture. Furthermore, because this study only looked at PA accreditation, future research might look at SFL personnel's perspectives on all certifying agencies, providing a more comprehensive and nuanced picture of the accreditation landscape.

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Conflicts of Interest

This article has no financial, commercial, legal, or professional relationship with other organizations, or with the people working with them, that could influence our research.

Statement of Responsibility

Both authors would like to thank all the participants for their contribution to the interview part of the study.

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School Dropout Causes in Turkish Education System (2009-2022): A Pareto Analysis by Grade Level *

Türk Eğitim Sisteminde Okul Terk Nedenleri (2009-2022): Eğitim Kademelerine Göre Bir Pareto Analizi

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ABSTRACT: This research examines the reasons for school dropout occurring at varying education levels in the Turkish education system (TES). To this end, research on school dropouts pertaining to TES has been targeted. The systematic data analysis method was used in the research. 47 studies suitable for the purposes of the study were analyzed through content analysis. A total of 290 coding processes were carried out. The results suggest that the family factor emerges as the main factor for school dropout in primary education in TES. The inadequacy of families' financial situation and low interest in education are effective. At the high school level, students' academic failure, absenteeism, peer pressure, and indifference of families appear as the causes of school dropouts. In higher education, difficulties learners experience in adapting to novel social environments, academic failure, financial problems and the thought of being a misfit for the selected department seem to be among the causes of school dropout. In the other group, the reasons for dropping out are determined as academic failure, financial difficulties, early marriages, dislike of school, indifference of family, negative effects of friend groups, and indifference towards school.

Keywords: School dropout, Turkish education system, Pareto analysis.

ÖZ: Bu araştırmanın amacı Türk eğitim sistemindeki eğitim kademelerine göre okul terki nedenlerini incelemektir. Bu doğrultuda TES'te okul terki üzerine yapılan araştırmalara ulaşılmıştır. Araştırmada sistematik veri analizi yöntemi ile araştırmanın amaçlarına uygun olan 47 araştırma içerik analizi ile incelenmiştir. Toplamda 290 kodlama işlemi gerçekleştirilmiştir. Araştırma sonucuna göre TES'te ilköğretim kademesinde okul terki nedenlerinde aile faktörü öne çıkmaktadır. Ailenin maddi durumun yetersizliği ve eğitime karşı düşük ilgisi etkilidir. Ortaöğretim kademesinde öğrencinin akademik başarısızlığı, devamsızlığı, akran baskısı, ailelerin ilgisizliği okul terklerine neden olmaktadır. Yükseköğretimde ise öğrencinin sosyal çevreye uyum sağlamada güçlük yaşaması, akademik başarısızlık, maddi sorunlar ve eğitim gördüğü bölüme uygun olmadığını düşünmesi okul terkinden ortaya çıkan sonuçlardır. Hiçbir eğitim kategorisine girmeyen diğer grubunda okul terki nedenleri de akademik başarısızlık, maddi imkânsızlıklar, erken evlilikler, okulu sevmemek, ailenin ilgisizliği, arkadaş gruplarının olumsuz etkisi ve okula karşı ilgisizliktir.

Anahtar kelimeler: Okul terki, Türk eğitim sistemi, Pareto analizi.

* The findings of this research related to higher education were presented as an oral presentation at the International Conference on Modern Education Studies - "School Dropout".

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School dropout is undoubtedly one of the most important problems affecting education systems because the losses caused by school leavings are not only academic but also societal. That is why, the investigation of the causes of school dropout (SD) has been the subject of worldwide studies, particularly of education research (Vasconcelos et. al., 2019). Accordingly, SD has received increasing attention in recent years (Blöndal, 2014). Similarly, for the last two decades, the SD problem has been on the agenda of all developed and developing countries, and it indeed worries decision-makers in both education and social fields (Said, 2021).

Dropout rates present a multifaceted challenge, characterized by their potentially abrupt and unpredictable occurrence, as well as their widespread prevalence, highlighting the need for a thorough understanding of this problem (Gul & Arshad, 2013). Consequently, educational institutions in developed countries have been actively putting their greatest efforts to prevent and decrease dropout rates. (Foley, et. al., 2014; Mahoney & Cairns, 1997; Ream and Rumberger, 2008; Wallace, 2016). In a similar vein, SD is recognized as a critical problem impacting institutions worldwide (de Sousa et. al., 2021). For example, the high SD rates in the USA are causes for concerns for policymakers. Several theories have been developed towards figuring out why and how SDs occur. Still, as noted by various theoretical frameworks, such factors as students' academic performance, social behavior, and level of engagement in school activities significantly influence SDs (Ream & Rumberger, 2008).

Given that SD is a multifactorial process extending to very early ages (Papachristopoulou et. al., 2018), it should be regarded as both a social issue and a public health concern (Valkov, 2018). Drop-out is a critical social phenomenon and often leads to daunting conditions for adolescents and is linked to low academic achievement (Jana, et. al., 2014). In addition, SD disproportionately affects several disadvantaged groups, with higher dropout rates. Especially in rural areas, such factors as parents' reluctance towards education, students’ helping out with housework, financial difficulties, and giving more importance to the education of boys than girls often lead to school dropouts among all relevant demographic groups, including girls (Jana, et. al., 2014). According to the research results of Ioana et. al., (2015), dropout rates in disadvantaged neighborhoods are alarmingly high.. Those living in poverty are 2.9 times more likely to drop out of school than those whose income exceeds the poverty threshold by 150% (Chenge, et. al., 2017).

Arguably on account of its complicated geographical, cultural, social, and sociological structure, the Turkish education system (TES) has not been able to reach a solution that addresses SDs. In light of the data collected from 35.475 households in Türkiye, the reasons behind SDs are as follows: marriage, working, living in a village or a town, living in a divorced family, academic failure, and economic problems (Boyacı, 2019). Studies emphasize that the factors that cause dropouts in TES are absenteeism of students, insensitivity of families towards their children, economic difficulties, the inadequacy of school facilities, early marriages, and the education system itself (Aküzüm et. al., 2015; Aslan, 2022; Ergül, 2019; Kartal & Ballı, 2020).

The findings, which emerged as a result of the examination of numerous reports on SDs in TES, draw attention to similar results. To cite an example, drop-outs have an increasing graph by years in TES (Yorğun, 2022). Due to compulsory education, the schooling rate in secondary education has increased in TES, but the number of students

per classroom and teacher is decreasing (Can & Sezer, 2022). High-achieving countries in PISA have lower out-of-school child populations or lower illiterate youth and adult populations (Maya, 2013a), yet Türkiye lags behind EU countries in gross enrollment rates for girls at all levels of education (Maya, 2013b). As Bayhan and Dalgıç (2012) underpin, SD is an ongoing problem in TES, and the current studies on SD focus solely on the causes and intervention models of compulsory education at the primary level. There exists a lack of research examining the dropout phenomenon at the high school level. As a result, it would be fair to say that no study examines SD in TES according to education levels. Determining the causes of SDs for different education levels can also support effective education policy production in this context. Thus, dropouts can be reduced and prevented in a reductionist approach. This research then attempts to determine the factors that cause dropout in TES according to education levels.

Literature Review

Causes of SD

SD is the main cause of unemployment, social exclusion, poverty, and poor health. The reasons why groups of young people drop out of school earlier are personal and family problems, learning difficulties, or being in a difficult socio-economic situation. Besides, the (dis)functionality of the education system, the lack of a positive school climate, and negative relationships between teachers and students are the reasons for dropping out (Gherasim, 2022). All these imply that dropping out of school is a severe issue having impacts both individually and socially. For example, drop-out can be observed as a final result of a longer withdrawal process, which begins with frequent absenteeism, low course grades, and reduced social interactions with teachers and peers (Krstić, et. al., 2016). Even though it is mostly defined in this way, it should be underlined that SD has a comprehensive structure, which hints at the fact that it is not always easy to predict SD action. What is more, SD frequently negatively influences both the life of the individual who leaves school and the whole social structure in the long run.

According to Yassin (2020), the dropout rate is not a single factor, it is a combination of plentiful factors. In this context, it can be put forth that researchers need to focus on the individual and social consequences as well as the causes of SDs. Similarly, as pinpointed by Nguyen, et. al., (2022), students drop out of school for several reasons and SD has negative effects on society as well.

SD and child labor are also associated with low socioeconomic status (Raccanello & Garduño, 2018). Child labor, the education level of parents, and early marriages are prominent factors that pave the way for SD (Mambo et. al., 2019). The migration of parents for harvest work results in dropouts too (Rathod & Koli, 2015), like drug use (Valkov, 2018), poverty, ignorance, parental ignorance, and educated unemployment (Gul & Arshad, 2013).

The research results of Ioana et. al., (2015) cast light on that low-income levels, low educational levels of parents, difficulty in maintaining a basic life at home, and the existence of divorced family or single parents are explained as high risks of SD. Not studying regularly, poor quality of the living environment, frequent moving of families, not being in a safe environment, and poor teacher-student rapport are among the factors that escalate the risk of SD (Hasan & Irhaif, 2021). Unhealthy ways of living and

malnutrition, child labor, financial inadequacies, ethnic origin, family's perspective on education, having a large family, teacher absenteeism, the location of the school, and education services' being not quality are some of the causes of SD as well (Hasan & Muneer, 2019).

According to Hartnack (2017), on the other hand, the causes of SD can be classified as social factors, family factors, individual factors, and school factors. Nita, et. al., (2021) show that there are two main causes of SD. These are explained by the concepts of family and poverty. Poverty emerges as a determinant of SD in two ways. The first is that parents deprive their children of school for reasons such as not being able to buy clothes or school equipment, which are necessary for their children to continue their education. The second is that students have to contribute to family income. As put forward by Ioana, et. al., (2015), high absenteeism, learning difficulties, low school performance, and low motivation to participate in school activities are linked to SD. The decrease in household income as a result of the unemployment of the parents is also effective on the SD of the child (Di Maio, et. al., 2016). Moreover, the difference between schools shows that dropping out of school is not only due to the characteristics of the students but also other factors such as the school environment (Zorbaz & Özer, 2020).

When SD is examined in terms of gender, it can be stressed that girls constitute a disadvantaged group. The social reasons for girls to drop out of school are enlisted here: the pressure to get married, ignoring education, preferring boys to be educated, having problems and arguments within the family, and the death of the father (El-shaer & Radwan, 2019). Further, the main factors that lead to girls' dropping out of school are of economic origin and are also connected to situations such as child labor, distance from school, marriage, and migration to different countries (Yassin, 2020).

As can be understood from what the line of literature italicizes, it can be argued that risk groups with a high probability of SD are inclined to have a similar family structure, with the environment or individual factors that may resemble each other. Whatever the reason may be, the alienation of a child from the school environment is a problem that needs to be resolved for the sake of society within the frame of authority of education systems.

Effects of SD

Most of the empirical studies concentrate on the socio-economic effects of SD and emphasize the psychological effects attributed to school failure resulting in dropout (Curelaru, et. al., 2010). SD has prominent effects on personal development as well as short, medium, and long-term consequences on human resource development and community development in general (Nita, et. al., 2021). The prevention of SD is an eminent policy objective, as young people who leave school without a diploma are worse in almost every aspect later in their lives. Additionally, dropouts receive lower wages, are more likely to be unemployed, engage in more criminal activities, and face worse health outcomes (Bolhaar, et. al., 2019). The research results of Huisman and Smits (2009) cast light on the strong evidence that once SD is delayed until completing primary education and provided it extends primary education the probability of staying in school longer gets higher.

The persistent refusal of SDs leads to the waste of public resources in terms of time, money, and personal power, and leads to opportunity costs to society. SD needs to be considered as a manifestation of a dysfunctional education system and social organization (Amgoth, et. al., 2019). On top of that, SD has a major impact on students' academic performance, and leads to drug use and undisciplined behavior boosts owing to school dropout (Ayesiga Kaahwa, 2011). Further to these, high SD has negative consequences, including negative effects on employment, lifetime earnings, and physical health (Lee-St. John, et. al., 2018), hence high school dropouts not only affect the individual but also society (Wallace, 2016), and finally, the higher the SD rates, the greater the social corruption becomes. An individual's dropping out of school not only reveals a self-limited result but also has a social impact as has been underlined earlier in this paper. All these make it essential to produce and implement functional education policies to reduce and eventually fully prevent SD.

SD Concerning Educational Levels

There are dropouts at education levels from primary school to university, and it emerges as a phenomenon that even advanced education systems have difficulty in solving this. To be able to produce effective education policies for dropouts, determining the causes of dropouts in line with education levels can provide important clues in this context.

Khan, et. al., (2017) argue that the reasons behind dropping out of primary school students are listed as lack of an appropriate curriculum, too strict discipline practices of schools, the lack of physical and educational equipment, insufficient educational support from parents, and low socioeconomic status. In addition to these, the main reasons for leaving secondary school arise from the family. These are financial difficulties, low educational level of parents, divorce, or parental death (Chenge, et. al., 2017). Ioana, et. al., (2015) unearth that the dropout rate in primary school is lower than in secondary school, and boys drop out more than girls in primary school.

High SD rates pose a serious threat to education systems. There are approximately 7.000 students who drop out of high school every day across America (Wallace, 2016), and dropout rates are higher in the early years of high school than in middle school (Mahoney & Cairns, 1997). What the current outlook of the Turkish education system portrays is not different from what has been depicted above. SD is one of the most alarming issues waiting for a permanent solution. That being said, how to initiate a process toward a solution brings uncertainty. This is because the prevention of SD, which comprises multifactorial and intertwined problems, is only possible with applicable education policies derived from the results of reductionist research. No research has been found that systematically inspects the causes of SD according to education levels in TES. This research seeks to identify the factors that cause dropout in TES by education levels in view of empirical research findings. The problem of this research is to seek an answer to the question "What are the reasons for dropout in the Turkish education system by education levels?" In doing so, the answers to the following sub-problems were pursued:

1. What are the reasons for dropping out of students at the primary education (primary/secondary school) level?

2. What are the reasons for dropping out of students at the high school level?

3. What are the reasons for the dropout of students at the tertiary level?

4. What are the reasons for school dropout according to studies that do not specify any level of education?

Method

This research was conducted based on the stages of the systematic literature review proposed by Kitchenham, (2004) and Gough (2007). This four-stage process entails the following route:

Identification of The Need for A Review and Establishing the Review Question

Though there exist studies investigating the factors that cause SD in TES, no systematic research was spotted that does so for the causes of SD by education levels i.e., for primary/high school/higher education levels. This research endeavors to answer the question: "What are the reasons for dropout in the Turkish education system by education levels?" In this frame of reference, it can be effective to come up with an education policy according to education levels that can aid in preventing or reducing school dropouts. This study can also guide education policymakers in this sense.

Articulating The Search Strategy, Including Information Sources

The research is centered only on SD in TES. A review of the literature for SD was executed using both Turkish and English keywords, to wit, *"Okul terki", "school dropout", "okuldan ayrılma", "school leaving", "Türkiye'de okul terki", "school dropout in Turkey".* TR Index, Yök Tez, Eric, Ebsco, Scopus, Google Scholar, ProQuest, and Web of Science indexes were scanned in this regard. The studies to be analyzed were attained in two separate periods. The first data collection round took place between April 2022 and May 2022. The second one was held in November 2022.

Selection of Studies, Data Extraction, and Inclusion

The inclusion or exclusion criteria of the studies that is consistent with the purpose of the study are presented in Table 1.

Table 1

Inclusion or Exclusion Criteria of Studies from The Analysis

Criteria	Inclusion (First stage)	Exclusion (Second stage)
empirical studies	•	
Main focus on SD	•	
article, master's, or doctoral dissertation	•	
Dealing with Turkish education system	•	
Presenting clear findings on SD	•	
Papers, reviews, and reports		•
When a finding is not available		•
Not related to the Turkish education system		•
Studies on absenteeism from school		•

According to the first set of searches, 72 studies were reached in the literature. As appears in the inclusion (first stage) criteria stated in Table 1, 72 studies were probed. In the first stage, 13 of these studies were eliminated and 59 studies remained. Afterward, 12 studies were eliminated according to the exclusion (second stage) criteria and 47 studies remained. The data analysis of this study was completed in accordance with the 47 studies specified in the appendix (Annex-1).

In line with the sub-problems of these studies, 47 studies were divided into four categories, considering the groups (samples) through which the attached studies were performed. These are primary education, high school, higher education, and other groups. Should a study not belong to any level of education or if no education level was specified, then, this was transferred to the other group. While the most recent research in the appendix belongs to 2022, the oldest research belongs to 2009 (Annex-1).

Data Synthesis

This research spotlights the findings of each attached study. The research findings were analyzed by content analysis and using pareto analysis methods. In the content analysis, 'word' was preferred as the unit of analysis.

A total of 290 coding processes were applied for the content analysis. In the primary education category, a total of three studies were included and 19 coding processes were carried out. In the high school category, 28 studies were analyzed, and 171 coding processes were accomplished. Nine studies were delved into in the higher education category, and 55 coding processes were embarked on. Finally, seven studies were evaluated in the other category and 45 coding processes were run (Annex-1). I

used the MAXQDA software program to analyze the data and the data was stored in the '.mx20' file.

The frequencies resulting from each coding process were referred to in the pareto analysis. The Pareto principle, often entitled the 80/20 rule, was introduced by Vilfredo Pareto to show that eighty percent of Italy's wealth is distributed among twenty percent of the total population (Craft and Leake, 2002). Later, it was developed as a method to be used in almost every branch of science. In this study, the factors causing school SD in TES were ranked from the most coded to the least coded by education levels. The codes that were coded the most and that made up 80% of the total coding were identified. In doing so, the areas where most of the problem takes place are listed cumulatively according to the Pareto analysis. In line with the 80/20 principle, it was struggled to unveil the factors that cause SD at every education level, which make up nearly 80% of the problem.

Ethic

This present study research was planned, carried out, and reported in line with the ethical principles of APA and COPE with the approval of Nevşehir Hacı Bektaş Veli University Ethics Commission dated 24/02/2023 and numbered 2023-02-56.

Limitations of the study

The research is limited to the results of 47 studies on SD in TES and the data of the above-mentioned indexes in 2022.

Findings

In this section, the findings of the research are given in order following the sub-problems of the research. The causes of SD in primary education are presented below.

Table 2

Pareto Analysis Results of Primary School Students' SD Reasons

Themes	Frequency	Cumulative Percent (%)	Themes	Frequency	Cumulative Percent (%)
Financial impossibilities	4	21.05	Peer bullying	2	84.19
Indifference of the family and low education level	4	42.1	Lack of social support	1	89.45
Academic failure and absenteeism	4	63.15	Physical incompetence of the school	1	94.71
Negative attitude towards school	2	73.67	Negative attitudes of teachers and administrators	1	100
Total Number of Codes: 19			Number of Studies Analyzed: 3		

According to the results of the three studies analyzed according to Table 2, eight themes emerged. The causes of SDs of students at the primary (primary/secondary school) level of TES are listed in order of importance as financial impossibilities, indifference of the family and low education level, academic failure and absenteeism, and negative attitude towards school. These four factors occupy 73.67% of the causes of SDs in primary education (primary/secondary school). The rest are peer bullying, lack of social support, physical incompetence of the school, and negative attitudes of teachers and administrators. The reasons for SD for students at the secondary (high school) level in TES are in Table 3 below.

Table 3

Pareto Analysis Results of Secondary School (High School) Students' Reasons for Leaving School

Themes	Frequency	Cumulative Percent (%)	Themes	Frequency	Cumulative Percent (%)
Academic failure and absenteeism	36	21.05	Health problems	5	87.56
Negative influence of peer group	18	31.57	Low education level of the family	5	90.46
Family problems and apathy	16	40.92	Inadequate teaching techniques	3	92.21
Financial constraints and having to work	15	49.62	Belief that education cannot offer employment	3	93.96
Low commitment to school	13	57.22	Low self-esteem and feeling worthless	3	95.71
Poor communication	10	63.06	Marriage at an early age	2	96.87
Negative impact of the environment	9	68.32	Tendency to violence	1	97.45
Inadequate vocational guidance	8	72.99	Lesson intensity	1	98.03
Disciplinary measures	8	77.66	The school is in a remote area	1	98.61
Anti-social behavior	6	81.16	Perceived abuse from the father	1	99.19
Teacher/school administrator attitudes	6	84.66	Control-oriented school approach	1	100
Total Number of Codes: 171			**Number of Studies Analyzed: 28**		

According to the results of 28 studies analyzed in Table 3, 22 themes emerged. The causes of SD for secondary school (high school) students of TES are in order of importance, are academic failure and absenteeism, the negative influence of peer groups, family problems and apathy, financial impossibilities and having to work, low

commitment to school poor communication, the negative impact of the environment and inadequate vocational guidance. These nine factors compose 77.66% of the causes of SD in high school. The other reasons for leaving school are anti-social behavior, teacher/school administrator attitudes, health problems, low education level of the family, inadequate teaching techniques, education's not being able to warrant employment, low self-esteem, and feelings of worthlessness, early marriage, the tendency to violence, lesson intensity, the school's being in a remote area, perceived abuse from the father, control-oriented school approach. The reasons for SD of students at higher education (university) level at TES are demonstrated in Table 4 below.

Table 4

Pareto Analysis Results of SD Reasons for Students at Higher Education (University) Level

Themes	Frequency	Cumulative Percent (%)	Themes	Frequency	Cumulative Percent (%)
Social maladjustment	7	12.72	Family education level	1	83.57
Academic failure and absenteeism	7	25.44	Health problems	1	85.38
Financial problems and having to work	7	38.16	The thought of not being employed	1	87.19
Realizing you don't have skills for the job	5	47.25	Change school	1	89
Choosing the department incorrectly or forcefully	5	56.34	Family problems	1	90.01
Faculty member mobbing	4	63.61	Enlist	1	92.62
Appointment as a civil servant or starting a business	3	69.06	Drug use	1	94.43
Inadequate facilities of the city	2	72.69	Close friends drop out of school	1	96.24
Alienation from school	2	76.32	Conducting a disciplinary investigation	1	98.05
Marriage	2	79.95	Dating violence	1	100
Shelter and nutrition problems	1	81.76			
Total Number of Codes: 55			Number of Studies Analyzed: 9		

According to the results of the nine studies analyzed in Table 4, 21 themes emerged. In order of importance, the reasons for SD of students at the higher education (university) level of TES are social maladjustment, academic failure and absenteeism, financial problems and having to work, one's realizing they do not have the skills for

their future job, choosing the department unconsciously or without discretion, faculty members' mobbing, being appointed as a civil servant or starting a business while still studying, inadequate facilities of the city of the university, alienation from school, marriage. These 10 factors incorporate 79.95% of the causes of SD in higher education. The others causing school dropout are shelter and nutrition problems, low family education level, health problems, the thought of not getting employed after graduation, changing school, family problems, being enlisted, drug use, close friends' dropping out of school, having a disciplinary investigation, dating violence. The reasons for SD in the other category, which embodies the SD of students who do not specify their education level in the research or of those studied through the open education system, are also outlined in Table 5 below.

Table 5

Pareto Analysis Results of SD Reasons of Students in Other Level

Themes	Frequency	Cumulative Percent (%)	Themes	Frequency	Cumulative Percent (%)
Academic failure and absenteeism	10	22.22	Negative thoughts of the family about education	2	82.18
Financial difficulties and poverty	9	42.22	child labor	2	86.62
Marriage and early child marriage	4	51.1	Teacher's negative attitude and incompetence	2	91.06
Not liking school	3	57.76	Low self-level	1	93.28
Fellowship influence	3	64.42	Failure of education to provide employment	1	95.5
Family problems	3	71.08	Disciplinary measures	1	97.72
Low level of education and indifference of the family	3	77.74	Health problems	1	100
Total Number of Codes: 45			**Number of Studies Analyzed: 7**		

According to the results of the seven studies analyzed in Table 5, 14 themes emerged. In parallel with the results of the studies that could not be enclosed at any of the education levels, the causes of SD are given in order of importance as academic failure and absenteeism, financial difficulties and poverty, marriage and early child marriage, dislike school, fellowship influence, family problems, low level of education and indifference of family. These seven factors represent 77.74% of the reasons for SD in the other category. The remaining reasons for dropout manifested as negative thoughts of the family, negative thoughts about education, child labor, teachers' negative attitude and incompetence, low self-level, education's being incapable of offering employment opportunities, disciplinary measures, and health problems.

Discussion

The family factor comes to the fore in the SD at the primary (primary/secondary school) level of TES. Insufficient financial investment of the family, indifference to education, and low level of education of parents can be articulated as the main reasons. Academic failure and negative thoughts about the school can also be strongly explained as the causes of SD. The causes of SD in primary education (primary/secondary school) are not any different, namely, fiscal difficulties, low education levels of parents, divorce, or parental death (Chenge, et. al., 2017). Frequent study, poor quality of living environments, frequent moving of families, not being in a safe environment, and poor teacher-student relationships are the parameters that add to SD (Hasan & Irhaif, 2021). According to the research results of Ioana, et. al., (2015), high rates of absenteeism, learning difficulties, low school performance and low motivation to participate in school activities are the main reasons for dropping out. Khan, et. al., (2017) count inadequate curriculum, strict disciplinary practices of schools, lack of physical and educational equipment, insufficient educational support of parents, and socioeconomic status as the factors in this manner.

Children dropping out of school due to abandonment by their peers emerges as a dominant factor in school dropout (Gagica, et. al., 2022). Similarly, Masing and Astuti's (2022) research revealed that the two main factors affecting children's school dropout are abandonment by their peers and dropping out of school due to dislike of school. Other factors include distance from school to home, relocation of parents, bullying of students, failure to enroll, and neglect by parents. According to the results of another research, the main reasons why students drop out of school are the necessity of making a living, housework, health problems, lack of interest, and failure in classes and exams (Khan & Samad, 2022). Similarly, housework, lack of parental guidance in classes, large family size, poor economic situation of the family, failure in exams, lack of time to study, teachers' punishment, and lack of interest in classes also cause school dropout (Baruah & Goswami, 2012). Inadequate teacher-student relationships, students having to study on their own, not being ready to learn, not encouraging school environment and disciplinary punishments cause school dropouts (Katolo, 2014). In addition, having a good school infrastructure and qualified teachers reduces the risk of students dropping out of school. Although family-level factors cause school dropout, school-level factors also reduce this risk (Wortsman, et. al., 2022).

The chief reason for SD in high school in TES is the student's academic failure and absenteeism. The negative effect of peer groups, the indifference of families, and problems within the family also cause SD. Another reason is that because of financial difficulties, education is not a primary choice. Not liking the school enough, students' poor communication with others, choosing the wrong major, the negative effects of the environment, and disciplinary punishments are also influential in the SD, respectively. The problems seem to be caused by academic failure, financial inadequacies, family problems, and inadequacy of vocational guidance. Research results also indicate similar issues. Dropping out of high school has negative consequences, including negative effects on employment, lifetime earnings, and physical health (Lee-St. John, et. al., 2018). Poverty, ignorance, ignorance of parents, and unemployment of the educated are the main causes of SD (Gul and Arshad, 2013). To prevent SD, parental involvement in academic studies is a positive factor affecting students' graduation from high school for

low-achieving high school students (Nguyen, et. al., 2022). Studies within the scope of TES at the high school level also draw similar conclusions. Peer influence and academic failure (Yorğun, 2014), family interference in school, school intervening in family, problems in student-teacher relations, and negative effects of friend groups inside and outside the school stand for SD (Boyacı & Öz, 2018). Along the same lines, the main causes of academic failure, family environment, discipline problems, and social incompatibility (Çakır & Çolak, 2019) and dropout are stressed out as school, environment, family and individual (Taş, et. al., 2013).

School dropout is a phenomenon that consists of multiple factors and is dynamic in nature. It is understood that this situation prevents the implementation of effective public policies towards the problem (de Lima Kanashiro, et. al, 2023). In particular, it is understood that high school students drop out of school due to reasons such as low academic success, course repetition, absenteeism, insufficient economic status, reluctance, indifference, negative behaviors, bad peer group, bad social environment, negative role models, different career orientations and disciplinary punishments (Arslan & Peker, 2023). Similarly, in high school, the majority of students who drop out do so due to poverty, apathy, or being negatively influenced by their peers (Amoroso, et. al., 2021). School dropout is also caused by inadequate academic performance, depression, insufficient parental support, life satisfaction at school, violation of student privacy, and factors affecting learning (Lee, 2023). Additionally, it shows that several determinants are associated with school dropout, such as truancy, lack of motivation, health, bullying, and living in economically distressed areas (Ripamonti, 2018). Poverty, students getting pregnant at a young age, substance addiction, peer pressure, social behavior and not caring about school cause school dropouts (Snyders, 2013).

The most powerful reasons for SD in higher education are the student's adaptation to the social environment and academic failure. Not being able to attend school due to financial problems, realizing that possessed and required professional skills do not match, and selecting an inappropriate major also cause students to drop out of school. Plus, the oppressive behavior of the faculty members, starting a business, the insufficient opportunities of small cities, the alienation of the student from the school, and getting married result in school dropouts. According to the results of Paura and Arhipova's (2014) higher education research, the main reason for dropping out is the inadequate high school knowledge brought by students to university and their low motivation to study at university. The studies conducted in TES at the higher education level have similar findings. Academic adjustment problems, financial difficulties (Bülbül, 2012), and factors that cause leaving postgraduate education are itemized as academic and social adaptation, not quality education, orientation to different fields, and transportation issues (Deniz, 2019). In addition, as the alienation of students in higher education increases, so does their tendency to drop out (Dündar and Bülbül, 2022). According to Gülşen's (2017) research results, leaving higher education in TES has three basic processes. These are pre-higher education, tertiary education, and the process of leaving higher education. Whereas the choice of department before higher education is effective in SD, it subsumes social cohesion, and academic and organizational factors in the higher education process.

College dropout is a multidimensional matter, broadly classified into five primary categories: student adaptation, personality, socio-economic status, teacher-

student relationships and the quality of university education. Among these categories, such sub-factors as a lack of motivation, low self-esteem, and unexpected life occurences including pregnancy, among others, play vital roles. This is because addressing these factors is of great importance to reduce dropout rates (Lorenzo-Quiles, et. al., 2023). There is evidence to suggest that the most impactful determinants of dropout include are personal, academic, economic and institutional domains, highlighting the. It has also complexity of the problem that encompasses a wide range of factors that affect a student's academic life in different ways (Silva, & Diaz, 2023). Further, it has been revealed by Long and Noor (2023) that personal economic factors, academic satisfaction, academic performance satisfaction, and family economic conditions are key factors contributing to the problem. Therefore, 73.8% of school dropout can be attributed to such factors as employment status, social relationships, technology skills, and gender differences (Mojdeh, 2014). Moreover, the family's economic situation, lack of interest, experiences of bullying, constant academic failure, difficulties in adapting, and academic pressure also significant causes of SDs (Figueiredo, & Salles, 2017; Mahesh, et. al., 2018; Sulayman & Ahmed, 2021).

This present study concludes that academic underperformance as well as financiak difficulties are the primary factors leading to SDs. Additionally, such factors as early marriages, disinterest in schooling, the influence of peer groups, the low educational attainment within families, and a lack of engagement with the school are the contrinuting factors. In summary, the primary causes of SD in the TES can be attributed to economic challenges, academic failures, family problems such as neglect and the negative effects of peers, the absence of vocational guidance, and the prevalence of early marriages.

Conclusion

In this study, financial constraints have emerged as the predominant factors linked to SDs in TES. Further, such additional factors as a lack of engagement with the school environment and the low educational attainment of family members has been found to associated with the incidence of SD. Since there is an education system focused on academic success, students who experience academic failure tend to drop out of school. Although not a leading factor, students' negative attitudes towards school, peer bullying, lack of social support, physical equipment of schools, and negative attitudes and approaches of educators also cause students to drop out of school at the primary education level.

In the Turkish education system, high school can be seen as the education level where the highest number of school dropouts occur. In particular, academic failure, absenteeism, negative influence of peer groups, irresponsibility and indifference of families, financial difficulties, negative attitudes towards school, and lack of communication emerge as the main reasons. School dropouts are also observed due to students' characteristics. For example, anti-social behavior, health problems and low self-perception can be listed. School dropouts due to education also occur at the high school level. It can be shown as inadequate teaching methods and high course intensity.

Although the reasons for school dropout at the tertiary level vary depending on the primary and high school levels, there are also similar aspects. Especially at the tertiary level, social disharmony, academic failure, and financial inadequacy are among

them. Realizing that a profession is not preferred based on individual characteristics and having to go to the preferred department can be listed as one of the prominent reasons. Other than these reasons, the factors that cause school dropout, although not prominent, are getting married, inadequate city facilities, housing, and nutrition problems, being drafted into the military, drug use, and receiving disciplinary punishment are also among the factors that cause school dropout.

The findings from this present study that did not specify specific educational level. I also focused on the studies on students in non-formal education such as open education were also examined. Within this broad context, academic underachievement, financial constraints, early marriage, disinterest to school and the adverse effects of the peer group, familial issues, and negative attitudes towards education have also been found to be linked to school dropout.

Suggestions

Bearing in mind the findings and results of this study, the following suggestions can be made to reduce and prevent SD in TES:

Strengthening School-Family Partnerships:

1. School-family collaborations should be strengthened. Particularly, in school adult education in the form of seminars and alike should be carried out for parents.

Purposeful Support for At-Risk Students:

2. Students at risk of dropping out should be identified and individual programs should be established to make sure that each student is brought to school.
3. The school should be provided with a physical environment that the student can enjoy being a part of.
4. University students with financial difficulties should be provided with part-time employment opportunities by universities.

Improving School Environment:

5. Academically low-performing students should be specified, and individual academic plans should be made to improve their academic competencies.

Monitoring and Intervening for Absenteeism:

6. Students with high absenteeism rates should be spotted and their reasons should be determined by commissions to be formed at schools. Thus, student follow-ups can be carried out more systematically.

Financial and Social Support:

7. Families with insufficient financial means and who are unable to provide their children with quality environment assisting in development at home should be detected by schools and the cases need to be reported in detail to the authorized institutions so that they can be provided with social support.

Vocational Guidance:

• Vocational guidance should be given to students effectively. Upon graduating from high school, they should be placed in departments that match their interests and abilities.

• Any environmental impact that may harm students should be noticed and eliminated through the collaborative work of school and law enforcement officials.

Social Integration:

• Orientation practices should be functional to guarantee social cohesion in universities.

Faculty Development:

• Faculty members should be trained for students to be successful both socially and academically.

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Conflicts of Interest

The author conducted the study alone. There is no conflict of interest.

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Annex

Annex-1: Studies from which data was collected

Education levels	Research: Title, Authors and Year	Number of Codes
Primary education	Ortaokul öğrencilerinin okul reddi ve okul terki risklerinin zorbalık-mağduriyet kategorilerine göre incelenmesi (Özgü, 2015)	5
	İlköğretim Kurumu Öğrencilerinin Devamsızlık ve Okul Terki Nedenleri (Aküzüm, Yavaş, Tan ve Uçar, 2015)	6
	Ortaokul öğrencilerinde okul terki riski, okul tükenmişliği ve algılanan sosyal desteğin bazı değişkenlere göre incelenmesi (konak ilçesi örneği (Tırpancıoğlu, 2019)	8
High school	The investigation of school-dropout at the secondary level of formal education: the stated reasons by the school administrators and school counselors: a preliminary study (Kirazoğlu, 2009)	12
	Yükseköğretimde Okul Terki: Nedenler ve Çözümler (Bülbül, 2012)	6
	Liseyi Terk Eden Öğrencilerin Tecrübelerine Göre Okul Terki (Bayhan, Dalgıç, 2012)	7
	Meslek Lisesi Öğrencilerinin Okul Terk Nedenleri (Taş, Selvitopu, Bora, Demiraya, 2013)	3
	Lise öğrencilerinde okul terki riskinin incelenmesi (Yorğun, 2014)	4
	Liselerde Akademik Başarısızlık: Nedenleri ve Önlenmesine İlişkin Öğretmen ve Okul Yöneticilerinin Görüşleri (Sezgin, Koşar, Koşar, 2016)	1
	Ortaöğretimde okul terkinin bireysel ve kurumsal nedenleri: Şanlıurfa ili örneği (Karacabey, 2016)	11
	Meslek Lisesi Öğrencilerinin Riskli Davranışlarının Yordayıcısı Olarak Sosyal Görünüş Kaygısı ve Mükemmeliyetçilik (Ekşi, Arıcan, Yaman, 2016)	1
	Metaforik Okul Algısı ile Okulu Terk Eğilimi Arasındaki İlişkinin Öğrenci Görüşlerine Göre İncelenmesi (Yüner, Özdemir, 2017)	5
	Öğrencilerin Özsaygılarının Artırılması Yoluyla Okul Terkinin Önlenmesi (Bademci, Karadayı, Karabulut, Vural, 2018)	2
	Üç öykü üzerinden "okul terki": eğitimsizlik, yoksulluk, ataerkillik (Küçüker, 2018)	3
	Erken Yaşta Evlenen Ergenlerin Bireysel ve Ailesel Özellikleri, Okul Terkinin Nedenleri ve Evlilikle İlgili Sorunları (Koçtürk, Bilge, Yüksel, 2018)	7
	Lise Öğrencilerinin Riskli Davranışlar Gösterme Düzeyleri ile Okula Bağlanma Düzeyleri Arasındaki İlişkinin İncelenmesi (Şimşek ve Çöplü, 2018)	3
	Lise öğrencilerinin okul terk risklerini etkileyen öğrenci ve okul düzeyindeki faktörler (Zorbaz, 2018)	4
	Ortaöğretimde Okul Terki ve Sosyal sermaye: Nitel Bir Araştırma (Boyacı ve Öz, 2018)	9
	Mesleki ve teknik ortaöğretimde okul terkinin nedenleri ve çözüm önerileri: Bütüncül bir program önerisi (Güngör, 2019)	31
	Meslek Liselerinde Başarısızlık Kaynaklı Okul Terkinin İncelenmesi (Ergül, 2019)	8
	Meslek lisesi öğrencilerinin okul terkinde rol oynayan faktörler ve önleme stratejilerine ilişkin yönetici, öğretmen ve öğrenci görüşleri: AB ülkeleri ile karşılaştırılması (Küçükarslan, 2019)	5
	Lise Öğrencilerinin Okul Terki Riskine İlişkin Görüşleri (Çakır ve Çolak, 2019)	8
	Liselerde okul terkinin çeşitli değişkenler açısından incelenmesi (Özger, 2019)	4
	Lise öğrencilerinde okul terki riskinin okul iklimi ve yapısal özellikler kuramı açısından incelenmesi (Çetin, 2019)	9
	Okul terkinin eşiğinde geleceği düşünmek: sınıf tekrarı yapan öğrencilerin gelecek emelleri (Türk, 2019)	4
	Do Student Characteristics Affecting School Dropout Risk Differ from One School to Another? (Zorbaz ve Özer, 2020)	9
	Ortaöğretim kurumlarında okul terkinin incelenmesi (Dirik, 2020)	6
	Ergenlerin anne babalarından algıladıkları duygusal istismar durumu ile riskli davranışları arasındaki ilişki (Orak, Kırbaş, Şahin, Gülırmak, 2020)	2
	Ortaöğretim Öğrencilerinde Okul Terki Riskinin Yordayıcıları: Okula Bağlılık ve Okul Tükenmişliği (Arslan, 2021)	3
	Meslek liselerinde okul terkinin nedenleri, sonuçları ve önlemeye yönelik çözüm önerileri (Öztürk, 2021)	8
	Açık öğretim liseleri öğrencilerinin okul terki ve mezuniyet durumlarının eğitsel veri madenciliği ile incelenmesi (Polat, 2021)	2
Tertiary	Üniversite Öğrencilerinin Okulu Bırakma Eğilimleri ve Nedenleri (Şimşek, 2013)	6
	Üniversite Öğrencilerinde Riskli Davranışların Ortaya Çıkmasında Yordayıcı Bir Etken Olarak Uyumsuz Şemaların Telafileri (Körük, 2017)	1

	The Reasons of School Dropouts in Higher Education: Babaeski Vocational College Case (Can, Aktaş, Arpacioğlu, 2017)	4
	Yüksek Din Öğretiminde Okul Terki (Baltacı, 2019)	7
	The relationship between the attitudes of Turkish university students towards dating violence with risk-taking behaviors, emotion regulation and emotional autonomy (Yıldız, Eldeklioğlu, 2020)	2
	Üniversite öğrencilerinin örgütsel imaj algılarıyla okula yabancılaşma düzeyleri ve okul terki eğilimleri arasındaki ilişki (Dündar, 2020)	3
	Yükseköğretimde okul terkinin değerlendirilmesi (Gülşen, 2017)	20
	Yükseköğretimde okul terki ölçeği'nin Türk kültürüne uyarlanması ve kültürlerarası ölçme değişmezliğinin belirlenmesi (Uyumaz, 2021)	3
	İlahiyat Fakülteleri'nde Okul Terki: İlahiyat Fakültesinden Kayıt Sildirenler Üzerine Fenomenolojik Bir Araştırma (Ay, 2021)	4
Studies that do not specify any level of education	Acarlar Beldesinde okul terkleri ve devamsızlık sorunu (Köse, 2014)	10
	Kız öğrencilerin örgün eğitimlerini sürdürmeme nedenleri (Yavuz, Özkaral, Yıldız, 2016)	5
	Öğrencilerin Okula Devamından Sorumlu Paydaşların Görüşlerine Göre Okul Devamsızlığının Nedenleri ve Buna Yönelik Çözüm Önerileri (Balantekin ve Kartal, 2016)	5
	Exploring the Factors Associated with the School Dropout (Boyacı, 2019)	5
	Okul Terkinin Maliyeti: Kamu Gelirleri Kapsamında Türkiye Değerlendirmesi (Bakırtaş ve Nazlıoğlu, 2021)	11
	Okul terkinin önlenmesi için öğretmenlerin aktif katılımıyla gerçekleştirilen psikolojik dayanıklılık programının niteliksel yöntemle değerlendirilmesi: Soyaç örneği (Kardaş, 2022)	5
	Evlilik Nedeniyle Okul Terkinin Toplumsal Hareketlilik Bağlamında Değerlendirilmesi (Aslan, 2022)	3
	Total	***290***

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The Effect of STEM-Based Robotic Coding Education on Primary School Students' Decision-Making Skills

STEM Temelli Robotik Kodlama Eğitiminin İlkokul Öğrencilerinin Karar Verme Becerileri Üzerine Etkisi

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ABSTRACT: The aim in this study was to determine the effectiveness of STEM-based robotic coding education for primary school students in terms of their decision-making skills. Mixed method research was conducted. Pretest–posttest control group designs were used in the quantitative phase, and a case study was performed in the qualitative phase of the research. The study sample consisted of 65 third graders. Pretesting of the experimental and control group students was performed using the decision-making skills scale. STEM-based robotic coding training was given to the experimental group for 6 weeks. Afterwards, the decision-making skills scale was applied as a posttest to both the experimental and control groups. The quantitative data were analyzed with paired and independent samples t-tests. A statistically significant increase was observed in the experimental group students' decision-making skills in favor of the posttest. There was no significant difference between the pre- and posttest scores of the control group students. An interview with 15 experimental group students was conducted to collect qualitative data, and the interview results were analyzed using content analysis. The robotic coding education positively affected the students' decision-making and problem-solving skills and their willingness to share ideas.

Keywords: Decision-making, mixed method, robotic coding.

ÖZ: Bu çalışmanın amacı STEM temelli robotik kodlama eğitiminin ilkokul öğrencilerinin karar verme becerisi üzerine etkisini incelemektir. Araştırmada karma yöntem tercih edilmiştir. Araştırmanın nicel aşamasında ön test- son test kontrol gruplu desen, nitel aşamasında ise durum çalışması deseni kullanılmıştır. Araştırmanın örneklemi ilkokul üçüncü sınıfta öğrenim gören 65 öğrenciden oluşmaktadır. Deney ve kontrol grubundaki öğrencilere karar verme beceri ölçeği ön test olarak uygulanmıştır. Ardından altı hafta süre ile deney grubuna STEM temelli robotik kodlama eğitimi verilmiştir. Uygulama sonucunda ise hem deney hem de kontrol grubuna karar verme beceri ölçeği son test olarak uygulanmıştır. Nicel veriler t testi tekniği ile analiz edilmiştir. Nicel verilerden elde edilen bulgular deney grubu öğrencilerinin karar verme becerilerinde son test lehine artış olduğunu ve bu artışın istatistiksel olarak anlamlı olduğunu göstermiştir. Kontrol grubu öğrencilerinde ise ön ve son test puanları arasında anlamlı bir farklılık görülmemiştir. Nitel verilerin toplanması amacıyla ilgili eğitimi alan 15 öğrenci ile üç sorudan oluşan yarı yapılandırılmış görüşme yapılmıştır ve görüşme sonuçları içerik analizi tekniği ile analiz edilmiştir. Nitel verilerden elde bulgulara göre robotik kodlama eğitimi öğrencilerin karar verme, problem çözme ve fikirlerini paylaşmaya dair süreçlerini olumlu yönde etkilemiştir.

Anahtar kelimeler: Karar verme, karma yöntem, robotik kodlama.

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Teaching educational disciplines through an integrative approach rather than teaching them separately has gained importance in recent years (Sickel, 2023). STEM education, which is one of these integrated teaching approaches, refers to an interdisciplinary approach in which the aim is to acquire 21st century skills (Topsakal et al., 2022), such as problem-solving (Çakır & Altun-Yalçın, 2021), creativity, decision-making (Pleasants et al., 2019), and entrepreneurship (Meral and Altun-Yalçın, 2022). In addition, it is seen that STEM education, which involves teaching by integrating science, technology, engineering, and mathematics, is integrated with different teaching practices.

Thibaut et al. (2018) have categorized the themes in which STEM education is integrated, namely STEM content-based integration, problem-based integration, research-based integration, design-based integration, and teamwork-based integration. The content-based category includes instructional practices for making connections between different STEM disciplines. In other words, it is related to the interdisciplinary role of STEM, which includes solving daily life problems. Further, in this category, the focus is on curriculum-based issues, the integration of technology, and the teaching of concepts and skills belonging to certain disciplines (Hwang & Taylor, 2016). In the problem-based integration category, there are problem-based learning and project-based learning and focusing on real-life problems. In research-based integration, there is integration with practices that encourage students to research, such as data interpretation, questioning, and authentic scientific process practices. Design-based integration includes engineering design practices, learning from failure, and schematic solutions. Teamwork-based integration, as its name suggests, supports collaborative learning, communication, and working in small groups (Thibaut et al., 2018).

The increasing importance of technology integration in education has resulted in robotic coding education becoming widespread (Altun Yalçın et al., 2020). Thus, it is seen that STEM education has been integrated into robotic coding education in recent years. This progress in today's technological age has caused robotics to become popular at almost all educational levels (Seckin Kapucu, 2023). The dissemination activities related to robotic coding are carried out via the courses and training given to teachers and students entitled "robotic coding" (Çınar, 2020; Filipov et al., 2017).

Robotics constitutes a broad section covering concepts related to mechanical materials, motors, sensors, and programming (Rogers et al., 2010). Coding refers to a process by which a computer, electronic circuit, or mechanical device carries out a series of instructions (Güven et al., 2022). Accordingly, educational robotics can be described as the process of introducing robotics and related topics within the knowledge set of a specific curriculum content acquired by a student; it can also be explained as the addition of robotics and its entire background to a certain curriculum (Patiño-Escarcina et al., 2021).

Text-based and block-based programming are both options for students to code. Using a computer keyboard, students create codes and commands as text according to text-based coding procedures. Block-based coding, on the other hand, consists of combining blocks like a jigsaw puzzle without writing any text (Güven et al., 2020).

In general, studies on the robotic coding applications in education have put more emphasis on the effects of educational robotics on cognitive domains of individuals, such as problem-solving, computational thinking, creativity, STEM skills,

metacognitive skills, and transferring skills (Anwar et al., 2019; Zong and Xia, 2020). It has been shown in many studies that robotics education contributes to these cognitive skills (Tramonti et al., 2023). However, the skills investigated within the scope of robotic coding are not limited to the cognitive domain. In addition to cognitive skills, there are studies investigating affective domain and social skills such as collaboration, communication, motivation, and attitude (Yang et al., 2023). In these studies it is also argued that robotic coding contributes to affective domain skills, social skills, attitudes, and motivation (Atman-Uslu et al., 2022).

It is essential to emphasize the incorporation of robotic coding into education to promote its widespread acceptance. Robotic coding has been integrated into courses, curriculum content, and various disciplines such as mathematics and technology (Bers et al., 2019; Alqahtani et al., 2022). In addition, studies in which robotic coding is integrated with STEM have gained importance in recent years. Kaygısız et al. (2020) carried out a study on the teaching of STEM-based robotic coding applications with the participation of prospective primary school teachers and, according to the result of their study, prospective teachers can basically integrate robotics into STEM-based science teaching. Moreover, preservice teachers stated that robotics might be included in all guides, particularly science, and this could make a contribution to students' algorithmic thinking abilities and problem-solving. Tiryaki and Adıgüzel (2021) found STEM-based robotics applications increased the creativity and scientific attitudes of secondary school students.

Research problem

Considering the studies carried out in the field in question, it can be asserted that the experimental studies on STEM-based robotic coding are quite limited. The field of educational robotics requires more experimental studies, according to Tselegkaridis and Sapounidis (2022). Their research indicates that nonexperimental methods are favored by most researchers, which highlights the need for a shift in research practices. By utilizing an experimental design, the present study can make a valuable contribution to the field. Additionally, the study's focus on decision-making skills is a unique aspect that sets it apart from other research in the field. As mentioned above, the experimental studies were mostly focused on students' cognitive domain skills. These skills particularly emphasize computational thinking, creativity, critical thinking, and problem-solving. On the other hand, one skill important for students to acquire from an early age is decision-making. Children's decision-making skills continue to develop due to the fact that their brains are still maturing (Garon and Moore, 2004). Decision-making is unique to humans, who have reason, logic, consciousness, and will, and all human actions are related to a decision-making process (Yurtseven et al., 2021). A person has to encounter a series of situations in which the obligation to make a decision arises. The decision-making process consists of different elements such as defining the problem in the face of any event, creating options for the defined problem, choosing the most appropriate one among all the options, making a decision according to the plans made, implementing the decision, and evaluating the result (Adair, 2000). These stages are very similar to problem-solving, the engineering design process, and STEM implementation processes (Meral et al., 2022). For this reason, it is hypothesized that STEM-based robotic coding education can influence students' decision-making skills.

While studies, such as that by Agostini et al. (2017), indicate a positive impact of robotics on decision-making skills, there is a notable absence of experimental research addressing the relationship between STEM-based robotic coding and these skills. Therefore, it is considered that the present research will make a contribution to the field, due to its investigation of the effect of STEM-based robotic coding on students' decision-making and the inclusion of primary school students, contrary to the general trend in related studies. In this regard, the objective was to determine the impact of STEM-based robotic coding education on primary school students' decision-making. Aligned with this purpose, the aim in the research was to provide answers to the following research questions:

1. Does STEM-based robotics coding education have a significant impact on primary school students' decision-making skills?
2. Does STEM-based robotics coding education have a significant impact on the subdimensions of decision-making skills of primary school students?
3. What are the viewpoints of primary school students concerning STEM-based robotics coding education?

Method

Research Design

The sequential explanatory mixed method was used in the research. This design was chosen to investigate the efficiency of the research, to explain the results with different measurement tools, and to test its reliability. In this method, quantitative data are dominant and collected beforehand; then qualitative and quantitative data are analyzed. The experimental design was chosen in the quantitative phase of the research. Findings obtained in the quantitative method are presented as numerical data and analyzed using statistical methods (Büyüköztürk et al., 2008). A pretest–posttest paired control group model was used in the quantitative stage. The case study design and the semi structured interview method within this scope were included in the qualitative stage. Semi structured interviews allow the participants to describe the world they perceive with their own thoughts through open-ended questions prepared in advance by the interviewer (Patton, 2014).

Study sample

The study universe comprised primary school students, and the sample consisted of 29 third graders in the control group and 36 third graders in the experimental group. Convenience sampling, which is categorized as a nonprobability sampling method, was chosen because of the proximity and easy access to the sample (Etikan et al., 2016).

Table 1

Study Sample

		N	Grade
Control group	Pretest	29	3rd grade
	Posttest	29	3rd grade
Experimental group	Pretest	36	3rd grade
	Posttest	36	3rd grade

Ethical Procedures

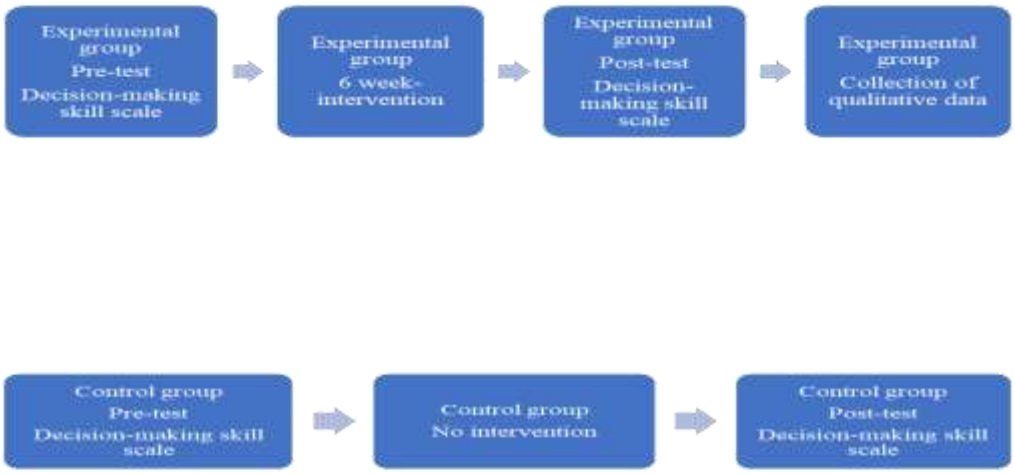
Ethical approval with the number 01/10 (31.01.2023) was obtained for the study from the university's scientific research and ethics committee where the research was carried out. The informed consent process was meticulous, with participants and their parents receiving detailed explanations of the study's procedures and data usage. Participant consent was acquired verbally and in writing, and volunteers were carefully selected. In addition, parents' written approval was acquired and submitted as part of the application to the ethics committee. The participants were informed of their right to withdraw from the study at any time. To prevent bias, the data were transcribed verbatim as reported by the participants. Pseudonyms were assigned to the participants to maintain confidentiality. The research was carried out systematically. The data were collected transparently and honestly through audio recording methods.

Implementation

Both the experimental and control group students completed a decision-making skill scale before the application, and the experimental group underwent a 6-week STEM-based robotics training program. Afterwards, the same scale was applied to both groups. As part of the experimental procedure, STEM-based robotic coding training was offered to 36 third grade students for six weeks. The training was provided using Lego-based Fischertechnik sets. The students performed these activities in groups. Figure 1 illustrates the stages of the application process.

Figure 1

The Application Process of the Research



Experimental Intervention Process

In the initial step, the students were divided into 3 to 4 groups. Fischertechnik construction kits were allocated to each group. Subject matter experts were present within each group to guide the students. Subsequently, the students undertook the task of crafting prototypes for engineering designs employing the building blocks provided. Noteworthy examples included prototypes for a traffic light, a carousel, a washing machine, and automated gate and exit control systems such as barrier gates commonly encountered in various settings.

Following the prototyping phase, the students proceeded to encode and execute the functionalities of these structures. The expert instructors performed an observational role, offering each student a distinctive problem scenario for coding and scrutinizing the accuracy of the code composition. Finally, all group members collectively engaged in higher-order thinking, deliberation, and collaborative coding endeavors. Consequently, each student was allowed to contribute to individual coding pursuits, thereby collectively addressing the challenges encountered. In addition to providing the students with hands-on coding experience, this approach also facilitated collaborative problem-solving within the group.

Data Collection Tools

A decision-making skill scale was used to collect quantitative data from the students. It was a 5-point Likert-type scale consisting of 17 items. These 17 items contained a total of 5 subdimensions: realizing and identifying a problem, gathering information, generating alternative options, decision-making, and implementing and evaluating the decision. The scale, which was created by taking account of the opinions of 12 experts, was developed by Demirbaş Nemli (2018). The CVR (Scope Validity Criteria) formula was applied for each item in calculating the validity rate of the scale. According to this formula, items with a CVR coefficient below 0.56 were eliminated.

Since the chi-squared value in Bartlett's test was significant, the next step was taken. In the next step, Kaiser–Meyer–Olkin (KMO) analysis was performed, which showed the KMO coefficient to be 0.876. As this coefficient approaches 1, the scale is considered suitable for analysis. In the next stage, factor analysis was performed and it was seen that the data obtained explained 55.177% of the population and this value was sufficient for the scale to be usable. The reliability Cronbach alpha value for the whole scale was 0.781. An interview with a semi-structured format was carried out with 15 experimental group students after the application to collect qualitative data. Three questions, which were about the processes of decision-making, were asked during the course of the interview.

Data Analysis

The Shapiro–Wilk and Kolmogorov–Smirnov tests were utilized to examine the normality of the quantitative data and, according to the results, the data showed a normal distribution. Subsequently, the t-test, a parametric test, was performed to analyze the quantitative data. The pre- and posttest means of both the experimental and control groups were analyzed with the paired samples t-test. Afterwards, the experimental and the control groups were analyzed among themselves with the independent samples t-test.

The kurtosis/skewness values and Shapiro–Wilk and Kolmogorov–Smirnov test results of the normality distribution analysis are shown in Table 2.

Table 2

Normality Test Results of Quantitative Data

Groups		N	x̄	SD	Shapiro–Wilk	Skewness	Kurtosis
Control group	Pretest	29	2.984	0.354	0.488	-.002	-.823
	Posttest	29	2.911	0.339	0.438	-.417	-.225
Experimental group	Pretest	36	2.721	0.412	0.321	-.497	0.751
	Post test	36	3.403	0.304	0.038	-.840	0.276

Table 2 shows the normality test results of the pre- and posttest scores of the control and experimental group. Based on the Shapiro–Wilk results, since the sample number was below 50, except for the experimental group's posttest Shapiro–Wilk value, the other values are above 0.05 and show a normal distribution. Since the kurtosis/skewness value of the experimental group in the posttest was between -2 and +2, the entire dataset is normally distributed (George & Mallery, 2010).

The qualitative data of the research were examined by content analysis. This is a technique that aims to intensify the phenomenon and obtain a broad definition of it. As a result of the analysis, concepts or categories that define the phenomenon are created. Content analysis allows the researcher to examine the data via an impressionistic, instinctive, and interpretive approach (Hsieh & Shannon, 2005).

Validity and Reliability

The necessary information was given to the students at the beginning of the research to provide validity of the quantitative stage of the research and it was ensured that the students consciously answered the questions on the scale. The application time was not kept too long to minimize the effect of subject loss and subject maturation. Attention was paid to ensuring that the scale applied to the students was appropriate for their level. In addition, Cronbach alpha reliability analysis of the currently valid and reliable scale was also performed. The Cronbach alpha values obtained in the present study were 0.782 for the control group pretest, 0.740 for the control group posttest, 0.734 for the experimental group pretest, and 0.751 for the experimental group posttest. The results of the scale are considered reliable provided that the Cronbach alpha value is above 0.70 (Taber, 2018). Furthermore, students must give sincere answers to ensure the validity of the qualitative stage of the research (Büyüköztürk et al., 2008). For this reason, sufficient time was provided for the interaction with students. Moreover, codes and categories were confirmed by both experts and participants through direct quotations. The reliability formula (Reliability: Consensus/(Consensus+Disagreement)×100), which was created by Miles and Huberman (2014), was used to determine the reliability of the qualitative data. The agreement between the codes and categories, which were developed by two separate researchers who are experts in their fields, was calculated according to this formula. The reliability coefficient was 92%.

Results

Quantitative Data

The quantitative results are presented in Tables 3-6.

Table 3

Paired Samples t-test Results of the Control and Experimental Groups

Groups		N	x̄	SD	t	p
Control group	Pretest	29	2.984	0.354		
					0.879	0.392
	Posttest	29	2.911	0.339		
Experimental group	Pretest	36	2.721	0.412		
					-7.348	0.000
	Posttest	36	3.403	0.304		

*p>0.05, * *p<0.05

The paired samples t-test results of the pre- and posttest means of the control and experimental groups are presented in Table 3. It is seen that there is no statistically significant difference between the pretest mean ($\bar{x}$=2.984) and the posttest mean ($\bar{x}$=2.911) of the control group (p>0.05). However, there is a statistically significant difference between the pretest ($\bar{x}$=2.721) and posttest ($\bar{x}$=3.403) means of the experimental group in favor of the posttest (p<0.05).

Table 4

Results of the Paired Samples t-test for the Subdimensions of the Control Group

Subdimension	Measurements	N	x̄	SD	t	p
Realizing and identifying a problem	Pretest	29	3.034	0.667		
					0.306	0.762
	Posttest	29	2.982	0.604		
Gathering information	Pretest	29	3.506	0.465		
					0.646	0.524
	Posttest	29	3.419	0.581		
Generating alternative options	Pretest	29	2.738	0.579		
					-1.747	0.093
	Posttest	29	3.007	0.633		
Decision-making	Pretest	29	3.043	0.653		
					5.093	0.000
	Posttest	29	2.087	0.570		
Implementing and evaluating the decision	Pretest	29	3.095	0.654		
					-.183	0.857
	Posttest	29	3.131	0.640		

There was no significant difference between the pre- and posttest means of the control group in any of the four subdimensions ($p>0.05$), namely realizing and identifying the problem, gathering information, generating alternative options, and implementing and evaluating the decision. On the other hand, a significant difference was observed in favor of the pretest in the decision-making subdimension ($p<0.05$).

Table 5

Results of the Paired Samples t-test for the Subdimensions of the Experimental Group

Subdimension	Measurements	N	x̄	SD	t	p
Realizing and identifying a problem	Pretest	29	3.034	0.667		
					0.306	0.762
	Posttest	29	2.982	0.604		
Gathering information	Pretest	29	3.506	0.465		
					0.646	0.524
	Posttest	29	3.419	0.581		
Generating alternative options	Pretest	29	2.738	0.579		
					-1.747	0.093
	Posttest	29	3.007	0.633		
Decision-making	Pretest	29	3.043	0.653		
					5.093	0.000
	Posttest	29	2.087	0.570		
Implementing and evaluating the decision	Pretest	29	3.095	0.654		
					-.183	0.857
	Posttest	29	3.131	0.640		

According to Table 5, the pre- and posttest means of the four subdimensions of the experimental group differ significantly in favor of the posttest ($p<0.05$). These subdimensions are realizing and defining the problem, generating alternative options, decision-making, and implementing and evaluating the decision. However, no significant difference is observed between the pre- and posttest means of the subdimension gathering information ($p>0.05$).

Table 6

Independent Samples t-test Results of the Control and Experimental Groups

Groups		N	x̄	SD	t	p
Control group	Pretest	29	2.984	0.354		
					-.276	0.785
Experimental group	Posttest	36	2.721	0.412		
Control group	Pretest	29	2.911	0.339		
					0.581	0.285
Experimental group	Posttest	36	3.403	0.304		

The independent samples t-test results of the pre- and posttests of the control and experimental groups are given in Table 6. According to these results, there is no statistically significant difference between the pretest means of the control group ($\bar{x}$=2.984) and the experimental group ($\bar{x}$=2.721) ($p>0.05$). In addition, there is no statistically significant difference between the posttest means of the control ($\bar{x}$=2.911) and the experimental group ($\bar{x}$=3.403), although the posttest score of the experimental group is higher ($p>0.05$).

Qualitative Data

Content analysis techniques were used to analyze the qualitative data, which are shown in Tables 7, 8, and 9 along with the frequency and percentage values.

Table 7

Students' Views on the First Question

Category	Code	Frequency (F)	Percentage (%)
Yes	Placement of Lego blocks	8	38
	Wrong coding	5	24
	Communication with friends	5	24
No	Not encountering a problem	3	14
Total		21	100
Solutions	Getting help	9	50
	Trying different alternatives	6	34
	Communication solutions	3	17
Total		18	100

Table 7 shows the answers to the question "Did you encounter problems while doing robotic coding activities? How did you solve the problems you encountered while doing these activities?" Accordingly, only 3 out of the 15 students stated that they did

not encounter any problems at all. These students stated that the robotic coding activities were easy and they could perform them without any help. On the other hand, other students (80%) encountered some problems. The main problem encountered by the students concerned the placement of Lego blocks (38%). The students had problems while attaching the blocks to each other or they set them incorrectly. In addition, they encountered an error in coding (24%). Some students (24%) had problems in communicating with their group mates. For instance, these students stated that they had disagreements with their group mates in deciding on how to code. According to the category of solutions, half of the students (50%) found solutions to their problems by getting help. They solved their problems by asking questions to their teachers and asking friends for help. Some students tried to come up with a solution by trying different alternatives (34%). For instance, when they incorrectly set the blocks, they tried to attach them in a different way or they tried to complete their models by trying different tools. Some students, on the other hand, preferred to solve their problems by talking to their friends (17%). In this way, they found solutions to their communication problems.

S1: "I solved my problems by asking my teacher for help." S2: "I got help from my friends in solving my problems."

Table 8

Students' Views on the Second Question

Category	Code	Frequency (F)	Percentage (%)
Yes	Learning how to do	12	53
	Learning from mistakes	4	15
	Learning from ideas	2	8
	Placement of Lego blocks	3	11
	Problem-solving	2	8
	Being sure	1	4
No	No impact	1	4
	Not getting along with friends	1	4
Total		26	100

Table 8 presents responses to the question "Did these activities contribute to your decision-making skills? Why or how?" along with the categories and codes. A significant majority of the students (92%) stated that the robotic coding activities contributed to their decision-making skills. In this case, the most frequently stated reason (53%) for this contribution was because robotic activities contributed to students learning how to code and considering it. Additionally, some of the students (15%) discovered that they improved their decision-making skills by learning from their mistakes, decided how to place the blocks (11%), developed their problem-solving skills on robotic coding (8%), and learned from each other's ideas (8%), and they thought about how robotic coding was implemented (8%) thanks to the robotic coding

activities. Therefore, they used the decision-making process. One of the students stated that the robotic coding training made him feel confident and that he made a better decision in this way. Two students (8%) stated that the robotic coding activities did not have any impact on their decision-making skills. One of these students (4%) stated that he had problems in decision-making because he could not get along with his group mates.

S5: "It helped my decision-making skills because it made me feel confident about what I was doing." S6: "It helped me decide how to place the Lego blocks."

Table 9

Students' Views on the Third Question

Category	Code	Frequency (F)	Percentage (%)
Shared person	Teacher	7	47
	Friend	6	40
No	Inability to share easily	2	13
Total		15	100
Reason to share	A better understanding	5	38
	Reaching a solution	3	23
	Help-seeking	3	23
	Being willing to share	1	8
	Enjoyableness	1	8
Total		13	100

Table 9 shows the answers to the question "Did you share your ideas with your friends and teachers during the activities; why did you share them?" along with the codes and categories. Most of the students (87%) were able to share their ideas with their teachers or friends. Out of the surveyed students, only 2 did not share their ideas easily and stated that they were embarrassed to do so. The reasons for sharing the ideas of the students consisted of gaining a better understanding of the activities, reaching a solution, asking for help, being willing to share, and enjoyableness of sharing ideas. The most common reason for sharing ideas (38%) was for a better understanding of the activities. The students preferred to share their ideas to perform the coding better. Furthermore, 23% of the students shared their ideas with friends and teachers to assist in finding a solution. The students who shared their ideas because they thought it was fun and they were willing to do so accounted for 8% of the participants.

S9: "I couldn't share my ideas easily; I was embarrassed." S10: "I was comfortable sharing my ideas because it was necessary for me to get help."

Discussion and Conclusion

The present study was conducted to determine the effect of STEM-based robotic coding education on the decision-making skills of primary school students. Based on the quantitative results, there was an improvement in their decision-making skills after the implementation process. The findings obtained from the interview also revealed that the students' decision-making skills improved as a result of the robotic coding training given for 6 weeks. In other words, STEM-based robotic coding education positively affected primary school students' decision-making skills. The results of the experiment show that there was a significant improvement in the final test scores of the experimental group, while no significant difference was observed in the control group. This suggests that the application had a positive impact on the experimental group. Although there was no significant difference between the pretest and posttest scores in the control group, there was a decrease in the posttest scores. A similar decrease was also observed in a previous study by Bozanoğlu (2005) in the field of educational sciences. It is possible that external factors may have affected the decision-making process of the control group, leading to this decrease. In fact, Realyvásquez-Vargas et al. (2020) stated that adverse environmental factors can negatively influence final test scores. Furthermore, the diversity among educators in the control group and the varying pedagogical approaches and strategies they use in teaching the subject are considered possible factors in this scenario. The findings reported by Vanlommel et al. (2018) suggest that teachers' instructional approaches and attitudes have a noteworthy impact on the decision-making skills of students. That study's results can be identified as a potential explanation for the changes observed in the control group.

Karahan et al. (2023) claim that creative thinking skills predict primary school students' decision-making skills since decision-making is one of the dimensions of creative thinking abilities. Accordingly, it can be inferred that activities that can improve creative thinking skills can also affect decision-making skills. In fact, it has been suggested in numerous studies that robotic coding education positively impacts students' creative thinking skills (Zhang and Zhu, 2022; Arslan and Çelik, 2022) and this has been demonstrated in experimental studies (Tiryaki and Adıgüzel, 2021; Noh and Lee, 2020). The present study also supports similar studies in terms of showing how robotic coding training develops decision-making skills, one of the skills that make up creative thinking.

According to the analysis of the pre- and posttest means for the subdimensions of the decision-making skills scale, no significant differences were detected in the subdimensions of realizing and identifying the problem, gathering information, generating alternative options, or implementing and evaluating the decision in the control group. The control group, however, demonstrated a significant difference favoring the pretest in the subdimension of decision-making. A significant difference was found in favor of the posttest in the subdimensions of decision-making and implementation and evaluation in the experimental group. The significant difference can be attributed to the robotic coding activities. In addition, the experimental group's posttest means were significantly higher than the pretest means in the subdimensions of realizing and identifying the problem and generating alternative options. Based on the qualitative results, the students stated that they developed their decision-making skills as a result of the activities. They could make better decisions and support their decision-

making by thinking about how to perform robotic coding activities, attempting to solve the problems they faced, and making sure of their coding.

Considering the qualitative findings, it is clear that the students encountered some problems while performing the robotic coding activities. These problems were generally caused by the incorrect layout of the blocks, incorrect coding, and disagreements with group mates. These problems are likely due to the young age of the group receiving the robotic coding training and the fact they had never participated in such activities before. In addition, since the students carried out these activities in groups, it was inevitable that sometimes communication problems could occur within groups. The qualitative findings also confirm a significant increase in terms of the experimental group's subdimension of realizing and identifying the problem. The students were able to identify the problems they had during the robotic coding activities and found solutions to them. Moreover, according to the qualitative findings, the students tried various alternatives besides getting help from their friends and teachers to solve the problems they encountered. For instance, when they could not place the blocks, they changed the items or when their coding was wrong, they were able to correct it by creating different codes. Therefore, the considerable increase in the experimental group's subdimension of generating alternative options supports these findings. Moreover, in the study conducted by Çakır and Altun Yalçın (2021), the students stated that they tried different alternatives to solve their problems and received help from teachers and friends. These findings also overlap with the qualitative results of the present study. Therefore, it appears that students' ability to create alternatives and develop solution options to problems increased due to the robotic coding activities. It is thought that this situation also strengthens the students' decision-making skills, because during the decision-making process, first of all, the problem is defined, then the alternatives for the solution of this problem are determined, and the most appropriate option to obtain the solution is decided on (Adair, 2000).

According to Yurtseven et al. (2021), a correlation exists between primary school students' problem-solving skills and their decision-making, and it was concluded that decision-making was positively correlated with problem-solving skills, and problem-solving skills were predicted by decision-making. Therefore, a key finding of this research is that decision-making and problem-solving skills are closely related and that they affect each other positively. Moreover, there are many studies indicating that robotic coding education improves students' problem-solving skills (Atmatzidou et al., 2018; Çalışkan, 2020), and the results of the relevant studies support the findings of the present study. Consequently, within the framework of our research and similar research results, it can be inferred that there is an interrelationship between skills regarding problem-solving, computational thinking, creativity, critical thinking, and decision-making, and, therefore, an increase in any of these skills might positively affect other skills. However, the experimental and control group did not differ significantly in the subdimension of gathering information. Nevertheless, considering the qualitative data, although the students did not make clear statements about the information-gathering process, getting help from their teachers and friends and completing the activities by asking them questions show to some degree that they collected some information. However, due to the practice-oriented nature of robotic coding and low education levels of the students in terms of conducting theoretical research or gathering information, it is

estimated that information-gathering could not be adequately performed. Another finding obtained from the qualitative data is that the majority of the students were willing to share their ideas and solutions. As a result of this process, the students saw that they could create models and solve problems on their own, and they were enthusiastic and excited to share their ideas. Cakir and Altun-Yalcin (2022) examined students' views on STEM education and concluded that they showed an improved sense of curiosity and self-confidence. In this respect, it can be concluded that robotic coding activities help students improve not only in terms of cognitive skills but also in other areas such as socialization, communication, self-confidence, and motivation. Other studies in this field also support this result. Kandlhofer and Steinbauer (2016) reported that educational robotics applications improved students' social skills. Furthermore, Yang et al. (2000) concluded that students found educational robotics fun, resulting in increased motivation, and Vourletsis and Politis (2000) concluded that the ability to solve problems through robotic coding improved students' self-confidence as well.

Recommendations

The present study had the following limitations: the application period was limited to 6 weeks, it only involved 3rd-grade primary school students, and no other robotic tools were used in training process apart from the Fischertechnik set and ROBO pro software. Therefore, a longer-term robotic coding training program can be conducted with students at various levels in this field. Studies can be implemented with different robotic tools. In addition, it is thought that more experimental studies involving students' affective skills will make a significant contribution. As a final note, it is crucial to emphasize individuals' decision-making and problem-solving abilities from the beginning of the elementary level. Thus, beginner-level coding courses or activities aimed at developing these skills should be integrated into primary school programs.

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Statement of Responsibility

Multi-author publications have taken the necessary responsibility including the tasks such as conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing-original draft, writing-review&editing, visualization, supervision.

Meryem Meral-Language, Literature review, Data analysis, Conclusion

Sema Altun Yalçın-Data collection, Results, Conclusion

Zehra Çakır-Methodology, Data curation, validity

Esila Samur- Methodology, Data curation, Validity

Conflicts of Interest

There is not any conflict of interest that could influence our research.

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