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CONTENTS

REPRESENTATION AND COMMUNICATION IN RESCHOOL MATHEMATICS PROCESS STANDARDS: MEASUREMENT THROUGH DRAWING AND EXPRESSION

Ayşegül Ergül[1]

1 Part of this study was presented as an oral presentation at the 8th International Early Childhood Education Congress organised by Karamanoğlu Mehmet Bey University.
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Introduction

Research indicates that many young children possess a complex understanding of measurement, often exceeding curriculum expectations (Cheeseman & McDonough, 2019). Children's everyday experiences, particularly those at home, have a significant influence on their mathematical understanding, including measurement. These experiences provide a rich context for children to develop informal measurement skills before formal schooling (MacDonald, 2022; MacDonald & Lowrie, 2011). Children often encounter measurement in familiar environments, such as their homes, where they use tools like rulers and measuring tapes. These experiences are crucial as they offer a context for children to relate measurement to real-world applications, such as measuring ingredients for cooking or determining the length of a room (Figueiredo, Gomes, & Aires de Matos, 2021; MacDonald, 2012).

Throughout these formative experiences from the very beginning of their lives, children eagerly share their observations and discoveries with those around them. The content and process standards (NCTM, 2000) in the realm of school mathematics provide a framework that allows for the continuation of children's natural behaviors related to exploration and sharing their discoveries with others, whether through interactive play or direct engagement, in later educational phases.

The themes of representation and communication within the mathematics process standards have a profound influence on preschool children's comprehension of mathematical concepts, thereby enhancing their ability to articulate, interpret, and connect mathematical ideas. These standards promote the inclusion of various communicative modalities and representations, which are crucial for developing mathematical literacy and problem-solving skills among young learners. By engaging in activities that involve verbal expression, listening, reading, writing, and the use of diverse representations, preschool children can deepen their understanding of mathematical concepts and apply them in various contexts.

The integration of diverse representations in preschool mathematics education is essential for fostering a deep understanding and lasting retention of mathematical principles. Effective methodologies include utilizing various representations, involving children in meaningful activities, and incorporating play. These strategies help children progress from an informal to a formal understanding of mathematics, making abstract concepts more concrete and relatable.

Effective communication in mathematics enables children to express their thoughts, compare ideas, and collaborate with peers, thereby enhancing their learning experience. Preschool children communicate their mathematical

understanding through various methods, including verbal expressions and physical gestures, which aid in their grasp of mathematical concepts (Lundström, 2015). Gordon, Scalise, and Ramani (2021) demonstrated that preschoolers who spontaneously used gestures during a cardinality task exhibited significantly better numerical knowledge, independent of working memory ability. This finding supports the hypothesis that gesture functions as an independent scaffold for early numeracy. Similarly, Goldin-Meadow, Cook, and Mitchell (2009) showed that encouraging children to produce correct gestures during math instruction facilitated the development of new problem-solving strategies. Their results suggest that gesture does not merely accompany learning—it can reveal and even generate conceptual insight. Expanding on this, Jamalian (2014) found that preschool children who used grouping gestures alongside diagrams demonstrated more accurate counting strategies and a deeper understanding of cardinality. This interaction between visual and gestural representation was particularly effective in reducing common errors in quantity comparison tasks. A recent study on proportional reasoning by Göbel et al. (2021) found that the type of gestures children used (continuous vs. discrete) influenced their susceptibility to whole-number bias. Continuous gestures helped mitigate this bias, indicating that gestural form may influence conceptual framing. Also encouraging children to express their mathematical thinking through speaking and writing reinforces their understanding and promotes a collaborative learning environment (Thompson & Chappell, 2007). Engaging in mathematical communication nurtures critical thinking and problem-solving skills, which are vital for understanding complex concepts (Iman et al., 2024).

Using multiple representations (e.g., visual, verbal, and physical) helps children grasp mathematical concepts more effectively (Bautista et al., 2019). Children express mathematical concepts through various representations, including drawings and gestures, which are essential for cognitive development (Bobis & Way, 2018). Drawing helps children articulate their understanding of mathematical problems, facilitating reasoning through imagery (Saundry, 2006). Incorporating writing and drawing activities allows children to express mathematical ideas in a way that is accessible to them. This can include drawing shapes, writing numbers, or creating simple graphs (Wood, 2016). If educators do not promote students' ability to perceive, contemplate, and articulate their thoughts through visual means, they lose a vital opportunity to enhance cognitive understanding. Effective teaching strategies for developing mathematical proficiency include using visual aids and graphical representations: the act of visualizing leads to a deeper level of understanding (Boaler et al., 2016). Draw-and-tell activities can be structured as part of learning trajectories, helping teachers interpret children's thinking and providing meaningful opportunities for mathematical engagement.

Therefore, these activities could serve as a bridge between formal and informal instruction, assisting both parents and teachers in supporting children's mathematical development in an engaging and accessible manner.

Background literature

When measuring with concrete materials, children engage in hands-on activities that promote active involvement in learning. For example, they might use building blocks to measure length, fraction tiles to understand parts of a whole, or counters to represent quantities. These activities help children develop spatial skills and conceptual understanding of mathematical principles (Byrne et al., 2023). Measurement skills are closely linked to numerical understanding. Activities that integrate measurement with number sense, such as number-line estimation tasks, can enhance both areas of learning. These tasks help children understand the relationship between numbers and measurement, fostering a more profound comprehension of both (Cheeseman, Benz, & Pullen, 2018; Cohen & Sarnecka, 2014). Instructional practices play a crucial role in shaping children's understanding of measurement. Engaging children in tasks involving drawing and measuring can enhance their conceptual understanding by providing meaningful contexts for learning (Lehrer & Schauble, 2023).

Effectively implementing mathematics process standards requires explicit support for early childhood educators, ensuring they can integrate these practices into their teaching (Piñeiro, 2021). Professional development opportunities can equip teachers with strategies to foster mathematical communication and representation in their classrooms (Clements et al., 2003). Educators should consider incorporating draw-and-tell activities into their mathematics curriculum as a way to engage children in meaningful mathematical learning. These activities can be particularly effective in early childhood settings, where play-based learning is often emphasized (Granone & Reikerås, 2023; Wickstrom & Pyle, 2023).

The draw-and-tell methodology serves as a powerful tool in mathematics education, particularly for developing representation and communication skills as outlined in the Mathematics Process Standards (NCTM, 2000). This approach involves students creating visual representations of mathematical concepts and then explaining their drawings, which can greatly enhance the understanding and sharing of mathematical ideas. The benefits of this pedagogical method are varied, impacting cognitive processes, engagement levels, and overall instructional effectiveness. The draw-and-tell technique in preschool mathematics education provides significant advantages for improving representation and communication skills among young learners. This strategy allows children to demonstrate mathematical concepts both visually and verbally, promoting a deeper understanding and increased

engagement with the subject. This method leverages children's natural tendency to draw as a way to express their knowledge and feelings about mathematics. The technique not only helps children visualize mathematical concepts but also encourages them to explain their thought processes, thereby enriching their comprehension of the subject.

Children's Drawings in Mathematics

Drawings serve as a powerful tool for children to visually represent mathematical ideas. This can help in interpreting the meanings of mathematical concepts, relationships, and processes, making abstract ideas more concrete and accessible to young learners (Lipovec & Podgoršek, 2016). In a study involving children from kindergarten through Grade 3, it was found that pictographic and iconic drawings helped children represent multiplicative strategies and understand the structural elements of multiplicative relationships (Cartwright, 2023).

As articulated by Björklund van den Heuvel-Panhuizen, & Kullberg (2020), mathematical graphics (language) serves as the intermediary between children's internal cognitive processes (thinking) and their external communicative interactions (interactions) that are mathematically relevant. In the graphical representations of children, without exception, one can observe an emerging mathematical realm that includes spatial awareness, comparative analysis, geometric shapes, numerical concepts, positional awareness, measurement, pattern recognition, circularity, and dimensionality, among other concepts. Ultimately, however, children's graphics act as a communicative medium that facilitates their engagement and the establishment of infinite connections within their environment, the construction of meaning, and the sharing of these distinctive meanings with others: a visual modality of cognition, learning, and relationship-building manifested on paper (Dwyer et al., 2024).

Through drawing, children can demonstrate their understanding of numeracy concepts such as spatial orientation, quantification, and attributes of objects. This method allows them to explore and express these ideas in a way that is meaningful to them. The draw-and-tell technique encourages children to explain their drawings, helping them develop the language skills necessary to articulate mathematical ideas. This process of verbalizing their thoughts can lead to a better understanding of the concepts being explored (Chigeza & Sorin, 2016). Drawing activities have been shown to improve spatial reasoning and geometric knowledge in children. By creating and interpreting geometric shapes through drawing, children enhance their ability to perceive and create spatial relationships, a critical skill for mathematical problem-solving (Sinclair et al., 2018). Drawings serve as a medium for children to express their understanding of geometric concepts and relationships. The act of

drawing itself can facilitate awareness and comprehension of these concepts, suggesting that drawing is not merely a reflection of understanding but a tool for developing it (Thom & McGarvey, 2015).

By engaging in discussions about their drawings, children learn from their peers and teachers, fostering a collaborative learning environment. This interaction is essential for developing communication skills and building a sense of community in the classroom (Björklund & Palmér, 2023). Cartwright's (2023) study on children's drawings reveals that pictographic and iconic drawings can effectively represent mathematical strategies, such as counting and multiplicative reasoning. This visual representation aids children in articulating and refining their mathematical thinking.

Draw-and-tell activities, which combine drawing with narrative storytelling, have emerged as a powerful tool in early childhood education for enhancing children's understanding of mathematical concepts. These activities capitalize on the natural inclination of young children to express their thoughts and ideas through visual and verbal means, fostering a holistic learning experience. Research has shown that such activities not only promote mathematical thinking but also support cognitive development, problem-solving skills, and communication abilities (Oers, 2023; Pramling & Samuelsson, 2008; Roberts & Stylianides, 2013).

The draw-and-tell technique can reveal both instrumental (procedural) and relational (conceptual) understanding of mathematical concepts. It enables children to represent less abstract concepts more accurately, thereby facilitating a deeper understanding of mathematical knowledge (Lipovec & Podgoršek, 2016). By encouraging children to draw themselves engaging in mathematical activities, educators can collect rich attitudinal data that reflects children's personal experiences and engagement with mathematics (Quane et al., 2021).

Utilizing drawing as a methodological approach to explore children's comprehension of measurement principles

According to MacDonald (2013), the act of drawing can clarify the methodologies that children use to understand mathematical principles. Drawing serves not only as a medium for children to document their grasp of a concept; it also functions as a means through which understandings can be formulated, reassessed, and applied in innovative contexts. Drawing encapsulates the process of constructing a mathematical concept or relationship (MacDonald ve Lowrie, 2011).

Children's drawings can reveal their understanding of measurement concepts such as length, size, and proportion. For instance, when children draw objects of different sizes, they demonstrate their ability to compare and

contrast these objects, a fundamental measurement skill (Hartweg & Hardy, 2006; Lembrér, 2013). Drawings can also indicate children's grasp of more complex measurement concepts, such as conservation and transitivity, which are essential for accurate measurement. These concepts can be challenging for children to grasp, and their drawings can provide valuable insights into their level of understanding (Tahal, 2022). As children advance through their early years of schooling, their drawings become more sophisticated, reflecting a deeper understanding of measurement. This progression is often characterized by an increased ability to use symbols and conventional structures in their representations (Bobis & Way, 2018).

Encouraging children to explain their measurement decisions and reasoning during draw-and-tell activities is beneficial. This practice helps them articulate their thought processes and deepens their understanding of measurement concepts. Facilitate group activities where children share their drawings and measurement strategies with their peers. This can foster collaborative learning and expose children to various problem-solving approaches (Ergül & Artan, 2017).

Children's ability to understand mathematical representations presented to them, create their representations, and explain using these representations is crucial for enhancing retention in the learning process. Acquiring information from various sources, primarily through different representations, and presenting this information in multiple formats, along with reinforcing it through peer explanations, is also vital for promoting meaningful learning. In this way, children are better prepared to recognize what, how, and to what extent they have learned, taking greater responsibility for their learning paths.

Young children's representations of measurement are deeply intertwined with their everyday experiences and activities. These representations are not only a reflection of their cognitive development but also a product of their interactions with the world around them. Children often use measurement concepts in informal settings, which helps them develop a foundational understanding of these concepts. This understanding is further shaped by the educational strategies employed in early childhood settings, which aim to connect these informal experiences with formal mathematical learning.

The main purpose of this study is to examine preschool children's representation and communication processes regarding the measurement content standard. To achieve this, the "Draw yourself measuring" task developed by McDonald (2011) was utilized. The research questions are as follows:

1. Do children recognize the measurable properties of living and non-living things?

2. Which measurable properties of living and non-living things do they include more in their drawings and explanations?

3. Do they use measuring instruments in their drawings and explanations?

4. In their drawings and related explanations, how is real-life context utilized in the measurement process?

5. In their drawings and related explanations, how do children identify themselves?

6. Is there a gender-related difference in the characteristics of drawings and concepts related to measurement?

Method

This research is a qualitative study that examines children's knowledge of measurement concepts through their drawings and narratives. Qualitative research constitutes an inquiry framework wherein methodologies for the collection of qualitative data—including interviews, observations, or document analyses—are employed, and a qualitative approach is adhered to elucidate perceptions and occurrences comprehensively and authentically within a naturalistic context (Creswell, 2021:15). The basic qualitative study design is considered to be appropriate for the scope and objectives of the study. In a basic qualitative study, the researcher is interested in how people make sense of their lives, experiences, and structures of the world (Merriam & Tisdell, 2016, p. 24)

Sample

A group of 19 children, consisting of 10 boys and 9 girls, participated in the research. They were enrolled in two different preschool classes in an urban area. To define the study group, which included children aged 61 to 77 months, convenience sampling was used as the primary method. The process was initiated after obtaining the necessary permissions from the relevant institutions and the children's teachers.

Data collection

The information was acquired through one-on-one interviews conducted with children throughout the first two weeks of June in the spring semester of 2022-2023. The researcher spent some time in classrooms throughout the semester, aiming to establish a positive relationship with the children. H/She fostered this closeness by engaging them in conversation, particularly during free playtime.

The interviews were held in a room away from their classrooms, which contained no stimulating visuals, toys, or educational materials—only a child-sized table and chairs. The researcher followed the same procedure for both

groups. First, all the children were asked if they would like to draw together, ensuring that everyone could hear the question. The children who volunteered to participate were taken, one by one, to the room where the interviews would be conducted. Upon arrival at the interview room, the child was instructed to take a seat on the chair oriented towards the wall. The researcher positioned herself/himself on a similarly sized chair, in a position where she/he could easily see the children's drawings and the mimics, finger and hand movements they displayed during the process. During the interviews with the children, they were first asked "what it means to measure, what people measure, how and why we measure". Afterwards, they were asked to imagine themselves making measurements and draw a picture of it. They were provided with an A4-sized blank white paper and a box containing 12 colors of crayons. They were informed that there was no time limit for children to organize their thoughts and feel comfortable. After ensuring that the children had completed their drawings, they were asked to explain what was happening in their drawings. The dialogues conducted with the children endured for a duration ranging from six to twenty minutes.

During the drawing and interview process, no guidance was given to the children, and their answers were transcribed in the same way without adding any comments. The answers given by the children to the questions and the explanations they brought to their drawings were recorded both in written and audio form.

Data analysis

Children's drawings and their narratives were analysed by the descriptive analysis method. Descriptive analysis involves summarizing the data in a way that presents the participants' experiences or perspectives, typically in the form of themes or categories, staying close to the participants' own words (Creswell & Poth, 2018, p. 185). The descriptive analysis method was preferred since the meaning of the pictures was evaluated together with the explanations of the children, and it was aimed to reflect their knowledge about the measurement subject in line with the predetermined themes. The following criteria, developed by MacDonald (2011), were used in the analysis of the data.

Table 1. Matrix for analysis of responses to the "Draw yourself measuring" task.

Level 1: Identification of measurable attributes	Level 2: Use of suitable language
(a) Limited context	
Level 1a: Recognition that objects have attributes which can be measured.Context is typically limited to a description of the artefacts.	Level 2a: Use of language appropriate to the attributes being measured.Context is typically limited to a description of the artefacts.
(b) Moderate context	
Level 1b: Recognition that objects have attributes which can be measured.Real-life context more evident, with reference to people and/or places.	Level 2b: Use of language appropriate to the attributes being measured.Real-life context more evident, with reference to people and/or places.
(c) High context	
Level 1c: Recognition that objects have attributes which can be measured.Often reference to specific measuring tools.Real-life context consistently evident, with reference to specific people and/or places.Identification of self within the context.	Level 2c: Use of language appropriate to the attributes being measured.Often reference to specific measuring tools.Real-life context consistently evident, with reference to specific people and/or places.Identification of self within the context.

The presented table provides a structured framework for evaluating learners' cognitive and linguistic development in relation to measurable attributes within varying contextual settings. It emphasizes the importance of both conceptual knowledge (knowing what can be measured) and communicative competence (using appropriate language) in increasingly rich and authentic contexts. Some example sentences are given to support the understanding of the criteria:

Table 2. Contextual Examples of Measurable Attribute Recognition and Language Application

Context	Level	Dimension	Example Sentence
Limited	1a	Identification of measurable attributes	*"The ball is heavy."*
	2a	Use of suitable language	"The length of the stick is about 20 centimeters."
Moderate	1b	Identification of measurable attributes	*"This table is longer than the one in our kitchen."*
	2b	Use of suitable language	"We measured the height of the playground slide using a measuring tape."
High	1c	Identification of measurable attributes	*"When I helped my dad build the garden bench, we measured each wooden plank to make sure it was exactly 1.5 meters long."*
	2c	Use of suitable language	"To ensure the shelves were level, I used a spirit level and measured equal spacing with a ruler while organizing my room."

Each example sentence is mapped to a specific level of contextual complexity—ranging from limited to high—and reflects both cognitive recognition of measurable features (such as length, weight, or height) and the linguistic ability to express those measurements accurately. At the lower levels, children use basic descriptive language with minimal situational context. As progression occurs, the examples incorporate real-life settings, relevant measurement tools, and a more sophisticated command of mathematical vocabulary. The highest levels demonstrate the learner's ability to situate themselves within authentic contexts, apply measurement concepts purposefully, and articulate those concepts using precise, contextually appropriate language.

Results

Upon conducting an analysis of the responses provided by the children throughout the interviews, it was determined that 10 of the participants indicated that the term 'measuring' is synonymous with 'measuring height.' Regarding what was measured, eight children emphasised measuring their own and other people's heights. One of the children described the process of measuring height in detail, "we can make a picture like this and stand next to them and look at them in numbers." Two of the children referenced visiting the doctor when explaining why they measured their height. One of these children said, "We are going to the hospital, we need a height. He determines what to do on the paper. -Who? - The doctor."
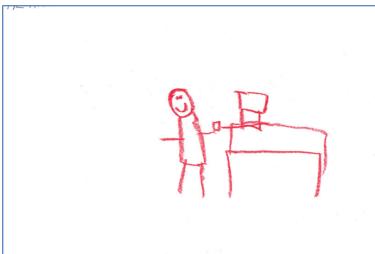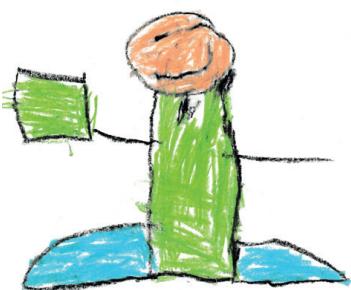
The following objects were mentioned as items that can be measured: books, pencils, trees, toys, buildings, and crayons. Three of the children added the statements, "You learn to make numbers," "how much we weigh," and "to put on TV" to their explanations. One of the boys also made the following statement: "For example, we try on whether our clothes can be small, it should be the same way as a try on... to have fun, to look."

There were three children who explained the meaning of measurement with expressions different from those given above. The responses of these children were "to make a house", "to put the nails, that is, to put them on the board", "to be the same size. It means that the boards are the same size. If they are not the same size, we cut them." Four other children used the expressions 'something big, for example', 'short and long', 'measuring something', 'something related to a ruler' in their definitions. Two children preferred not to answer these questions.

Six children used the word "ruler" in their expressions related to the question "what is used for measuring", while five children used the words "measure", "measuring thing", "gauge" and "meter" instead of "ruler". It was observed that seven children drew rulers and some of them also included numbers on these rulers. In the drawings, the people or objects to be measured

are placed side by side with the ruler or other figures. The images below are examples of the measurement process, why and how measurement is done.

Fig.1. *Children's drawings and explanations.*

"*I'm measuring the computer. There is such a thing,* **gauge**"

"*I measured my height. Ruler*"

"*I'm measuring with a ruler. The teacher gave me homework to measure something and I'm measuring it.*"

"*I'm measuring the box with a ruler*"

"*Tablet. Its size and the short one.*"

"*This is me, I wrote down how much I weighed here. When I went to the doctor, I weighed 11kg.*"
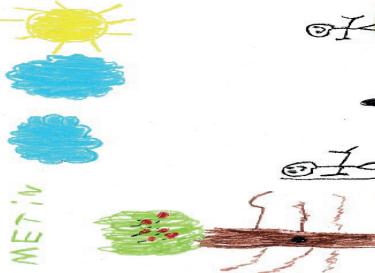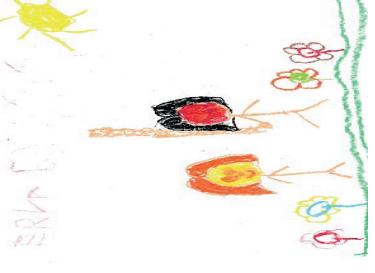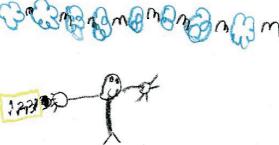
Eleven children created drawings featuring objects and human figures, but

it was unclear whether the scenes depicted indoor or outdoor environments. When these children were asked to explain their drawings, in addition to the comments above, they used expressions such as 'I use a ruler' and 'I measure myself'.

Eight children preferred to present themselves in contexts such as playing games, picnics or walking.

12 children stated that they made measurements in their drawings. Three children made explanations not related to measurement concepts and only described what they drew. One child gave an explanation that was not clear who was measuring. Two children said that their mother measured their height. One child did not want to talk about his drawing. Examples of these findings are presented below.

Fig. 2. *Children's drawings and explanations.*

"*Me and my mates are playing ball. And this is a tree, like these two are equal, like a meter.*"

"*There is a round thing and there are writings inside. We take off their writing and measure their height like this. My mum measures my height.*»

"*Gauge*"

"*This meter's on till 4, and I need one, I need one. I'm opening the meter, I'm thinking. I'm outside, there's clouds.*"

"*My mum - to see if she's tall*" | "*I'll put the numbers, the measuring thing.*"
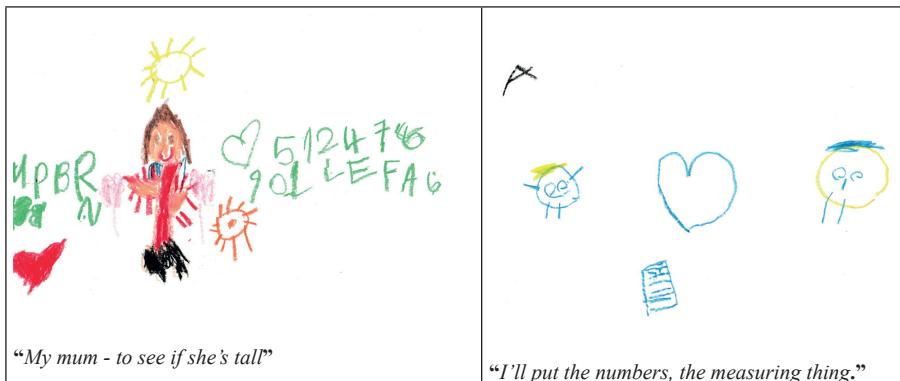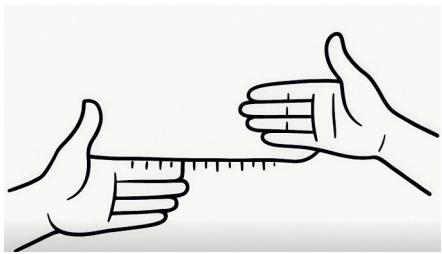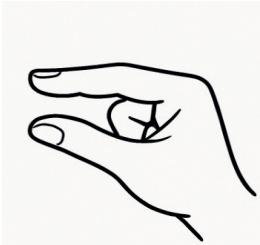
Out of 10 boys, five illustrated the scenario of measuring an object, while only one out of nine girls did the same. Additionally, six girls and two boys preferred an outdoor setting for the measurement process. In their drawings and related explanations, children mostly included the length attributes of living and non-living beings. In the answers given to the questions and in the process of explaining the drawings, the concept of small was expressed by four children, the concept of large by three children, the concept of long by three children, and the concept of short by two children.

According to the criteria developed by MacDonald (2011), an analysis of the children's drawings and their explanations suggests that nine children have a limited ability to define the measurement process, while ten children demonstrate a moderate ability.

The researcher also recorded the children's gestures while they drew and explained their drawings as observation notes. Five children—three boys and two girls—used gestures extensively without employing any concepts, such as 'long-short,' to support their communication. The children's gestures and explanations during the measurement process were conveyed through the following visuals generated using ChatGPT.

Fig. 3. *Images that symbolize gestures and children's descriptions*

"*One by one, like this, like this.*" (S/he drew a house and two children side by side and explained how to measure them with vertical movements.)	"*There is a round thing and there are writings inside. We remove the inscriptions and measure their length like this.*"
"*there's this thing, gauge*"	"*Measures the walls*" (made horizontal movements with his hands as if measuring.)"

Nine children quietly murmured to themselves while they were drawing. Their mumblings included discussions about what elements they would include in their drawings (e.g. draw this, before-after, draw feet) which colors they planned to use (e.g. "orange head, paint feet with this blue, paint top) and expressions/voices meant to encourage themselves. One child even repeated the numbers s/he wrote down.

Discussion and conclusion

The findings of this study contribute to a growing body of research emphasizing the significance of representation and communication in early mathematical development, particularly within the domain of measurement. Drawing on the "draw-and-tell" methodology, the study revealed that preschool children are not only capable of identifying measurable attributes but also engage with these concepts through both verbal and gestural expressions. Consistent with MacDonald's (2011) findings, many children demonstrated emerging understandings of measurement that are deeply rooted in their everyday experiences and sociocultural contexts.

Incorporate measurement concepts into stories where children draw scenes or characters that involve measurement tasks, such as comparing the

heights of trees or the lengths of roads. This method helps children relate measurement to real-world contexts and enhances their cognitive engagement with the material (Lembrér, 2013; MacDonald, 2011). Encourage children to draw maps or diagrams that require them to use measurement concepts, such as distance and size. This can help them make connections between two-dimensional representations and three-dimensional spaces, fostering a deeper understanding of measurement (Lembrér, 2013). Young children often demonstrate an emergent understanding of measurement, which involves initial, intuitive grasping of measurement concepts that gradually become more sophisticated as they engage with measurement tasks (MacDonald, 2011).

Young children often use drawings not merely as artistic expressions but as cognitive tools that help them externalize and clarify their understanding (Clements & Sarama, 2015). These representations—when supported by dialogue, gestures, and purposeful questioning—can reveal nuanced mathematical reasoning that might otherwise remain hidden (Björklund van den Heuvel-Panhuizen, & Prytz, 2019). Furthermore, engaging in conversations around their drawings allows children to refine their measurement concepts, fostering a shared mathematical language and deepening their understanding through social interaction (van Oers, 2010).

The role of gesture in early mathematical reasoning has received increasing empirical support, particularly in the context of preschool learning environments where verbal capacities are still developing. The findings from three key studies (Congdon, Kwon, & Levine 2018; Congdon & Levine, 2023; Seccia & Goldin-Meadow, 2024) to elucidate the role of movement-based instruction—specifically, action and gesture—in supporting young children's understanding of linear measurement. In this study, it was observed that children explained measurement processes by supporting them with gestures in addition to concepts, even to a greater extent. They expressed thoughts that could not be reflected in their paintings by describing them vividly through these movements.

Children's cognitive development plays a significant role in their ability to understand measurement concepts. As they grow, their ability to comprehend abstract concepts, such as measurement, improves, allowing them to transition from using non-standard units to understanding standard measurement tools, like rulers (Gómezescobar, Rodrigues, & Fernández-Cézar, 2023; McDonough Cheeseman, & Ferguson, 2013). Children's drawings often reveal their initial grasp of measurement concepts, such as length and volume. For instance, when asked to draw a ruler, children demonstrate their understanding of length by depicting the ruler's scale and units, which can indicate their ability to contextualize measurement concepts (MacDonald & Lowrie, 2011).

The data also suggest subtle yet meaningful gender-related trends in how children represent and contextualize measurement concepts. While both boys and girls were capable of articulating measurement-related ideas, boys more frequently depicted direct measurement actions—such as using rulers to measure objects—whereas girls more often situated measurement within social or imaginative outdoor contexts. Girls' drawings often involved interpersonal or scenic elements, potentially reflecting a relational or contextual orientation to measurement, while boys tended to focus more explicitly on tools and quantitative comparisons. These patterns point to the importance of recognizing and valuing diverse approaches to mathematical representation and expression, ensuring that instructional practices accommodate varied cognitive and expressive styles. A gender-sensitive perspective can enhance inclusivity and help foster equitable opportunities for all children to engage with mathematical content meaningfully.

The cultural and environmental contexts in which children are raised can influence their understanding of measurement. For instance, the tools and methods used in different countries can lead to variations in how children approach measurement tasks (Gómezescobar, Rodrigues, & Fernández-Cézar, 2023). According to the definition posited by Worthington, Dobber, & van Oers (2023), children's mathematical graphics are conceptualized as "a cultural-conceptual approach that prioritizes children's cultural knowledge, cognitive processes, and modes of representation. In this study, children's references to measuring computers and tablets provide insight into the environment in which they live. Children's life experiences are reflected in their narratives. For example, they associate measuring with various activities such as homework, visiting the doctor, having their heights measured by their mother, and measuring in house construction.

Recommendations

This small-scale study aimed to highlight the importance of assessing children's understanding of measurement in mathematics through drawing and communication. It is recommended that both teachers and researchers utilize the draw-explain method to gain a better insight into children's thought processes.

The findings of this study underscore the importance of adopting pedagogical strategies that leverage children's natural tendencies to express mathematical thinking through visual, verbal, and physical modalities. Integrating draw-and-tell activities into early mathematics instruction offers a powerful means of accessing and expanding children's conceptual understanding of measurement. Educators should provide structured yet open-ended opportunities for children to depict measurement scenarios that are personally meaningful, encouraging them to explain their reasoning

through both language and gesture. In doing so, teachers not only gain insight into children's thinking but also create a classroom culture that values multiple forms of mathematical expression. Furthermore, professional development for early childhood educators should include training on how to interpret children's drawings and narratives as valid mathematical data, and how to use these insights to guide responsive instruction. Tailoring measurement activities to include familiar contexts, real-life tools, and collaborative dialogue can deepen engagement and promote equitable participation across developmental and cultural backgrounds. Ultimately, these strategies support the goals of the NCTM (2000) process standards by fostering communication, representation, and meaning-making in mathematics from the earliest years of schooling.

The integration of representation- and communication-based activities, such as draw-and-tell tasks, provides a valuable foundation for formative assessment in early mathematics education. Unlike traditional assessment tools that often prioritize correctness over process, these methods allow educators to observe how children construct and communicate mathematical understanding in real time. Children's drawings and accompanying narratives serve not only as evidence of cognitive development but also as diagnostic tools that reveal misconceptions, emerging competencies, and individual learning trajectories. Embedding such practices within the curriculum enables teachers to tailor instruction more effectively, responding to learners' diverse needs and backgrounds. Moreover, designing curricula that embed measurement concepts within play-based and inquiry-oriented learning environments—while encouraging multimodal expression—aligns with developmentally appropriate practice and supports long-term retention. When used consistently, these formative strategies contribute to a more dynamic, child-centered mathematics curriculum that prioritizes understanding over rote performance and fosters a growth-oriented mindset toward mathematics in the early years.

Gesture emerged as a vital modality for expressing mathematical understanding in this study, particularly when children struggled to verbalize abstract measurement concepts. Several participants used hand movements—such as horizontal sweeps to indicate length or vertical motions to compare height—to accompany or even replace verbal explanations. Gestures appeared to function not only as expressive tools but also as cognitive scaffolds that supported children's ability to sequence, quantify, and make comparisons. Notably, in some cases, gestures conveyed insights not explicitly captured in the drawings or speech, highlighting their diagnostic value. Teachers and researchers should therefore pay close attention to children's spontaneous and intentional gestures during mathematical activities, as they offer rich, often underutilized, access to emerging ideas and strategies. Incorporating

gesture-friendly pedagogies—such as modeling actions or encouraging physical reenactments of measurement—can enhance both engagement and conceptual clarity in early mathematics instruction.

This study reinforces the value of multimodal representation—particularly drawing, gesture, and verbal expression—as key processes through which preschool children construct and communicate mathematical knowledge about measurement. The draw-and-tell methodology revealed that even at a young age, children engage meaningfully with measurement concepts when given opportunities to represent their thinking in developmentally appropriate and personally relevant ways. Gender differences, cultural contexts, and spontaneous gestures all played a role in shaping how children approached the task, emphasizing the need for inclusive and flexible instructional practices. These findings support a shift toward richer formative assessment strategies and curriculum designs that prioritize process, creativity, and communication alongside mathematical accuracy. By viewing children's illustrations and narratives as more than artistic outputs, educators and researchers can gain deeper insight into the cognitive pathways young learners take as they make sense of mathematical ideas.

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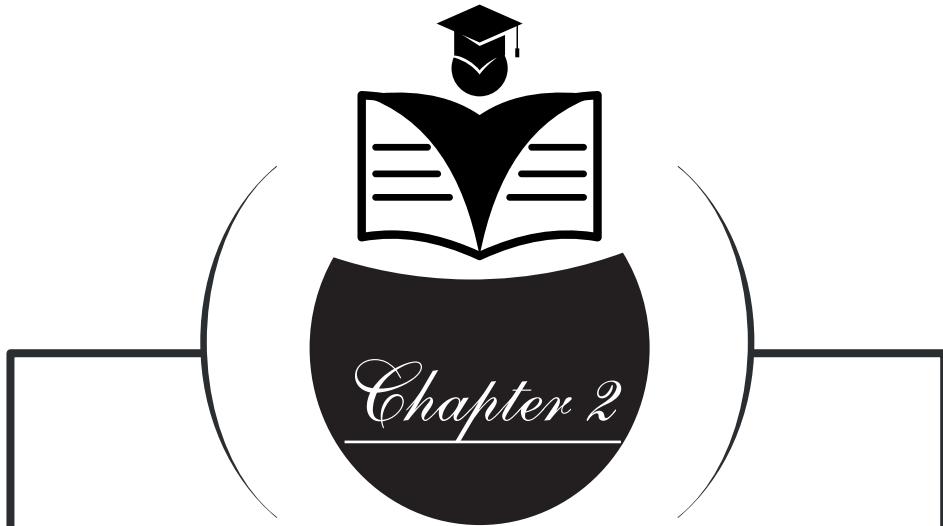
MUSIC EDUCATION FOR INDIVIDUALS WITH SPECIAL NEEDS

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1. Introductıon

Throughout history, music has not only been a source of aesthetic pleasure, but has also become a key area in which people express their subjective experiences, establish social relationships, and regulate their mental functions. On the other hand, education is one of the most fundamental rights that enables an individual's social integration, allows them to realize their potential, and supports them in leading an independent (autonomous) life. This right is also protected through international treaties and national legal regulations when it comes to individuals with special needs who show significant differences from their peers in terms of developmental characteristics. Today, the term "individual with special needs" encompasses people who exhibit mental, auditory, visual, or physical impairments; experience difficulties in language and speech; have been diagnosed with autism spectrum disorder; struggle with learning difficulties; or possess superior intelligence and abilities.

Special education is an educational approach designed to help individuals who are born with differences in physical, mental, emotional, or social development characteristics to complete their development by receiving education tailored to their specific needs. Due to their varying developmental qualities, they may demonstrate high or low levels of performance in the education they receive during their developmental processes. Individuals who require special support, i.e., special education, must receive quality education in order to lead more productive and healthy lives. For this reason, for the sake of their healthy development, special education must be determined according to the individual's specific situation, adapted to the individual, and made high-quality. Within the scope of education and teaching activities, it is of great importance that the personnel and educators who meet the needs of individuals requiring special education know the special education programs and methods and develop behaviors specific to the individual (Malkoç, 2022).

Special education is an educational process that provides children with special needs with the skills that will enable them to reach their full potential in line with their abilities, prevent their disabilities from becoming obstacles, and allow them to become independent and productive individuals who can integrate into society by enabling them to become self-sufficient (Ataman, 2005:19; Düzbastılar ve Eyüpoğlu, 2019: 385).

When examining the history of special education, a distinction can be made between the structure of education applied from a social and cultural perspective for extreme differences arising from individuals' physical, mental, or behavioral characteristics. The opportunities provided to those in this situation can be given as an example. In addition, the scientific study of differences in human nature may necessitate discussion of a structure and applicable education that demonstrates or clarifies the consequences of significant

differences. For example, blindness requires the adoption or implementation of teaching methods that eliminate the developmental and learning problems caused by blindness. On the other hand, special education efforts should not only refer to adoption and implementation, but also how these are organized, sustained, or developed (Gerber, 2011: 5). Special education should consist of educational programs and methods designed and implemented with consideration for the needs of individuals with special needs. Furthermore, it should be provided by specialized personnel according to the disabilities and characteristics of individuals with disabilities. Special education is a specialized educational program that does not exclude individuals with disabilities from society, but rather enables them to move freely, develop their skills, and prevent their disabilities from becoming barriers (MEB, 2010).

The purpose of special education is not limited to preventing the process from becoming an obstacle in areas where individuals requiring special education are deficient, and equipping them with the skills to integrate into society at a self-sufficient level and become independent and productive individuals, but also to enable gifted individuals to use their talents to the highest degree. The higher the level of quantity and quality of special education provided, the easier it becomes for students to acquire independent living skills and participate in social life (Ergül, Baydık ve Demir, 2013).

The need for areas that challenge the limits of traditional academic teaching strategies and nurture the emotional, social, and psychomotor development of individuals in this group from a holistic perspective is becoming increasingly apparent in their educational journeys. At this very point, music education stands out as a unique pedagogical tool. Music's universal nature, which transcends verbal communication, its unbiased and inclusive structure, and its nature that motivates individuals in a multi-layered way form an indispensable foundation in the field of special education. Historically, the healing effect of music has been used across a wide geography, from ancient civilizations to Ottoman hospitals. Today, music education has gained an institutional framework through pedagogical models with scientific foundations, such as Orff-Schulwerk and Collaborative Learning.

Within the scope of this section, the multifaceted effects, power, and function of music education in individuals with special needs, the role of music lessons in inclusion and integration practices, the collaborative learning method in inclusion, and music in the hearing impaired and music education in the visually impaired have been examined in detail based on a review of the relevant literature.

2. The Transformatıve Power And Functıon Of Musıc In Specıal Educatıon

Music education cannot be positioned solely as a "leisure activity" or "therapeutic tool" in the lives of individuals with special needs; rather, it plays a critical role in accelerating the acquisition of cognitive, social, and physical skills.

Collective (group) music activities, in particular, facilitate the internalization of social skills such as stepping outside one's self-centered world, waiting one's turn, listening to others, collaborating for a common purpose, and conforming to the group. Music raises children's motivation levels while strengthening their self-esteem and reinforcing their self-confidence. For example, in individuals with mental disabilities, music serves to reduce emotional tension and improve problem behaviors such as aggressive behavior or introversion.

There is a strong neurological and functional connection between music and language development. Singing songs, reciting rhymes, and practicing rhythms support the articulation (pronunciation) abilities of children with language and speech disorders in particular, while also enriching their vocabulary in a natural flow. The memory-friendly melodies of songs create a facilitating effect on learning and trigger motivation. Studies have shown that music education positively affects the language development, auditory perception capacity, sound discrimination skills, and attention spans of even hearing-impaired children.

3. The Role Of Music Classes In Integratıon And Assimilation Practices

Inclusion (integration) refers to the education of individuals with special needs in general education classrooms alongside their peers, with the provision of necessary support and educational services.

Music lessons, by their very nature, are non-competitive, enjoyable, and participatory, making them one of the most effective areas for implementing inclusion practices. Music class is not a passive lesson where students with special needs are made "invisible" in the classroom; on the contrary, it is a platform where they can take on an active role as 'musicians' or "members of the class community."

Music and music education, with its fun and educational activities that positively appeal to people's emotions, its therapeutic properties, and its wide range of applications that can contribute to individuals' motor skills development and mental processes, is essential for all individuals. The benefits of music activities are present in the social lives of individuals, especially those with special needs. It is supportive in terms of emotional, mental, social, and physical development; with these characteristics, it is implemented in schools as an important subject (Akıncı, 2022).

The "elementary music and movement education" approach developed by Carl Orff provides an ideal foundation for inclusive classrooms. The Orff approach is based on the principle of "music for everyone" and does not promote elitism; in other words, it is not necessary to have exceptional talent to make music in this approach. The strength of this approach in inclusive education stems from its flexible and inclusive structure (Eren, 2012).

Music and music education, with its fun and educational activities that positively appeal to people's emotions, its therapeutic properties, and its wide range of applications that can contribute to individuals' motor skills development and mental processes, is essential for all individuals. The benefits provided by music activities support individuals, especially those with special needs, in their social lives and accompany them. Due to its supportive nature in terms of emotional, mental, social, and physical development, it is implemented in schools as an important subject with these characteristics (Akıncı, 2022). Students who may experience such difficulties in music education through integration/inclusion can be offered support in the form of one-on-one rehearsals with the teacher before lessons, or rehearsals with a student they get along well with or a group of successful student friends. These solution-focused activities can help them adapt more easily to music activities and increase their motivation. When selecting songs for classes and students receiving music education through integration/inclusion, care should be taken to primarily utilize the country's musical cultural products. In music education efforts around the world, song education is of great importance in contributing to language development. Countries primarily begin education with their own traditional products, such as lullabies, nursery rhymes, counting songs, and children's songs. This situation is in line with the principle of education from local to universal and is preferred because it allows children to learn more easily in their own language (Akıncı, 2022).

Most students in the choir enjoy singing and eagerly await the opportunity to share their music with others. Some students are shy about singing on their own and are happy to be good listeners rather than singing for their friends. However, for some students, the whole situation can seem daunting and hopeless. They want to sing, but they don't see themselves as successful. They don't want to sit and sing because it feels like failure to them (Hammel, 2017: 70-71).

Following the 2000s, various pilot projects and regulations were implemented in the field of education as part of Turkey's alignment process with the European Union. As a result of these efforts, the "General Directive on Education Practices Through Inclusion/Integration" published in 2017 and the "Regulation on Special Education Services" published in 2018 were enacted. In current processes, the terms inclusion and integration are used together as "Inclusion/Integration" in various regulations and circulars. In fact, the

"Inclusive Education" practice has also become a noteworthy and widely discussed application (Tanrıverdi ve Sarıca, 2021: 27). Integrative values include self-confidence, cooperation, sharing, friendship, empathy, interest, honesty, and respect for the outside world and individuals (Sarı ve Pürsün, 2016: 51). It can be said that educational practices through integration also aim to ensure that all students have access to education together in the least restrictive environments possible.

3.1. Collaborative Learning Method in Integration

In integration classes, the use of collaborative learning methods instead of traditional and competitive methods increases both academic and social success. Collaborative learning is a method in which students work in small, heterogeneous groups toward a common goal and help each other learn.

In an experimental study conducted by Güven and Tufan (2010), the "Learning Together" technique was applied in inclusive classrooms. At the beginning of the study, it was observed that students with typical development did not want to be in the same group with their peers with special needs and objected to this. However, at the end of the process, it was found that prejudices were broken down due to the effect of the collaborative structure, and there was a significant increase in the music lesson success and attitudes towards the lesson of students with special needs (those with intellectual disabilities and learning difficulties). Through this method, the student with special needs was given the role of "an individual who contributes to group success," strengthening their sense of social belonging and increasing their communication with other students.

4. Hearing Impaired People And Music

Deaf individuals; In Turkey, hearing-impaired students can receive education in special education classes specially prepared for disabled students in primary and secondary schools affiliated with the Ministry of National Education, in special vocational high schools for the hearing-impaired, and in schools where hearing and speaking individuals are educated. Additionally, they can also receive education in schools where hearing and speaking students are educated within the scope of integration/inclusion practices (Ceylan, 2022).

In schools for the hearing impaired, the educational programs implemented in schools for hearing and speaking students are applied. According to the "Weekly Lesson Schedule for Elementary and Middle Schools for the Hearing Impaired," compulsory music lessons in elementary schools for the hearing impaired are one lesson hour per week for grades 1, 2, 3, and 4.

In middle schools for the hearing impaired, the compulsory music course for grades 5, 6, 7, and 8 is two class hours per week for each grade level. "Art

and Sports, Visual Arts, Music, Sports, and Physical Activities" courses can be selected for two (2) or four (4) class hours, depending on the students' preferences. In addition, school administrations may decide to implement up to 10 class hours of educational activities related to art activities, sports, social and cultural events, and special education, taking into account the school and environmental conditions, the individual characteristics of the students, and the needs of the students (Millî Eğitim Bakanlığı, 2013).

The Individualized Education Program (IEP) is prepared by the IEP development unit established at the school. When preparing the Individualized Education Program (IEP), it is extremely important to determine the student's current performance level so that progress can be observed. Once the performance level has been determined, long-term and short-term goals must be set accordingly. Long-term goals are those that are expected to be achieved by the end of the year, based on an assessment of the child's characteristics. Short-term goals are those that are expected to be achieved by the student in a shorter period of time. It is important to set short-term goals in order to achieve the targeted long-term goals. In addition, the teaching methods and materials necessary for the student to achieve the set goals must be determined. It is necessary to specify how the "Individualized Education Plan" will be evaluated, based on objective criteria, using which measurement and evaluation tools and criteria. In conclusion, with the Individualized Education Program, the existing program is adapted according to what the child can do. The Individualized Education Program is a flow plan that shows the behaviors that individuals with disabilities need to perform according to their existing needs, how to perform them, and with whom (Akçamete ve Gürgür, 2010, Özyürek, 2010).

Hearing impairment can occur during the pre-speech period, as well as in periods following speech acquisition. Music educators should take into account the individual differences of children who became deaf before the speech period and adapt lesson content to meet the diverse needs of these individuals (Schraer ve Chen, 2009). In addition to developing different methods for hearing-impaired individuals to hear music better, one of the most important factors is for the hearing-impaired individual to begin music education as early as possible. In order to create an effective music program for hearing-impaired individuals, the foundations of music perception must be established in the early years of the child's music education (Hagedorn, 1992).

Educational programs designed for children with hearing impairments should be tailored to students' existing performance levels and be open to developing students. The music education program should support the auditory training provided to hearing-impaired children and should be designed in accordance with the objectives of special education in a way that facilitates and supports the development of their auditory perception, balance skills, com-

munication skills, ability to perceive sounds, listening skills, language and speech skills, tactile stimulation, self-awareness, self-confidence, aesthetic perception, and social interaction, facilitate and support the learning of basic skills, and be designed in accordance with the objectives of special education (Ceylan,2022)

5. Music Education For The Visually Impaired

Visual impairment is the negative impact on an individual's educational performance and social integration due to a partial or complete loss of vision (MEB Özel Öğretim Kurumları Genel Müdürlüğü, 2008: 4). Individuals with visual impairments require more support education services, including special education and special education materials (Doğan, 2019: 444; Özsökmen, 2019: 8). Because visually impaired individuals can only integrate into society, communicate effectively with others, and enjoy a quality life if they have a social position and good motivation, which can only be achieved through education. This will enable visually impaired individuals to communicate more with their surroundings and remove the barrier to their being perceived differently due to environmental factors (Mağden ve Artan, 1992: 28).

Education plays a major role in shaping an individual's personality, establishing their place in society, understanding their environment, and making sense of life from a broad perspective. When it comes to individuals with visual impairments, the importance of education becomes even more prominent. This is because individuals with disabilities need to break free from the prejudiced behaviors of society, socialize, establish their place in society, and overcome their sense of isolation by receiving education in the same environments and classrooms as their peers, which is their most fundamental right (Özsökmen, 2019: 15).

Music has many developmental and inclusive qualities. Considering that individuals with visual impairments approach objects in their environment with a sense of touch, it can be said that the use of music in a playful manner, based on humming and singing, is of great importance in instilling a sense of togetherness and belonging with the environment, increasing socialization and motivation by providing self-confidence, and contributing to the acquisition of a sense of sharing and collaborative approach. Furthermore, it is believed that singing-based music education plays a major role in teaching individuals, reinforcing knowledge, gamifying and dramatizing songs, and enabling them to achieve the happiness of expressing their feelings together with their friends. It is thought that the fundamental structure of Kodaly's music education principle, which is based on song-based education, and its validity and place in the educational phase from its inception to the present day, lies in this point. This is because song-based education and the games learned through this method greatly benefit children's social, emotional, cog-

nitive, and language development; they can also develop a culture of listening and musical dramatization (Baydağ, 2022).

Expecting a high level of performance from individuals with visual impairments during the song-singing or piece-teaching stage, disregarding their level, would be one of the biggest mistakes that can be made. Because the important part here should be to remove the barrier of disability through the unity of music, rather than performance-based education. Mistakes made by expecting high-level performance (avoiding unnecessary ambition) have the potential to negate the healing effect of music. Correctly identifying the problems encountered in the education of children with disabilities and planning activities accordingly will enable music to serve its purpose more effectively. At this point, the order of piece selection can be expressed as follows (MEB, 2014: 5):

The selected piece (musical work, children's song, folk song, etc.) should be simple and easy to imitate, progress from simple to complex, clearly define vocal limits and not exceed them excessively, and support the language, motor, cognitive, self-care, and social development areas of children with disabilities (MEB, 2014: 5).

The student's level, stage of development, and ability level should definitely not be overlooked. Learning through play should enable the individual to reveal their talents and move. A sense of togetherness should be instilled; it should not be forgotten that working together and moving to the rhythm of music will increase motivation. It should ensure the development of self-esteem and an increase in self-worth. It should develop its educational and instructive aspects. The selected songs should be beautifully pronounced, impart correct speech skills, and ensure the learning of new words. It should provide experience in creative expression and emotional responses through entertainment (BAYDAĞ, 2022).

6. Conclusıon And Recommendatıons

The education of individuals with special needs is a fundamental right that goes beyond the mere transfer of academic knowledge, aiming to facilitate their social integration, enable them to lead independent lives, and maximize the realization of their individual potential. Historically positioned as both a therapeutic (healing) and aesthetic resource, music education has come to the fore today as an indispensable pedagogical tool for achieving these goals.

Collective music activities (choir, group instrument training, etc.) enable individuals to internalize basic social skills such as waiting their turn, cooperating, listening to others, and adapting to the group, thereby moving beyond their self-centered world. Collaborative learning methods strengthen the sense of social belonging and increase communication with peers by gi-

ving students with special needs the role of "individual contributing to group success." Singing, rhymes, and rhythmic practices enrich articulation capacity and vocabulary in a natural flow, especially in children with language and speech disorders. They even have positive effects on auditory perception, sound discrimination, and attention span in hearing-impaired children. Music reduces emotional tension, strengthens self-esteem, and helps improve problem behaviors such as aggressive behavior or introversion, especially in individuals with mental disabilities. The memory-friendly melodies of songs create a facilitating effect on learning and trigger motivation. Music lessons are one of the most productive platforms for integration/inclusion practices due to their non-competitive, enjoyable, and participatory nature.

Carl Orff's approach to "elementary music and movement education" provides an ideal, flexible, and inclusive foundation for inclusive classrooms based on the principle of "music for everyone." In music class, students take on an active role as "musicians" or "members of the class community" rather than being passive listeners. Studies show that music education conducted using collaborative learning techniques breaks down prejudices among typically developing students and leads to a significant increase in the success and attitude of students with special needs in music class.

Music education should be adapted to the specific needs of different disability groups: Music for the Visually Impaired can be used in a gamified way based on tactile sensitivity. Song-based education (similar to the Kodaly principle) supports social, emotional, and cognitive development. Education should focus on removing barriers to disability rather than performance-based expectations; the selection of works should progress from simple to complex. For the hearing impaired, an effective music program aims to develop auditory perception, balance, communication skills, and the ability to perceive sounds. Starting music education at an early age and preparing content appropriate to the student's existing performance level through Individualized Education Programs (IEP) is of critical importance.

In summary, music education is not merely a supportive element in the educational journey of individuals with special needs, but rather a multi-layered discipline that is of primary importance for cognitive organization, social adaptation, and the building of self-confidence. Teachers' knowledge of special education methods and their ability to adapt their approach to the individual are fundamental requirements for the effective transmission of this transformative power.

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Chapter 3
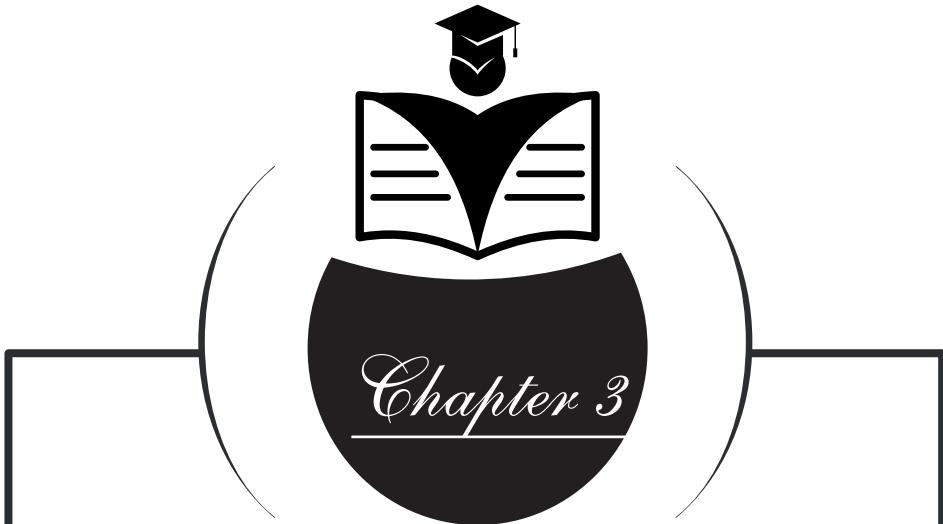
MUSIC TEACHERS' VIEWS ON LIFELONG LEARNING PROCESSES: A QUALITATIVE STUDY

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Introduction

In the 21st century, educational environments are undergoing constant transformation due to rapid technological developments, changing social expectations and changing student profiles (Demirel, 2019; Özcan, 2008). This transformation has made the teaching profession dynamic and has made it impossible for teachers to rely solely on the knowledge and skills they acquired during their university education. In this context, the lifelong learning approach has gained an increasingly central position in teachers' professional and personal development (Demirel, 2011)..

Lifelong learning is an approach that envisages individuals developing their knowledge, skills, values and attitudes not only during the formal education process but throughout their entire lives (Epçaçan, 2013). International organisations such as the European Union, UNESCO, and the OECD define lifelong learning as one of the fundamental elements of economic development, social cohesion, and individual empowerment. Adopting a lifelong learning approach in education enables teachers to keep themselves up-to-date both pedagogically and technologically, allowing them to respond to the changing needs of their students. Given the critical importance that this international life attributes to lifelong learning and the necessity of keeping education current, music education is also at the heart of this universal call (Güleç, Çelik & Demirhan, 2012).

Music education, by its very nature, is an interdisciplinary field that requires continuous practice and innovation, and is therefore directly related to lifelong learning. Music teachers must continue to develop their individual instrumental skills, learn different musical styles, apply contemporary teaching methods, and integrate digital music technologies into their lessons. In addition, the dimensions of music education involving individual performance, creativity, and learning within a community require teachers to continuously develop not only their technical skills but also their pedagogical, social, and cultural aspects (Gödeneli & Aksoy, 2023; Akay, 2023). The need for continuous renewal and multifaceted equipment requirements also necessitates a systemic approach to professional development.

Professional development refers to the systematic processes that teachers undertake to increase their knowledge and skills throughout their professional lives. The professional development of music teachers is not limited to in-service training; it includes many strategies such as participating in digital learning platforms, joining professional learning communities, attending domestic and international seminars and workshops, engaging in reflective practices, and establishing mentoring relationships. These strategies contribute to teachers both developing their pedagogical practices and

continuously maintaining their individual musical competence (Konokman & Yelken, 2014).

In the Turkish context, the Ministry of National Education and Higher Education Institutions run various in-service training programmes, projects, and academic collaborations to support teachers' lifelong learning processes. Furthermore, international projects such as Erasmus+ offer important opportunities for music teachers in Europe in terms of professional development and gaining intercultural experience. Such practices demonstrate that lifelong learning is not only an individual choice but also an institutional and societal necessity (Toprak & Erdoğan, 2012).

Lifelong learning is a dynamic and continuous process that enables individuals to develop their knowledge, skills and competences throughout their lives (Epçaçan, 2013). This concept is not limited to formal education but also encompasses individuals' informal and non-formal learning experiences. UNESCO (2015) defines lifelong learning as an approach that supports individuals' personal, professional, social, and cultural development. In the European Union's education policies, lifelong learning is also seen as a fundamental element that not only increases individuals' employability but also strengthens democratic participation and contributes to social integration (Özcan, 2008).

The importance of lifelong learning in the field of education is becoming increasingly apparent, particularly in the teaching profession. Teachers must adapt to constantly changing teaching methods, technological developments and diverse student profiles. In this context, lifelong learning is considered one of the most important tools for teachers to develop their professional competence and remain up to date throughout their professional lives (Gödeneli & Aksoy, 2023; Tunca, Şahin & Aydın, 2015).

Teachers' professional development is one of the most concrete reflections of the lifelong learning approach. Professional development refers to individual or institutional activities that teachers participate in to improve their professional knowledge, skills, and attitudes. This process covers a wide range, from planned in-service training to individual research and experiences (Konokman & Yelken, 2019).

The constantly changing nature of the teaching profession requires educators to keep up with current developments and develop their professional competence throughout their lives. This situation requires teachers to not only be equipped with subject knowledge but also to be open to a multifaceted development process in pedagogical, technological, and social terms. According to Yıldızlı (2019), teachers must possess various skills to become lifelong learners. It is important for teachers to continuously develop both their personal and professional skills; to adopt a critical, questioning and research-

based attitude; and to be open to learning and collaborative. Furthermore, competencies such as keeping up with interdisciplinary developments, adapting information and communication technologies to teaching processes, possessing effective communication skills, and leading innovative practices are among the fundamental elements of the lifelong learning approach.

Various models related to teachers' professional development are highlighted in the literature. These include the In-Service Training Model, Professional Learning Communities, Reflective Teaching Model, Mentoring and Peer Support, and Digital and Online Learning Models Sökeoğlu Atılgan & Taş, 2019). Each of these models supports teachers' pedagogical and artistic development in the context of music education.

This particularly broadens the scope of music teachers' professional development processes. Music education demands a multifaceted approach to development from teachers due to its interdisciplinary nature, structure requiring continuous practice, and rapidly digitalising teaching environments. Therefore, examining the attitudes acquired and strategies implemented by music teachers within the scope of lifelong learning is considered important both to contribute to the field and to shed light on the development of educational policies. These behaviours and competencies, which are necessary for teachers to maintain their professional competence and become lifelong learners, are supported by various professional development models within a theoretical framework. However, in an interdisciplinary and practice-based field such as music teaching, it is of great importance to determine how these models and lifelong learning strategies are perceived by teachers, what kinds of difficulties they encounter, and which strategies are more effective. In this context, one of the objectives of this study is to combine the theoretical knowledge in the existing literature with practical applications in the field.

1.2. Research Objective:

The purpose of this research is to examine in depth the current views and experiences of music teachers regarding lifelong learning approaches in their professional development processes. In line with this purpose, the problem statement has been formulated as follows: "What are the perceptions, experiences, and strategy preferences of music teachers regarding lifelong learning approaches in their professional development processes?"

1.3. Significance of the Research:

This research is of great importance as it focuses on the needs of music teachers who are forced to adapt to rapidly changing educational environments. Furthermore, it is believed that this study will contribute to theoretical, practical, and individual development in the field of music education.

Method

2.1. Research Model

This research was conducted using qualitative research methods to thoroughly examine music teachers' views on their professional development processes within the framework of a lifelong learning approach. Qualitative reearch is a methodology where the researcher explores the meaning that individuals or groups ascribe to a social or human problem by studying them in a natural setting (Creswell & Creswell, 2018). The Semi- Structured Interview design, a type of qualitative research methodology, was employed in this study, enabling the detailed exploration of participants' individual experiences. This design aligns with the phenomenological approach, and was specifically chosen to uncover the inherent menings, individual interpretations, and deep-seated perceptions related to the phenomenon of lifelong learning within the context of music teachers' Professional development.

This model allows music teachers' thoughts on lifelong learning, professional development practices, the difficulties they encounter, and the strategies they develop to emerge holistically in a natural discussion environment.

2.2. Study Group

The working group for this research consists of 8 music teachers selected on a voluntary basis. A working group of 8 people was preferred in order to maximise group interaction and enable each participant to express their views in depth.The study was based on a "convenience sampling" group, which is used in qualitative research. Convenience sampling allows the researcher to select a situation that is easy and accessible. Although this method adds speed and practicality to the research, the generalisability of the findings is limited, and the cost is lower than other methods (Yıldırım & Şimşek, 2018). This sampling approach was preferred because it facilitates the process of accessing the field for the research and supports qualitative data that provides rich and detailed information about the participants' experiences.

Participant Code	Gender	Professional (Years)	School Type
K1	Female	5	Secondary School
K2	Female	12	High School
K3	Female	8	High School
K4	Male	15	Middle School
K5	Female	10	High School
K6	Female	7	Middle School
K7	Female	18	High School
K8	Male	3	Middle School

Table 1. Demographic Characteristics of Participants

As shown in Table 1, 6 of the 8 teachers in the study group are female and 2 are male. Considering that the number of female teachers is higher in the field of music education, this distribution also reflects the general occupational profile. The professional experience of the participants ranges from 3 to 18 years. This diversity encompasses the views of both novice and experienced teachers, offering different perspectives on lifelong learning awareness and professional development processes. The participants work in primary, secondary and high schools.

2.2. Data Collection and Analysis

The research data were collected using a Semi- Stuctured Interview form prepared by the researcher. The Semi- Stuctured nature of the form allowed the heacher to express their personal experiences and views in detail.

Development of the Interview Form: To develop the interview form, fundamental concepts related to lifelong learning, professional development, and music education were first identified through a review of the literature. In line with these concepts, a draft form containing 5 main themes and 12 open-ended questions appropriate for the research objectives was prepared. The draft form was submitted for evaluation regarding its validity and reliability to the opinion of two academics specializing in qualitative research and music education; the language and flow of the questions were finalized based on the feedback received.

Data Analysis

Content analysis, a frequently utilized method in qualitative research, was employed to analyze the collected data. Content analysis is the process of grouping similar data under specific themes and categories to uncover the underlying concepts and relationships within the data.

Coding and Theming: For data coding, the audio recordings were transcribed verbatim, and each participant's statement was compiled in a digital environment. The transcribed data were carefully read; the meaningful segments of each statement were grouped into initial codes and sub-categories that served the research objectives. The relationships between the generated codes were examined, and more general and overarching main themes (e.g., Barriers and Difficulties, Effective Methods in Practice, etc.) encompassing these codes were determined. The resulting themes were presented, supported by their frequencies and direct quotes from the participants' most striking and representative statements. To ensure the reliability of the analysis, 20% of the data was also independently coded by the researcher and a domain expert. The inter-coder agreement percentage was calculated using Miles and Huberman's (1994) formula [Agreement = Number of Agreements / (Number of Agreements + Number of Disagreements)] and was found to be 88%. As

this figure is above the generally accepted threshold of 70% for qualitative research, the reliability of the data is confirmed.

Findings

3.1. Lifelong Learning Awareness

Table 2. Lifelong Learning Awareness Theme

Theme	Category	Description	Example Pariticipant Statement
Lifelong Learning Awareness	Conceptual Familiarisation	How teachers first encountered the concept of lifelong learning	"Our university faculty members frequently emphasised this concept." (K1)
	Perception of Continuity	Awarness that kearning is a continuous process throughout one's Professional life	"I believe that learning is a never-ending process." (K3)
	Professional Identity	Viewing lifelong learning as an integral part of teaching	"Teaching requires constant self-renewal." (K5)

Looking at Table 2, all participants considered the concept of lifelong learning to be a fundamental element of the teaching profession. Teachers stated that they mostly encountered this concept during their university education or in the early years of their professional life. Some participants expressed that they saw lifelong learning as a necessity for personal development and artistic progress.

3.2. Professional Development Experiences

Table 3. Professional Development Experiences Theme

Theme	Category	Description	Example Pariticipant Statement
Professional Develeopment Experiences	Types of Participation	Forms of participation in Professional development activities for teachers	"I recently participated in the Yüzyıl Maarif model education." (K2)
	Learning Outcomes	The contribution of the activities they participated n to personal and Professional develoğment	"The courses I attended enhanced my pedagogical approach." (K4)
	Digital Experience	The contribution of online platfomrs	"Online training saves time." (K3)

In Table 3, participants stated that they contributed to their professional development by participating in in-service training programmes, workshops, seminars and online courses. It was emphasised that digital learning tools are increasingly preferred.

3.3. Sources of Motivation

Table 4. Motivation Sources Theme

Theme	Category	Description	Example Participant Statement
Motivation	Internal Motivations	Desire of personel development and teaching	"I am constantly learning because I love music and my proofession." (K1)
	External Motivators	Management, colleague and student-related motivational factors	"My students' interest drives me to explore innovations." (K2)
	Artistic fulfilment	Th personal satisfaction derives from musical progess	"Learning new techniques motivates me." (K5)

As shown in Table 4, participants stated that their motivation for lifelong learning was largely intrinsic, fuelled by a love of teaching and a desire for personal development. External sources of motivation included support from colleagues and institutional incentives.

3.4. Professional Development Methods

Table 5. Professional Development Methods Theme

Theme	Category	Description	Example Pariticipant Statement
Professional Development Methods	Applied Education	Practical learning processes sucj as drama, choir and accompaniment	"Choir work and drama training are very effective." (K3)
	Digjital Learning	Online courses, music applications	"We can now easily Access the information we need online." (K4)
	Collective Learning	Sharing experiences with colleagues	"Workshops are very useful for interacting with colleagues." (K1)

Table 5 shows that participants indicated that the most effective methods for the professional development of music teachers are practical activities, digital platforms, and collective learning environments. Teachers emphasised that the ease of accessing information has increased the importance of digital learning culture.

3.5. Barriers and Challenges

Table 6. Barriers and Challenges Theme

Theme	Category	Description	Example Pariticipant Statement
Barriers and Challenges	Time Constraints	Inability to allocate time for learning due to heavy course load	"The weekly course schedule is intense, I cannot attend the courses." (K5)
	Financial Constraints	The fact that training courses are free-based	"We cannot Access some training programmes because they are expensive." (K2)

Theme	Category	Description	Example Pariticipant Statement
	Access issues	Regional differencess and lack of resources	"There are few music-related activities in the city where Ilive." (K4)
	Lack of institutional support	Lack of managerial incentives	"The budget allocated to the arts is always limited." (K3)

Table 6 shows that all participants reported experiencing similar difficulties in their lifelong earning processes. The most frequently cited obstacles were time, budget constraints, and lack of institutional support.

3.6. Effective Strategies

Table 7. Effective Strategies Theme

Theme	Category	Description	Example Pariticipant Statement
Effective Strategies	Learning by Doing	The impact of experience-based learning methods	"Practical training makes knowledge stick." (K1)
	Culture of Sharing	Knowledge exchange among colleagues	"Projects carried out with other teachers are very beneficial." (K4)
	Student-Centred Approach	Encouraging student participation in the learning process	"Creating together with students enhances teaching." (K3)

In Table 7, participants indicated that most of the strategies they found effective were based on learning by doing and sharing. In addition, student-centred approaches and peer support were considered important.

3.7. Programme Recommendations

Table 8. Programme Recommendations Theme

Theme	Category	Description	Example Pariticipant Statement
Programme Recommendations	Personalized Education	Programmes designed according to the teacher's needs and areas of interest	"There should be modules specific to my field." (K2)
	Art-Technology Integration	Integration of digital music tools into education	"I want education that combines technology and art." (K5)
	Practical Modules	Training programmes that include experience sharing and group work	"Drama and choir modules would be very beneficial." (K4)

As shown in Table 8, participants emphasised the need for practical, personalised and technology-supported content in professional development programmes tailored to their specific needs.

3.8. Recommendations for the Future

Table 9. Future-Oriented Recommendations Theme

Theme	Theme	Description	Example Pariticipant Statement
Future-Oriented Recommendations	Continius In Service Training	Professional development programmes organised at regular intervals	"In-service training should be regular." (K1)
	Digital Sharing Platforms	Digital environments for knowledge sharing among teachers	"Online communities should be established." (K3)
	Institutional Incentives	Support mechanisms to increase participation	"Participation certicicates and incentives are motivating." (K2)

In Table 9, participants suggested developing continuous in-service training, online resources, and teacher networks to enhance the professional development of music teachers.

Conclusion and Discussion

This study aimed to examine music teachers within the framework of a lifelong learning approach from a qualitative perspective. The findings revealed that music teachers have embraced the necessity of keeping their professional competencies up to date in the face of rapid technological changes and pedagogical innovations and that they have positive attitudes towards lifelong learning.

Participants' perception of lifelong learning as an integral part of their professional identity parallels the emphasis in current literature on the need for teachers to continuously renew themselves. The strength of intrinsic motivational sources such as the love of teaching and artistic advancement reveals that this approach is nourished by the nature of the music teaching profession, namely its interdisciplinary nature that requires constant practice and innovation. According to Korthagen (2017), teachers' concern is not how to apply theory to practice, but whether theory is directly useful for the classroom problems they encounter.

The study found that participants had strong intrinsic motivation, which is consistent with previous research in the field of music education. It has often been emphasised that music teachers' motivation for professional development is related to the creative and application-oriented nature of music (Hallam, 2011). In this study, participants also considered both artistic progress and

pedagogical renewal as fundamental elements of lifelong learning.

While appreciating the time-saving and easy accessibility advantages offered by digital platforms, teachers considered practical training (choir, drama, etc.) and collective learning methods based on sharing experiences with colleagues to be the most effective strategies. This confirms that, given the practice-oriented dimensions of music education, such as individual performance and learning within a community, professional development must be based on a culture of learning by doing, rather than solely on the transfer of theoretical knowledge. With educational institutions globally undergoing a process of digital transformation, digital technologies have become an important area of interest for educators. It is stated that these technologies make important contributions to improving learners' performance and enhancing the effectiveness of teaching-learning processes. It is also emphasised that digital tools play a critical role in ensuring the sustainability and continuity of education, especially during pandemics (Wang, Chen, Yu, Liu & Jing, 2024).

However, the greatest challenges teachers face in lifelong learning processes are consistent with similar findings in the literature. Obstacles such as time constraints due to intensive teaching schedules, financial constraints due to the cost of training, and lack of institutional support limit this process despite teachers' positive attitudes. In particular, the lack of institutional incentives has been found to reduce teachers' active participation. The OECD (2020) report states that one of the biggest factors limiting teachers' participation in professional development activities is lack of time. According to Can (2013b), it is essential to implement regulations that support teachers' professional development; such regulations can help establish a viable teaching career system. In this context, there is a need to ensure teachers' professional development in personal, subject-specific, institutional, and pedagogical dimensions.

In conclusion, music teachers are willing and eager to engage in lifelong learning; however, in order to sustain this willingness and effectively update professional competencies, there is a need for personalised, practical, technology-supported training programmes reinforced by institutional incentives.

Recommendations

Based on the findings of this research, the following recommendations are made to enhance the lifelong learning processes of music teachers:

• Continuous in-service training programmes can be organised. Training can be provided at regular intervals, enabling teachers to keep up with current approaches.

• Personalised professional development modules can be increased. Online courses, video libraries and technology-based applications can be offered to teachers free of charge or at low cost.

• Practical training can be prioritised. Experience-based activities such as drama, choir, accompaniment, and repertoire work can support teachers' pedagogical and artistic development.

• Institutional incentive mechanisms can be strengthened. Certificate programmes, support projects and motivational applications can be promoted to increase participation in training.

• Peer sharing platforms can be established.

• Budget and resource access can be strengthened.

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Chapter 4

FORMS OF CURRICULUM THEORISING: EXPLAINING OR EXPERIENCING THE CURRICULUM?

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Introduction: Curriculum Theory and Variations of Curriculum Theorizing

Theory is defined as a "formal statement of ideas that are suggested to explain a fact or event, or how something works" (Cambridge University Press, n.d.). From this definition, one can easily say that theories help people explain and prescribe procedures, steps, related elements or components of something in formal ways. That is, as a theory defines sets of ideas and procedures to follow, it can have a directive function on people who want to perform a particular activity for which the theory is developed or devoted to. Descriptions and explanations as to the required steps to do something or as to what something really refers to appear to compose the basic components of a theory. Ornstein and Hunkins (2004, p. 174) differentiate between "scientific theory" and "humanistic theory". According to Ornstein and Hunkins' (2004), scientific theory aims at providing explanations of facts or realities irrespective of individual's feelings or contextual characteristics surrounding them. Humanistic theory, on the other hand, is aimed at providing beliefs or helping people understand things. This act of understanding seems to be less concrete and absolute than the explanation and validation of facts which are in fact the fundamental mechanisms of a scientific theory. The question here is where we can place a curriculum theory. For Gordon (1968, as cited in Ornstein and Hunkins, 2004), educational theories appear to be more linked with humanistic and philosophical thinking as a humanist theory centers on feelings, meaning making and thinking of individuals more than it does on explanations as to empirical and factual validations. For some other scholars, there are varied answers. That is perhaps the existence of these two different poles that make curriculum theory a different combination. For most scholars, curriculum theory meant different things and thus different classifications of curriculum theories emerged.

McNeil's (1977), for instance, differentiated among humanist, technological, academic subjects and social reconstructionist curriculum theories. Pinar (1978) also mentioned traditionalist, conceptual empiricists and reconceptualist theorists when categorizing different camps of thinking concerning curriculum orientations. Ellis (2004), on the other hand, talked about three main orientations to curriculum theory which were named as knowledge-centered, learner-centered and society-centered. Yaşar and Aslan (2021) in their detailed literature review study put forth the idea that although there were different classifications of curriculum theories, most of them appeared to have more commonalities than differences. For the purposes of simplicity, the writer of this work wanted to share in what follows a curricular theory overview representing two major approaches to theoretical orientations in the field of curriculum. That is, the first approach will represent similar shades with a scientific theory while the second one will be better or more equated

with a humanist/philosophical theoretical outlook.

The following overview of curriculum development approaches or curriculum theories has been taken from Ornstein and Hunkins' (2004) groupings of curriculum development models. Since curriculum models belong to theorists that again come from different orientations to curriculum theory, it seemed wise to utilize the two-category classification of curriculum development models as was already reported by Ornstein and Hunkins' (2004). The technical and non-technical camp of theorizing can be easily corroborated with Ellis's (2004) and McNeil's (1977) more-category classifications mentioned above by employing some umbrella terms formula of reduction. Table 1 below depicts the differences between the *Technical-scientific* and *Non-technical & Non-scientific* orientations to curriculum theory based on the personal insights of the researcher of this work and Ornstein and Hunkins' (2004, p. 215) overview in their famous book on the foundations of curriculum.

Table 1.

Technical-scientific versus Non-technical & Non-scientific Orientations to Curriculum Theory

Technical-scientific Orientation to Curriculum Theory	Non-technical & Non-scientific Orientation to Curriculum Theory
Steps and procedures of curriculum development can be determined	There is no clear and pre-determined steps and strategies in curriculum development
Curriculum is developed via following a linear, step-by-step or clearly defined system	There is no clearly defined route to curriculum development but flexibility and need-filling
Curriculum is made up of several distinct sub-components	Curriculum is a living entity enriched and understood with experiences not with constructing/deconstructing the sub-components
Curriculum has clearly defined goals and expected ends making the process an objective and prescriptive one	Curriculum is arrived at by means of subjective and transformative reflection and self-realization making the process an experiential one
Curriculum is created as a result of rational and logical decision making	Curriculum emerges as a result of interaction and experiencing
Major models include those suggested by Tyler (1949), Taba (1962) and Hunkins (1980)	Major models include those suggested by Pinar (2004) and McCutcheon (1995)

The above account indicated the two camps of theorizing about curriculum. Technical-scientific orientation to curriculum theory seem to look for standardized, absolute, scientific and clearly defined procedures and prin-

ciples in making curricula. On the other hand, non-technical/non-scientific orientation to curriculum theory appears to respect subjective, personal and dynamic understanding and experiencing on behalf of curriculum makers and educators. To exemplify these two orientations further, the following part will discuss and compare *traditionalist* and *reconceptualist* perspectives towards curriculum theory and theorizing as another piece of evidence for variations in curricular theorizing. That is to say that this paper here will be aimed at finding an answer to the inquiry *"What could be the main camps of thinking in curriculum theorizing that influence today's conceptualizations of the field of curriculum?"*

Curriculum Theory: Traditionalist Perspectives and Curriculum Making

Tyler's (1949) with his book named as "Basic Principles of Curriculum and Instruction" became one of the important figures shaping the curriculum theory and influencing most of today's thinking about curriculum theory. His famous Tyler's Rationale (1949, p.1) formulated by him in his book suggested a systematic framework for future professionals to understand what curriculum referred to and what components it was made of. With the help of the questions shaping Tyler's Rationale, the field of curriculum could get to a point where it can now list some clear sub-components of the curriculum (Görgen, 2018; Sönmez, 2012; Varış, 1988) and several generic procedures to follow when developing curricula (Figure 1; see Mutlu & Anılan, 2025, p. 6).
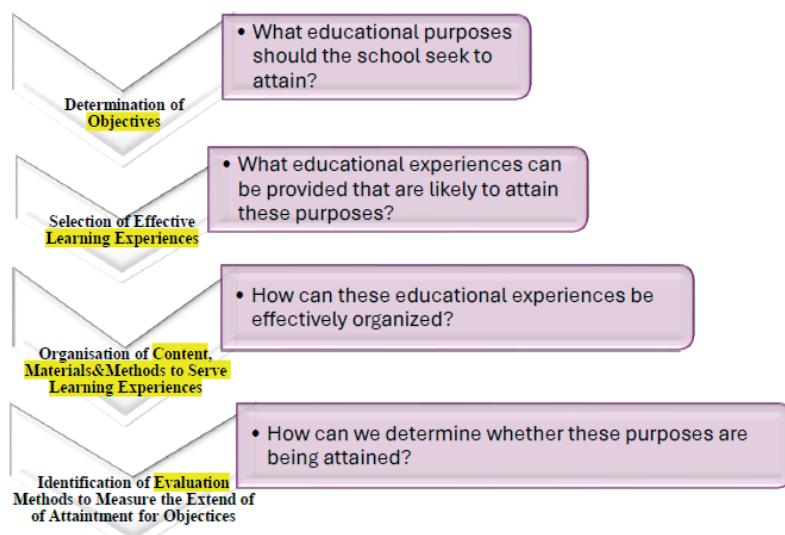
Figure 1. Components and Related Procedures of Curriculum (with guiding questions adopted from Tyler, 1949, s. 1)

It appears that Tyler's Rationale (Tyler, 1949) provided educators or curriculum developers with generic principles and procedures that can work in any and all curriculum design attempts irrespective of discipline areas and contextual characteristics. That was in fact this overgeneralization which was later opposed by Schwab (1969) rather than the existence of a theory that can help professionals determine what to teach, when and how to teach. Schwab (1969, p.7) and his later follower Pinar (2004) contradicted with the long-established belief of "a supposed fixed structure of knowledge" working and valid for all types of curricula irrespective of the contextual, historical or social characteristics when making curricula. In similar veins, another generalized mind of theory regarding curriculum theory is related to the steps or stages to follow when developing a curriculum. Wulf and Schave (1984) have presented an orderly and organized model for designing curriculum by talking about the existence of a systems approach in planning and by also specifying three distinct phases to classify the sub-procedures of curriculum design and development (Figure 2). One can easily grasp the idea that Wulf and Schave's (1984) model for curriculum design has a lot of commonalities with what Tyler's (1949) preliminary work suggested and with what later curriculum designers confirmed by implementing Tylerian theoretical principles upon their own curriculum development models and principles they developed (Hunkins, 1980; Saylor, Alexander & Lewis, 1981; Taba, 1962)
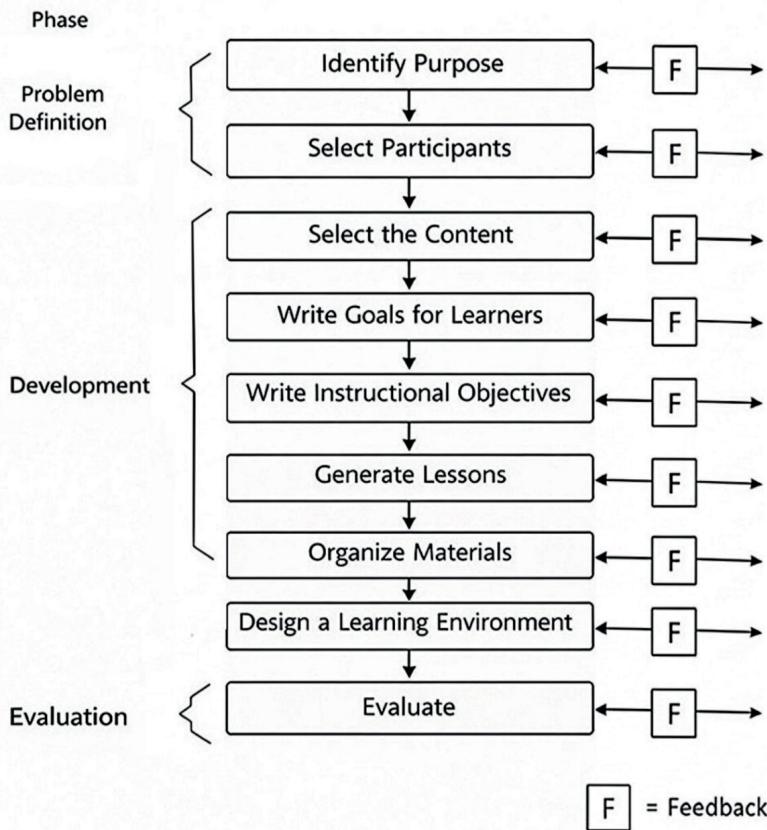
Figure 2. A Model for Curriculum Design (adopted from Wulf and Schave, 1984, p.4)

Though Wulf and Schave (1984) in their book presented this plan to follow when one is involved in any curriculum development work, they also mentioned some resistance to such organized models of curriculum design. They mentioned that this type of approach to curriculum design can be considered as having hindering effects for the creativity of educational professionals and for humanistic student outcomes. They also touched on the idea that in such an orderly system, when content was not properly learnt by the students, students were likely to fail in the exams. This failure can be directly attributed to teachers' responsibility or capabilities. Though Wulf and Schave (1984) recommended the use of this step-by-step guideline for curriculum design and thus tried to provide their audience with some theory or knowledge of curriculum design work, they also attempted to discuss the problems that can stem from strictly following such theoretical principles. Such discussions can be related to the overgeneralization effects of theory (criticized strongly by reconceptualist curriculum theorists in the following) that can result in

isolation or alienation from the true realities of the classrooms and all other contextual forces.

Curriculum Theory: Reconceptualist Perspectives and Curriculum Understading

Pinar (2004) offers a new perhaps more subjective and reconceptualist perspective to curriculum theory by specifically pointing out the current situation in educational policy making and teacher responsibilities in line with these current policies. As put forth by several researchers (Apple, 2005; Kim & Abernathy, 2012; Pinar, 2004, Sierk, 2014), curriculum should be understood and lived by the teachers themselves in subjective ways. Pinar (2004, p. 5) uses such expressions as "public miseducation", "remaking of the school as a business" while several others also mention such words as "accountability", "standardization" or "standards-based accountability" and "exam-driven curricula" (Apple, 2001; DeBray-Pelot & McGuinn, 2009; Kim & Abernathy, 2012) to describe and criticize the current state of education and schooling, all of which in fact appears to give a sense of control from the outside in contrast to the control from inside, namely, someone directly related with the system of education and schooling.

For Pinar (2004), in such a chaotic state, teachers tend to lose their control over the curriculum by first becoming "factory workers" and then being promoted to the positions as "managers of student learning". Moreover, whatever role is assigned above, under such circumstances, teachers can be still considered as technicians serving the state more than as intellectuals with high visions and judgements (Pinar, 2004, p. 5). Pinar (2004) further criticized that teachers are held solely responsible for students' success more than their parents and the students themselves. Under such circumstances, teachers tended to become deskilled and semi-autonomous (Apple, 2005) and lose their creativity and freedom in making their own decisions and understandings of the curricula.

Teachers should think beyond the limits of rules and procedures in order to put their theoretical understanding of curriculum, pedagogy and academic work into a better form of practice in their classrooms (Kim & Abernathy, 2012). This better practice can be also possible by teachers' self-understanding of the conditions and creating their own tools and solutions to classroom conditions for which theory alone can never find perfect or effective answers. Teachers' self-understanding of curriculum and pedagogical work in fact stands for the art side of teaching. The gap between theory and practice or the gap between teaching as a science or as an art can be closed by means of a process of theorizing, and this work here centers on the means for curricular theorizing and understanding beyond the sole understanding of the theorical knowledge of curriculum.

Curriculum theory has been defined by Pinar (2004, p. 2) as *"the inter-disciplinary study of educational experience"* which has a "unique history, a complex present, an uncertain future". For some people, complexity and uncertainty detracts the power or capacity of word of "theory" from giving clear, systematic and standardized route and tactics to do any human activity. The problem is then whether we can talk about a true theory that shows us the correct routine or route to do things when it comes to curriculum. Pinar's (2004, p. 22) following statements can be taken as answers to this question in that he brings out a new conceptualization to the curriculum theory as a form of reorganization or reconceptualization of theory in combination with one's subjective meaning-making processes as in the following:

"Curriculum theory is a form of practical-theoretical reason. As such, it is not subject to the scientific norms of reason and truth. Curriculum theory can be best understood as extension and reconfiguration of theory in the humanities and the arts. Curriculum theory is significantly informed as well by social and autobiographical theory, themselves intersecting domains."

For Pinar (2004), curriculum theory is needed for intellectual practice like a foundational layer later to be grown. However, when people exactly follow what is stated outside in the form of guidelines or theoretical references, it refers to something not more than a mere repetition of the things or thinking imposed on them under the influence of social and historical forces of the time. In this essence, Pinar (2004) resembles curriculum theory to creating "room of one's own" by citing from Virginia Woolf's writings (p. 23) and curriculum theory is seen analogous to constructing one's own site or house upon the layers of existing theories or structures. This brings us to view curriculum theory as an act of understanding, reflection and interpretation pertaining to curricula besides learning about the basic technical principles of curriculum design work as depicted with technocratic curriculum models.

Before Pinar (2004), there was indeed a call from Schwab (1969) who previously attempted to guide educational professionals to think beyond the traditionalist approach in curriculum development. Schwab (1969) emphasized the idea that curriculum field was moribund, that is, on the brink of dying, with its decreasing capacity to answer the complex, real world decisions requiring cultural sensitivity and contextual understanding since curriculum field was dominated by abstract and long-established theories embraced by the curriculum scholars without questioning. Hence, Schwab (1969) called for a renewed perspective in curriculum field, or, namely, a renewed perspective of curriculum theory or theorizing long before Pinar's (2004) imitative for thinking about the curriculum.

However, as is explained above with the idea of reconceptualization of theoretical knowledge, in addition to incorporating your own style, it can be

inferred that there is still adherence to already existing body of knowledge in construction, that is, when constructing your own living apartment within wider spheres of residential areas or blocks. To put it differently, Pinar (2004, p. 22) believes in the idea that curriculum theory includes "a public and political commitment that requires autobiographical excavation and the self-reflexive articulation of one's subjectivity in society". The reference to public or political commitment when making your own way out in curriculum making in his statement may suggest that there is a prescriptive function of curriculum theory showing us how make our decisions concerning content, instructional activities and evaluation practices, which was put forth in similar ways to Pinar (2004) by Ornstein and Hunkins (2004) for whom theory constitutes part of our conscious or unconscious thinking process.

Schwab (1969) mentioned that he longed for an innovation period for the field of curriculum if "the bulk of curriculum energies are diverted from the theoretic to the practical, to the quasi-practical and to the eclectic" (p.1). To put it differently, the curriculum field needs a new conceptualization of curriculum theory that can allocate a place for performing "choice and action" (p. 2) in making curricular and educational decisions enriched with knowledge from other disciplines or timely conditions. Perhaps as a response to Schwab's (1969) call for a practical and eclectic perspective of curriculum theorizing, Pinar (1975) developed the method he named as *currere* with the word's Latin origin meaning "to run" (Merriam-Webster, n.d.). In Pinar's (1975) method of currere meaning to run, who is expected to run? It feels as if it is the curriculum developers or those educators related with curriculum work who are running back and forth throughout their past, current state and future imaginations. Self-understanding or autobiographical understanding of the participants involved in curricular conversation is the main purpose of running (i.e. currere) throughout the whole process of curriculum making.

Pinar (1975, p.424) mentions four moments of currere: *regressive*, *progressive*, *analytical*, and lastly *synthetical*. Although Pinar (1975) provided no graphical display of his model of currere, several other researchers attempted to give it a graphical shape (Dlamini, 2023; Nel & Van Staden, 2023). Figure 3 below depicts this model, as is drawn by the researcher of the current work herself, in a cyclical style that indeed makes it be in accordance with the uncertainty, non-linearity or non-hierarchical flow of tasks, that is, with the non-orderly continuous reflections on the past, current and future moments of one's experiences as an individual, curriculum designer or educator.

Figure 3. The Currere Method/Model of William Pinar (created based on Pinar, 1975, p. 424 and Pinar, 2004, pp. 4-5)

In the model of currere, there is a i) *regressive* moment in that one looks back to (regress towards) his/her past lived educational experiences and past educational decisions or practices shaping him/her today with a critical eye. It can be considered as an evaluative and reflective flashback to your past as an educational professional. There is also ii) *progressive* moment in the process of currere in which one also looks at (proceed towards) the educational future she/he is dreaming for. Here, one can consider the future conditions, newer perspectives or things required for future dream actions and even challenges surrounding their future imaginations. There is also an iii) *analytic* moment in the process of currere in that one should do some analytical checking upon his past, current and future states in order later to come to an understan-

ding with current realities. This moment is followed by a final phase called iv) *synthetic* moment when the previous educational experiential journey leads to a final ultimate and comprehensive understanding arrived at by means of intermingling all previous personalized experience with the worldviews and contextual conditions and characteristics surrounding you. In summary, Pinar's (2004, pp. 4-5) with his currere contends that "returning to the past (the "regressive") and imagining the future (the "progressive") must be understood (the "analytic") for the self to become "expanded" (in contrast to being made "minimal") and complicated, then, finally mobilized (in the "synthetical" moment)".

Concluding Remarks

Overall, the above account showed us that Pinar's (1975, 2004) curriculum theorizing refers to an active, deliberate, reflective and enlightening process for individuals and educators whereas traditional theorists' curriculum theorizing, as represented with a technical/scientific approaches to curriculum development, is based on the idea that curriculum is arrived at a result of following series or steps of technical procedures in an orderly and linear fashion. Mızıkacı (2017) suggested the use of word "curriculum" to exemplify this technical and outcome-dependent perspective. In contrast, the word currere should be used when we mean a lively entity with curriculum that is experienced and created by the individuals and educators during the journey from the past to the future. Accordingly, what Mızıkacı (2017) purports with these two types of word choices is closely linked with the writer's rational in designing this work. That is, curriculum theory can relate to conceptualizations of the field in terms of traditional, rational and linear characteristics and how to make and design such curricula in an orderly manner. This traditional outlook can only help us explain what curriculum is and what components it possesses. There is also another more contemporary conceptualization of curriculum as an experiential, reflective, subjective and uncertain journey throughout which educators or individuals move with their evaluations and projections concerning their past, today and future moments and pieces of experiences. It is this postmodernist and experiential perspective that can help us live, understand and experience the curricula. Without experiencing, curricula can be seen as a mere list of topics, strategies to teach or assessments methods to employ in the classes. With experiencing, meaning making based on your previous life, moments of self-awareness and self-understanding takes place thus reminding us of the basic premise that we are all human beings with feelings, values, emotions, aesthetical, cultural or historical concerns, and these characteristics can be only acted upon when we have a currere-friendly atmosphere open to thinking, questioning and reflection.

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Chapter 5
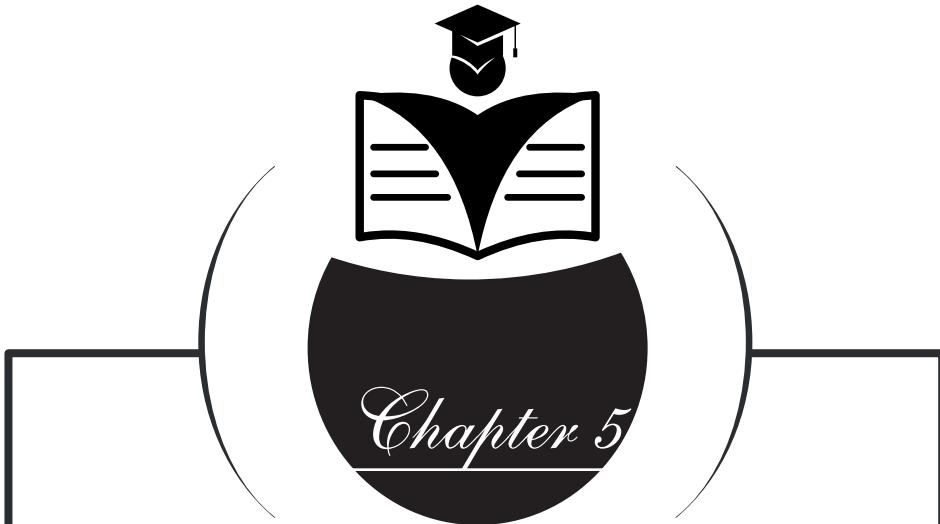
DIFFERENTIATED INSTRUCTION IN THE AGE OF AI: PERSONALIZING LEARNING THROUGH EDUCATIONAL TECHNOLOGY

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1. Introduction

1.1. Defining Differentiated Instruction (DI) and Personalization

Differentiated Instruction (DI) is a philosophy and pedagogical approach that acknowledges that students learn in various ways, at different paces, and with unique prior knowledge (Tomlinson, 2014). Effective DI involves modifying the content (what students learn), the process (how students learn it), and the product (how students demonstrate learning) in response to learner readiness, interest, and learning profile.

The concept of *Personalized Learning* has emerged as the technology-driven evolution of DI. While DI is often teacher-managed and group-focused, personalization leverages technology to deliver dynamically tailored learning experiences to the individual student. This shift moves the educational experience from a "one-size-fits-all" model to a student-centric approach where instruction is continuously responsive to real-time performance data (Bray and McClaskey, 2015). The goal of both DI and personalized learning is to maximize individual student growth and potential.

1.2. The Challenge of Differentiation in Traditional Settings

In traditional classroom settings, the sheer logistical demands of DI present significant barriers. A teacher attempting to manage 25 or more students, each requiring different resources, pacing, and feedback, faces an impossible task. Key challenges include:

1. Diagnostic Overload: Manually gathering, analyzing, and synthesizing formative assessment data for every student is time-consuming and prone to error.

2. Resource Management: Creating three or four variations of every assignment, reading passage, or assessment requires massive instructional preparation time.

3. Pacing and Feedback: Providing immediate, specific, and actionable feedback to multiple students working at different paces and on different tasks is often unsustainable.

These limitations frequently lead to "teaching to the middle," where the most advanced and struggling students are underserved (Tomlinson and Imbeau, 2010). It is these very logistical and data-processing demands that educational technology, and specifically Artificial Intelligence, is poised to address, moving the ideal of truly personalized learning from a theoretical aspiration to a scalable classroom reality.

1.3. The Role of Digital Innovation

Digital innovation—from robust *Learning Management Systems* (LMS) to *Adaptive Learning Platforms* and *Generative Artificial Intelligence* (AI)—provides the essential infrastructure to overcome the practical hurdles of DI.

The rationale for this chapter is to explore how digital tools transform differentiation from a philosophical ideal into a scalable reality. Specifically, we will demonstrate how technology can:

· **Automate Diagnostics:** Use algorithms to pinpoint learner gaps and strengths instantly.

· **Generate Diverse Content:** Employ AI to rapidly create varied reading materials, practice problems, and instructional scaffolds tailored to specific readiness levels.

· **Enable Flexible Modalities:** Offer learners choice in how they engage with material (video, interactive simulation, text) based on their learning profile.

· **Empower Teacher Orchestration:** Free up teacher time from grading and content creation to focus on high-leverage activities like one-on-one coaching and small-group targeted instruction.

This chapter aims to provide educators with a practical framework for leveraging digital tools to create truly personalized and effective learning environments, thus realizing the potential of DI (Steiner, 2015).

2. Theoretical Frameworks for Personalized Digital Learning

The integration of technology into DI is best supported by established learning theories, which provide the justification for content design and pedagogical choices.

2.1. Universal Design for Learning (UDL)

Universal Design for Learning (UDL) is the cornerstone of modern differentiated instruction. UDL asserts that barriers to learning reside in the curriculum design, not in the student (CAST, 2018). Technology is critical to implementing UDL by providing multiple means of:

1. Engagement: Providing multiple options for recruiting interest (e.g., choice boards, simulations, gamification).

2. Representation: Providing multiple options for perceiving and comprehending information (e.g., text-to-speech, video lectures, visual organizers).

3. Action and Expression: Providing multiple options for physical action and communicating understanding (e.g., digital portfolios, multimedia projects, audio recording).

Digital tools inherently offer the flexibility required to meet the three UDL principles, allowing students to access and demonstrate knowledge in ways that align with their strengths. Thus, UDL provides the philosophical mandate for why we must vary instruction, while educational technology serves as the essential enabling tool to make this variation scalable and efficient for every learner.

2.2. Sociocultural Theory and Scaffolding (Vygotsky)

Vygotsky's (1978) concept of the *Zone of Proximal Development (ZPD)*—the space between what a learner can do independently and what they can achieve with guidance—is essential to DI. Technology acts as a scalable, ever-present scaffolding tool.

· **AI-Driven Scaffolding:** Tools can provide just-in-time assistance, such as hints, glossaries, or simplified language, only when the learner is struggling. This temporary support allows the learner to operate within their ZPD, fostering independence.

· **Collaborative Digital Spaces:** Technology facilitates collaboration among peers (a crucial Vygotskian element), allowing students to share digital resources, co-edit documents, and provide mutual feedback in synchronous or asynchronous environments.

3. Digital Tools and Strategies for Differentiation

Effective digital differentiation involves matching the right tool to the instructional goal, focusing on the three main DI levers: content, process, and product.

3.1. Differentiating Content with Adaptive Platforms

Content differentiation focuses on varying the complexity or presentation of the material itself based on a student's readiness level.

Strategy	Digital Tool/ Platform	How Differentiation is Achieved
Adaptive Reading/ Math Practice	DreamBox, IXL, Khan Academy	Algorithms automatically adjust the difficulty of problems or reading passages in real-time based on the student's performance, ensuring productive struggle.
AI-Generated Text Variation	Generative AI (e.g., GPT, Gemini)	Teacher prompts the AI to rewrite a core reading text at three different complexity levels (e.g., A2, B1, C1) to ensure comprehension for all readiness groups.
Curated Digital Libraries	Google Classroom, Shared Drives, LMS Modules	Teachers organize and tag resources by topic, readiness level, and modality, allowing students to self-select appropriate content.

3.2. Differentiating Process through Flexible Modalities

Process differentiation focuses on varying the methods students use to master the content, appealing to different learning profiles and interests.

1. Choice Boards and HyperDocs: These digital documents embed links to various activities, allowing students to choose a pathway that suits their interests or preferred learning style (e.g., "Watch a video," "Read an article," or "Create an infographic" on the same topic).

2. Interactive Simulations and Virtual Labs: Tools like *PhET Interactive Simulations* offer hands-on, low-risk opportunities for students to explore concepts, providing a concrete process alternative to abstract lecture or text.

3. Multimedia Creation: Students can use tools like *Adobe Express* or *Canva* to demonstrate understanding by creating video summaries, podcasts, or digital presentations, appealing to those with visual or auditory learning preferences.

3.3. Differentiating Product with Personalized Assessment and Feedback

Product differentiation focuses on giving students varied ways to show what they know, moving beyond traditional tests. Technology also makes the feedback loop instantaneous and precise.

1. Digital Portfolios: Platforms (e.g., Seesaw, Google Sites) allow students to curate diverse products (essays, videos, code, images) over time, demonstrating mastery through a personalized collection rather than a single, high-stakes exam.

2. Automated Feedback Tools: Grammar and style checkers (e.g., Grammarly), or assessment tools with instant correct/incorrect feedback, provide immediate, non-judgmental information, allowing for rapid self-correction and revision.

3. Peer Review Platforms: Digital platforms facilitate anonymous or structured peer-to-peer feedback, exposing students to varied perspectives and strengthening their critical evaluation skills.

4. Advanced AI Applications for Personalized Differentiation

The true power of AI in DI lies in its ability to automate the cognitive load of personalization, enabling the teacher to manage an individualized learning ecosystem that was previously impossible (Lucking and Holmes, 2016).

4.1. AI for Automated Diagnostics and Needs Assessment

AI-driven systems shift assessment from simple summative grading to continuous, *diagnostic* data collection.

· **Real-time Skill Mapping:** Adaptive platforms use Item Response Theory (IRT) to constantly monitor student interactions, not just scoring performance but also inferring underlying skill gaps. This instantly identifies a student's precise readiness level, informing differentiated content delivery (Roll & Wylie, 2016).

· **Predictive Analytics:** AI can analyze historical student data to predict where a student is likely to struggle next. This allows the teacher (or the platform) to pre-scaffold content before the difficulty arises, transforming intervention from reactive to proactive.

· **Formative Feedback Generation:** Generative AI can analyze a student's open-ended response (e.g., an essay paragraph) against a rubric and provide personalized, scaffolded feedback that is tailored to that student's readiness level—something a human teacher cannot feasibly do for 30 students in real-time.

4.2. AI as a Personalized Scaffolding Tutor

AI acts as a constant, non-judgmental tutor that provides targeted scaffolding based on the learner's moment-to-moment needs (ZPD).

· **Contextual Hinting:** Unlike static hints, AI can generate hints that are progressively more revealing based on how many attempts the student has made, preventing frustration while encouraging independent effort.

· **Content Simplification:** Teachers can leverage generative AI tools to take complex source material (e.g., a primary historical document) and, using sophisticated prompt engineering (Chen et al., 2024), instruct the AI to simplify the text while preserving core concepts, effectively creating multiple reading groups with a single source.

· **Adaptive Practice Generation:** AI can instantly generate an unlimited supply of practice problems or questions focused only on the specific sub-skill a student failed in the most recent diagnostic, ensuring laser-focused remedial practice.

5. Example Case Studies

The following case study illustrates how AI tools can be orchestrated to differentiate a unit on the Industrial Revolution, addressing varied student readiness levels and interests. This orchestration demonstrates how the teacher moves from content creator to curator and coach, utilizing AI to meet individual student needs simultaneously.

Implementing DI with AI in a High School History Class

DI Lever	Student Group A (Below Readiness, Needs Scaffolding)	Student Group B (On Readiness, Needs Context)	Student Group C (Above Readiness, Needs Depth/Complexity)
Content	AI is prompted to summarize the core text (e.g., a chapter on factory life) using an 8th-grade Lexile score, focusing on key figures and events.	Standard textbook chapter is assigned. Teacher provides access to supplementary AI-curated short videos and interactive timelines for context.	AI is prompted to retrieve and summarize three primary source documents (e.g., Malthus, Marx, and Carnegie) related to the unit, focusing on contrasting economic philosophies.
Process	Students work through a DreamBox or similar platform module, focusing on sequential recall. They use a chatbot for vocabulary definitions and sentence simplification (AI-Driven Scaffolding).	Students engage in a digital simulation where they manage a factory or a city, making economic decisions that affect outcomes, fostering critical thinking.	Students engage in a digital HyperDoc containing links to scholarly articles and conflicting historical interpretations. They must choose three paths for deep research.
Product	Students create a digital timeline (using Canva/Adobe Express) summarizing 10 key events and their impact. The timeline is scored by the teacher for accuracy.	Students write a five-paragraph argumentative essay on a specific cause-and-effect of the revolution. The essay is assessed by an Automated Feedback Tool for grammar and structure before final submission.	Students create a multimedia presentation (podcast or short documentary) debating the ethical legacy of the revolution, referencing their primary source documents and addressing the counterarguments of Group C's sources.

The following case study illustrates how AI tools can be orchestrated to differentiate a unit on the Industrial Revolution, addressing varied student readiness levels alongside diverse language proficiency needs (FL/SL). By leveraging AI to adapt text complexity, provide real-time translation and scaffolding, and offer flexible product options, the teacher efficiently addresses the dual challenge of language acquisition and content mastery. This orchestration demonstrates how the teacher moves from being a primary content creator and translator to an expert curator and language coach, utilizing AI to meet complex, individual student needs simultaneously.

Implementing DI with AI in an FL/SL Field

DI Lever	Student Group A (SL - Developing, Needs Language Scaffolding & Core Readiness)	Student Group B (SL - Expanding, On Readiness, Needs Context & Vocabulary Depth)	Student Group C (FL - Advanced/ Fluent, Above Readiness, Needs Depth/Complexity)
Content	AI is prompted to summarize the core text (e.g., a chapter on factory life) using an 8th-grade Lexile score, focusing on key figures and events. The AI tool offers simultaneous translation and simple vocabulary support on demand.	Standard textbook chapter is assigned. Teacher provides access to supplementary AI-curated short videos and interactive timelines for context. AI provides specialized glossaries for disciplinary-specific vocabulary.	AI is prompted to retrieve and summarize three primary source documents (e.g., Malthus, Marx, and Carnegie) related to the unit, focusing on contrasting economic philosophies and providing academic vocabulary support.
Process	Students work through a simplified digital module focusing on sequential recall. They use a chatbot for vocabulary definitions, sentence simplification, and translation support (AI-Driven Scaffolding).	Students engage in a digital simulation where they manage a factory or a city, making economic decisions that affect outcomes, fostering critical thinking. Peer-to-peer digital collaboration is encouraged with built-in language tools.	Students engage in a digital HyperDoc containing links to scholarly articles and conflicting historical interpretations. They must choose three paths for deep research and justify their choices in an online academic forum.
Product	Students create a digital timeline (using Canva/ Adobe Express) summarizing 10 key events and their impact. The platform allows for audio recording in their native language (L1) or simple L2, focusing on content accuracy over linguistic complexity.	Students write a five-paragraph argumentative essay on a specific cause-and-effect of the revolution. The essay is assessed by an Automated Feedback Tool for grammar and structure (focusing on complex L2 sentence syntax) before final submission.	Students create a multimedia presentation (podcast or short documentary) debating the ethical legacy of the revolution, referencing their primary source documents and addressing the counterarguments of Group C's sources. The assessment focuses on depth of analysis and rhetorical skill.

6. Practical Implementation and Ethical Considerations

Successful implementation of AI-driven DI relies on practical preparedness and a commitment to ethical practice (Reiss, 2021; UNESCO, 2022).

6.1. Teacher Orchestration and Preparedness

The most critical component of digital DI is the teacher's ability to orchestrate the personalized learning ecosystem.

1. Diagnostic Literacy: Teachers must be trained to move beyond simple scores, learning to interpret the diagnostic maps and skill graphs provided by adaptive systems to understand the *why* behind student performance.

2. Pedagogical Prompting: Mastery of prompt engineering is essential. Teachers must be able to write sophisticated prompts that tailor AI output not just by topic, but by specific pedagogical variables (e.g., Lexile level, cognitive load, assessment format).

3. Focus on Human Interaction: By automating content and basic feedback, the teacher is freed to focus their high-value time on small-group interventions, emotional coaching, and complex critical thinking discussions that AI cannot replicate.

6.2. Ethical and Data Privacy Obligations

Differentiation relies on vast amounts of student performance data, raising significant ethical considerations (Holmes et al., 2022).

1. Algorithmic Bias: AI models, trained on existing data, can perpetuate and amplify biases related to race, gender, or socioeconomic status, leading to differential content delivery that may reinforce existing achievement gaps. Teachers must audit and question the platform's content suggestions.

2. Data Transparency and Privacy: The continuous collection of student data (clicks, time spent, errors) must adhere to strict privacy standards. Institutions must provide transparency regarding how AI uses student data to make instructional decisions.

3. The "Filter Bubble" Effect: Over-personalization can inadvertently limit a student's exposure to diverse perspectives or complex, unstructured learning materials. Teachers must intentionally introduce non-personalized, whole-class activities to ensure students do not remain trapped in a self-reinforcing learning "bubble."

7. Conclusion and Future Directions

The age of AI has transformed Differentiated Instruction from a desirable but often unachievable ideal into a practical, scalable reality. By leveraging adaptive platforms and generative tools, educators can manage the complexi-

ties of content, process, and product variation, meeting the unique needs of every learner. AI serves as a powerful partner in diagnosing needs, providing just-in-time scaffolding, and automating the creation of personalized resources.

However, the future success of DI in the age of AI depends not just on technological capability, but on human wisdom and ethical foresight. Research must continue to focus on the long-term impact of algorithmic decision-making on student motivation and agency, and teacher preparation programs must prioritize the skills of data literacy and pedagogical prompt engineering. Only through careful ethical consideration and pedagogical mastery can we ensure that digital innovation truly leads to equitable and personalized learning outcomes for all students.

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Chapter 6
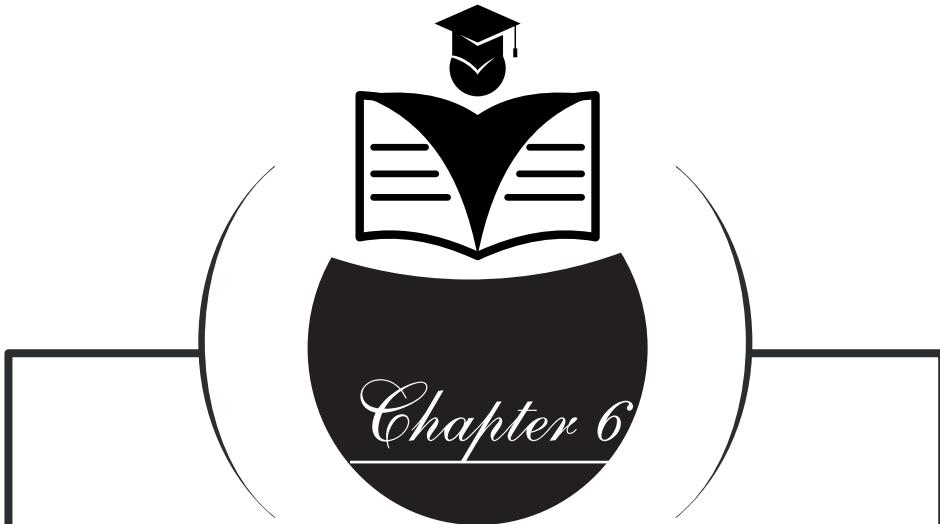
TRANSFORMATION IN EDUCATİON FOR A SUSTAINABLE FUTURE: THE STEAM APPROACH, DIGITAL TECHNOLOGIES, AND ARTIFICIAL INTELLIGENCE PERSPECTIVE

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1. INTRODUCTION

The 21st century we live in has confronted humanity with unprecedented complex problems such as climate change, declining biodiversity, and the rapid depletion of natural resources (Öztürk, 2017). In this process, global peace crises, social inequalities, and sudden health emergencies are causing existing crises to intertwine and deepen. These challenges are not independent phenomena; instead, they form a multidimensional structure that interconnects and threatens the sustainability of the global system.

Solving such deep and complex global problems through narrow technological interventions or short-term economic packages alone is not feasible. Overcoming these problems requires going far beyond technical improvements; it necessitates a fundamental transformation of humanity's basic thought patterns, ethical values, and daily behavior patterns. This situation necessitates a shift in mindset that will redefine the relationships between individuals and societies, and with nature and one another.

In response to the need for global transformation, the United Nations adopted a strategic framework in 2015 that provides a comprehensive roadmap for building a more equitable, prosperous, and sustainable world by 2030 (UN, 2015). This vision, comprising seventeen main goals and 169 indicators that detail these goals, aims to strike a critical balance between economic development, social inclusion, and environmental protection. This framework brings all actors together on a collaborative platform to protect humanity's common future.

However, achieving these global goals cannot be limited to changes in policy documents or technological innovations developed in laboratories. The key to success lies in raising deep awareness across all segments of society and transforming this awareness into lasting behavioral changes. In this context, the awareness of sustainability instilled in individuals, particularly through education systems, should be considered the most powerful instrument of social transformation.

Education is at the heart of this holistic transformation process and has the power to shape the future. Traditional educational approaches that present knowledge in isolated disciplines are inadequate for addressing today's complex problems, which require thinking beyond conventional boundaries. Instead, students must be equipped with competencies that enable them to produce innovative, creative, and sustainable solutions to real-world problems by blending science, technology, engineering, art, and mathematical thinking skills (STEAM) (GESS Education, 2024).

Recent studies indicate that artificial intelligence and digital technologies can act as a lever in this educational transformation, accelerating the achieve-

ment of sustainability goals (Leal Filho et al., 2023). Integrating technological capabilities into pedagogical processes not only increases technical efficiency but also enables students to analyze global issues in a multidimensional way.

2. SUSTAINABLE DEVELOPMENT GOALS AND THE ROLE OF EDUCATION

The Sustainable Development Goals (SDGs) implemented by the United Nations are based on fundamental pillars, including humanity, protecting the planet, promoting prosperity, establishing peace, and fostering global partnerships. All of these universal goals interact directly or indirectly with educational processes. In particular, Goal 4, entitled "Quality Education," focuses on ensuring that every individual has access to inclusive, high-quality education and that a culture of lifelong learning is supported (UN, 2015). However, the realization of this vision is only possible through a fundamental restructuring of the content and pedagogical methods of education, not merely through the improvement of physical facilities.

Sustainable Development Education (SDE), which is at the heart of this structural transformation, is based on individuals gaining a deep awareness and skills on how to build a sustainable lifestyle. This approach extends beyond traditional methods that merely convey theoretical environmental knowledge, aiming to enable students to understand the complex and interdependent relationships between social, economic, and ecological systems (Öztürk, 2017). Thus, individuals can rationally diagnose the shortcomings that arise within existing systems and take the initiative to produce innovative and lasting solutions to these multidimensional crises.

Developing the core competencies necessary for sustainable development enables individuals to make informed strategic decisions in a global future marked by uncertainty. Rieckmann (2018) states that competencies such as systems thinking, collaboration, and self-awareness play an indispensable role in internalizing the vision of sustainability. According to this academic perspective, education should be designed as a dynamic capacity-building mechanism that triggers social transformation, rather than a static vehicle for knowledge transfer. In this context, SGE surpasses the limitations of traditional learning models and engages the individual in a comprehensive development process.

The pedagogical framework of SGE possesses certain fundamental qualities that distinguish it from classical educational approaches and position it as the learning model of the future. Among these characteristics, as outlined by UNESCO (2017), a holistic perspective that integrates social and economic dimensions with environmental factors, and the critical thinking skills that enable students to question established norms, stand out prominently. Furthermore, the principle of participation, which envisions students' acti-

ve involvement in decision-making processes, and the analysis of local-scale problems from a global perspective form the core components of this approach, laying the foundations for social awareness.

For development goals to find a social response, the education system must focus not only on a purely cognitive process but also on a profound change in values and attitudes. Beyond students' conceptual understanding of the vital importance of sustainability, they are expected to establish an ethical and emotional connection with this concept and to be willing to reflect on the knowledge they have acquired in their daily life practices (Wals & Jickling, 2002). In this regard, SGE offers integrated character development by supporting the individual's mental development while also balancing affective and behavioral learning objectives.

Individuals who gain resilience against global crises and develop sustainable solutions require the redesign of education through interdisciplinary synergy. The blending of scientific data with creative design processes provides students with the advanced tools and methodologies necessary to solve complex real-world problems. Integrating technological capabilities and analytical thinking into these processes transforms the quality of education, moving students to a more productive ground.

3. STEAM APPROACH: INTERDISCIPLINARY INTEGRATION

STEAM stands out as an interdisciplinary educational paradigm that strengthens students' cognitive structures and equips them with multidimensional creative problem-solving skills (GESS Education, 2024). Unlike the traditional STEM model, which focuses on technical and analytical skills, the inclusion of the "Arts" component has added innovation, aesthetics, and a deep human dimension to the learning process. This integration enriches the modern educational experience by equipping students not only with rational and technical data but also with ethical values and a design-oriented perspective.

The fundamental philosophy of this approach is to blend scientific and technological knowledge with design-oriented thinking to produce flexible, human-centered solutions to social problems. As emphasized by Yakman (2008), the STEAM philosophy enables students to address complex problems from a multidimensional perspective rather than through the narrow confines of a single discipline. For example, when addressing an environmental pollution problem, students not only analyze chemical processes and mathematical data, but also develop the ability to visualize the social impacts of this problem and create innovative design strategies for sustainable living spaces.

In sustainability education, each component of STEAM plays a critical role in addressing global crises. While science provides the fundamental the-

oretical framework necessary to understand the complex mechanisms of the climate crisis and ecosystem balance (IPCC, 2021), technology offers concrete application tools such as renewable energy systems and environmental monitoring methods. At this point, Wiek et al. (2011) emphasize the importance of developing strategic, systemic, and future-oriented thinking skills in sustainability education, drawing attention to the vital role of interdisciplinary transition in transforming theoretical knowledge into concrete action and sustainable strategies.

The engineering discipline provides students with practical application methods for implementing sustainable design principles and developing environmentally friendly products. Art, on the other hand, is an indispensable means of expression for conveying sustainability messages to a wide audience, creating social awareness, and rebuilding the emotional bond with nature that individuals are assumed to have lost (Sternberg, 2010). Mathematics, on the other hand, provides students with the cognitive toolkit necessary to perform data-driven analysis of all these processes, understand complex system dynamics quantitatively, and construct future scenarios through scientific modeling.

The true transformative power of the STEAM approach stems from the fact that these fields are not treated as separate compartments, but rather as integrated projects woven around real-world issues. As stated by Bybee (2010), through comprehensive projects such as the conservation of local water resources, students directly experience and develop 21st-century skills, including collaboration, effective communication, and leadership. Such holistic applications prevent academic knowledge from remaining confined within classroom walls, creating a learning ecosystem where knowledge is directly transformed into social and environmental benefits.

A STEAM education aligned with the Sustainable Development Goals transforms students from passive recipients of knowledge into competent "agents of change" capable of actively addressing global issues. This approach, which increases individuals' motivation to generate solutions to environmental and social crises, plays a key role in raising conscious generations who will build the world of tomorrow.

4. DIGITAL TECHNOLOGIES AND EDUCATIONAL TRANSFORMATION

Digital technologies are fundamentally transforming the structural dynamics and operational functioning of today's education systems. Advanced tools, such as Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and the Internet of Things (IoT), democratize access to educational materials on a global scale, making learning processes more interactive, personalized, and data-driven (Selwyn, 2019). This technological integration

not only facilitates knowledge transfer but also increases the measurability of educational processes, enabling more transparent and effective monitoring of student development.

Digital tools play a critical role in fostering sustainability awareness, particularly in making abstract and difficult-to-grasp environmental issues tangible. Thanks to Virtual Reality technology, students have the opportunity to experience firsthand the devastating effects of massive-scale ecological crises, such as climate change and ocean acidification (Radianti et al., 2020). Similarly, Augmented Reality applications strengthen the connection with nature by providing instant digital data about a plant or ecosystem component in the physical environment, taking students' environmental awareness far beyond traditional classroom settings.

Digital Twin technology, used in the analysis of complex systems, enables students to simulate real-world scenarios in a virtual environment. With this innovative modeling method, the potential effects of a city's energy policies or transportation networks on its carbon footprint can be tested without any real risk (Grieves, 2014). Such technological approaches enable students to understand cause-and-effect relationships from a multidimensional perspective, thereby developing the strategic and analytical thinking skills needed to build a sustainable future.

Cloud-based collaboration platforms eliminate the geographical and physical boundaries of education, creating a global learning ecosystem. Tools such as Google Classroom, Microsoft Teams, or Moodle enable students from different continents to work on joint projects and collaborate synchronously on vital issues such as global water management (Garrison & Kanuka, 2004). This type of interaction helps students internalize different cultural perspectives, contributing to their understanding that local issues are part of a global whole and developing a collective sense of responsibility.

In the process of democratizing knowledge, Open Educational Resources (OER) and Massive Open Online Courses (MOOCs) play a revolutionary role. Through these platforms, high-quality content offered by the world's most prestigious academic institutions can be accessed for free from anywhere, which increases opportunities for individuals in socio-economically disadvantaged regions to participate in sustainability education (Butcher, 2015). Thus, barriers to accessing quality information are being removed, and sustainability-focused teaching approaches are supporting the goal of educational opportunity equality on a global scale.

Alongside the vast opportunities offered by technological advances, there are also serious pedagogical and ethical obstacles to overcome, such as the digital divide, data privacy, and technology addiction (Twenge, 2017). The process of digitization in education should not be limited to the use of tech-

nical tools; it should also focus on structuring these tools within an ethical framework that supports human intelligence (Luckin, 2018).

5. ARTIFICIAL INTELLIGENCE PERSPECTIVE: THE FUTURE OF EDUCATION

Although education is at the center of a major transformation, traditional education systems mostly focus on fragmented knowledge transfer, ignoring interdisciplinary connections. Today's complex problems cannot be solved with isolated approaches, so students need to be able to integrate science, technology, engineering, art, and mathematical thinking to produce creative and sustainable solutions to real-world problems (GESS Education, 2024). At this point, digital technologies and artificial intelligence (AI) emerge as the most powerful tools shaping the future of the education system. Artificial intelligence is effectively used to personalize learning processes, monitor student progress, support teachers' work, and dynamically adapt educational materials (Holmes et al., 2019). In particular, AI's potential to "enhance rather than replace human intelligence" serves sustainability goals by increasing students' capacity to understand complex issues (Luckin, 2018).

One of the most critical applications of artificial intelligence in education, personalized learning, breaks the structure of traditional systems that force every student to learn at the same pace and using the same methods. Based on the fact that each student has a different learning style, pace, and individual needs, AI-powered systems analyze each student's performance, preferences, and strengths/weaknesses to design personalized learning paths. For example, if a student prefers visual learning, the system can offer more videos and graphics, while creating a different flow for another student who prefers textual explanations (Vandewaetere et al., 2011). This approach is particularly valuable in the context of sustainability education, as sustainability is an interdisciplinary and multi-layered subject. Artificial intelligence systems can present sustainability topics in a way that suits individual perspectives, focusing on one student's interest in climate science and energy technologies while supporting another's curiosity in social policies and economics.

The vast amount of data collected by educational institutions is being transformed into meaningful guides through artificial intelligence-powered data analysis and decision support systems. These systems, which analyze numerous variables such as student success, attendance, and behavioral data, can identify which students are at academic risk or which teaching methods yield higher efficiency (Siemens, 2013). In terms of sustainability education, such analyses play a crucial role in measuring the progress students have made on global issues and the effectiveness of educational programs in real-world applications. Additionally, virtual assistants and chatbots offer students uninterrupted learning support, allowing for a learning environment that is inde-

pendent of time. Particularly in regions with limited access to qualified teachers, these AI-based tools have become a crucial mechanism for enhancing educational quality and promoting equal opportunities (Kuhail et al., 2021).

However, the integration of artificial intelligence in education also brings with it serious ethical and practical challenges. Data privacy and security raise concerns about the collection and storage of student data. In contrast, the risk of systems reproducing historical biases in educational data can reinforce the disadvantaged position of certain groups (Buolamwini & Gebru, 2018). Furthermore, the high cost of accessing advanced technology can exacerbate the digital divide, leading to educational inequality. To overcome these obstacles, the use of artificial intelligence in education must be guided by ethical principles within a framework of transparency, accountability, and fundamental human values. The fundamental purpose of this technological power should not be to replace teachers in the system, but rather to support and enrich their pedagogical roles (Prinsloo & Slade, 2015).

In conclusion, teachers should always be at the center of the educational process, and artificial intelligence should only be positioned as a strategic tool that facilitates this process. Sustainability-focused teaching approaches, when combined with the opportunities offered by STEAM disciplines and digital technologies, enable individuals to become better equipped to address global issues. This technological transformation has the potential to make the world more livable by developing not only students' academic achievements but also their global citizenship awareness. The future vision of education is shaped around the perspective of artificial intelligence, which aims to raise generations that will build a sustainable life by blending technology with a human-centered approach: the future of education.

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Chapter 7

UNDERSTANDING LECTURER EXPERIENCES IN ENGLISH-MEDIUM INSTRUCTION: CHALLENGES AND COPING PRACTICES

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INTRODUCTION

The use of English as the medium of instruction is a very popular trend in education. There exist various reasons behind the employment of English as the medium of instruction, especially in higher education. The main reason is to fulfill the criteria set for universities, triggered by globalization, internationalization, and the commodification of education (Giroux, 2004). To this end, higher education institutions aim to prepare their graduates for the international labor market, which is increasingly dominated by English. Another reason for implementing EMI is to encourage students' mobility. According to de Jong (2018), as evidenced by the so-called Erasmus scholarship program, such mobility promotes the formation of global classrooms in which English is the primary language of instruction.

Despite the many advantages EMI's implementation in higher education brings for students, lecturers, and organizations, its practice is not free of challenges. Especially, lectures using English as the primary means of instruction may face challenges and need to employ specific coping strategies, as learning and teaching an academic discipline in a foreign language is not a conventional approach for educational institutions in the expanding circle (Kachru, 1985). There are many empirical studies on the challenges EMI lecturers encounter and the strategies they develop to address them. This study aims to identify these challenges and the coping strategies used to address them.

EMI-Related Challenges Faced by EMI Lecturers

The use of English as the medium of instruction presents difficulties for EMI lecturers. There are various sources of challenges for the EMI lecturers cited in the related literature.
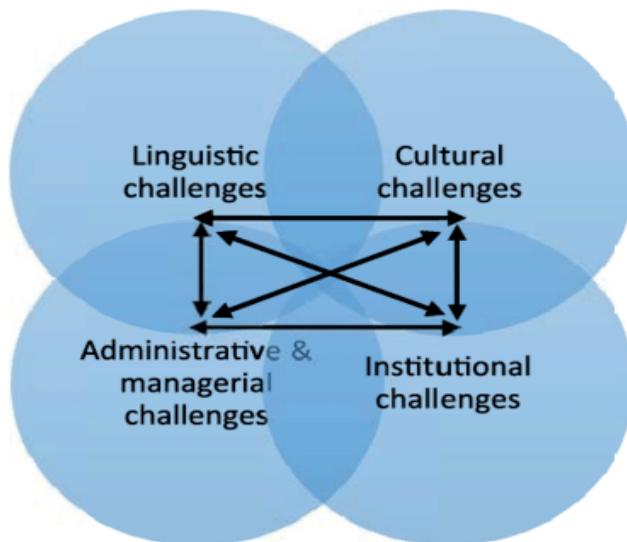

Figure 1: Typology of Challenges- Macaro, Curle, Pun, An, and Dearden (2018)

Most of these challenges are connected to their language proficiency. Multiple studies have proven that English proficiency is an obstacle for EMI lecturers (Özer, 2020; Pun & Thomas, 2020). As Hellekjær (2007) identified, EMI lecturers face challenges while delivering instruction in English properly because of their low language proficiency. Many EMI lecturers cannot teach the same amount of information in English as they can in their native languages. Empirical studies on EMI lectures revealed several linguistic issues, including pronunciation, slow speech rate, and the reduced use of expressions and clarity (Vinke, 1995). Vinke et al. (ibid.) stated that EMI lecturers have difficulty explaining academic and technical concepts in English and lack adequate English proficiency for teaching disciplinary content in English. According to Wilkinson (2005), when lecturers use humor, anecdotes, digressions, and spontaneous examples in their English language presentations, they often encounter communication problems. In addition, Barnard (2015: p. 9) argues that "those with linguistic ability might not have the pedagogic ability to deliver complex matters in a second language." It can be inferred that lecturers who use EMI in the classroom may not have the necessary pedagogical content knowledge.

Another problem faced by the EMI lecturers is their inability to use classroom discourse strategies. Nunan (1987) and Given and Prinsloo (2018) illustrate that EMI lecturers have difficulty asking pertinent questions, interacting with EMI students and maintaining the social language. As a result, they are unable to develop a relationship with students, give proper feedback on EMI-related issues and provide details about the target disciplinary knowledge. According to Yahaya et al. (2009), the major discourse-related challenge faced by EMI lecturers is receiving students' replies and maintaining communication in English. This, as a result, impairs student-lecturer interaction and slows the meaning transfer.

The lecturers' workload is an additional obstacle that poses challenges while teaching, assessing, and preparing for EMI lessons. It is asserted that preparing for EMI courses and studying English requires extra time to verify unfamiliar topics (Henriksen, Holmen & Kling, 2018). According to Vinke's (1995) research, lecturers reported spending more time preparing for teaching in English. This additional time is due to teachers seeking words and arranging an English lesson (Airey, 2011).

In addition, students' English proficiency is considered a significant factor that challenges lecturers in teaching. As Ashcraft (2006) noted, it is difficult for content lecturers to deliver their courses in English to students who are not fluent enough to comprehend lectures. The students who are unable to ask and answer questions in English, understand the English resource materials used in EMI lessons, and participate in and contribute to the lesson hinder the proper information flow in EMI lessons.

Also, the lack of financial resources and limited career development opportunities for the EMI lecturers create challenges for them. Manh (2012) suggested that the faculty prefer not to invest enough money in improving

English as the medium of instruction. In other words, EMI departments lack adequate financial support to improve the quality of teaching. Baldauf, Kaplan, Kamwangamalu and Bryant (2011) asserted that funding for standard programs, teacher training, and financial resources for textbooks are all insufficient. Besides, Vu and Burn (2014) posited that lecturers lack sufficient opportunities for appropriate language training prior to their appointment to EMI classrooms, which partially affects students' understanding of lessons. In addition, there is a lack of workshops and seminars related to EMI pedagogy. As a result, the absence of EMI-focused workshops and seminars further constrains lecturers' pedagogical development and reduces the overall quality of teaching and learning in EMI classrooms.

Other EMI-related challenges faced by EMI lecturers are finding out a fair and transparent assessment for the EMI students, lack of teaching skills in integrating content with language teaching, creation of an unrealistic learning atmosphere, finding suitable EMI course materials, less flexibility in dealing with unpredicted incidents and various challenges in the classroom and lack of motivation for teaching academic content in English (Al Zumor, 2019; Hultgren et. al, 2022). These difficulties collectively undermine lecturers' ability to deliver EMI courses effectively and to ensure fair, meaningful assessment practices. As a result, both the quality of instruction and the authenticity of the learning environment may be compromised in EMI classrooms.

It is evident from the literature that EMI lecturers may experience linguistic, social, cultural, occupational and social challenges while presenting the content knowledge in English.

EMI Lecturers' Coping Strategies

EMI lecturers employ numerous strategies to address EMI-related challenges when introducing content in English.
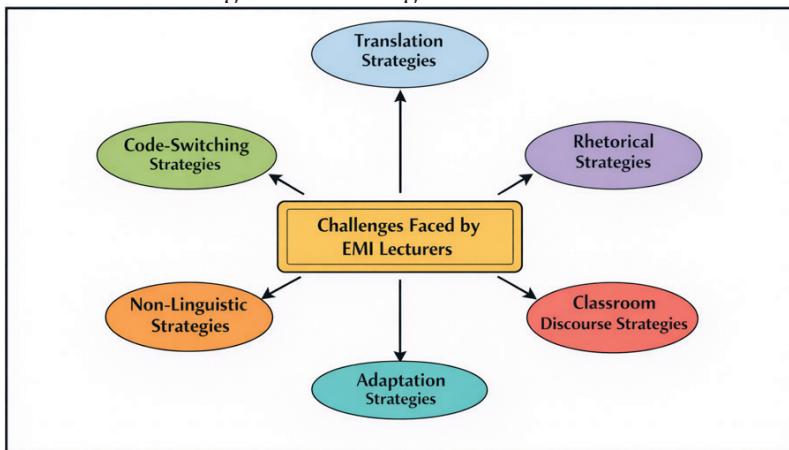

Figure 2: Coping Strategies Employed by EMI Lecturers

One coping strategy used by EMI lecturers is translation. With this strategy, EMI lecturers are able to provide more implicit content knowledge and

support for the students. To start with, Pun and Thomas (2020) stated that EMI lecturers utilize L1 to compensate for their inadequacies or to improve their learners' comprehension. As stated by Hummel (2010), using the native language of the students is a potentially effective cognitive plan for supporting learning in EMI settings. Also, Sezer (2022) identified that one of the applications that lecturers benefit from is translanguaging, an academic practice in which a student receives input in one language and provides output in another. Thanks to translanguaging, EMI lecturers can maximize learning and encourage a fuller understanding of the subject matter. In addition, EMI lecturers also employ code-switching to avoid EMI-related comprehension challenges. Yeh (2014) stated that code-switching, the practice of moving back and forth between two languages or dialects when speaking, is another essential pedagogical strategy that facilitates student learning and manages a student-teacher relationship in an EMI classroom. The strategic implementation of code-switching by educators may offer an educational benefit, particularly when students encounter challenges in processing and comprehending the target language (Cook, 2001). It is evident that careful use of code-switching helps students understand the lesson more easily and supports effective communication in EMI classrooms.

The EMI lecturers utilize rhetorical strategies to cope with challenges while providing knowledge of the target academic content in English. According to Bjorkman (2011), commenting on the concepts and terms, signaling discourse structure, signposting (telling students what they are to expect in the coming parts of the lecture) and backchannelling (acknowledgment of what the students have said) are the common rhetorical strategies addressed by the EMI lecturers to cope with EMI-related challenges. They also repair the students' faulty utterances and repeat the significant points in the lesson to improve comprehension and increase intelligibility.

EMI lecturers also make use of non-linguistic strategies to cope with EMI-related challenges. For example, Firth (1996) propounded that EMI lecturers opt to avoid troublesome circumstances by dismissing ambiguous phrases or words, provided that no misunderstandings will occur. Another non-linguistic strategy used by the EMI lecturers is called "making it normal" in the same research. This approach refers to the attempt made by EMI lecturers to accept students' nonstandard English use as usual. This approach suggests focusing on teaching content rather than students' incoherent English use. As stated by Han (2019), other non-linguistic coping strategies include choosing safe topics, using long pauses and supportive laughter. These strategies help create a more relaxed classroom atmosphere and reduce communication pressure, thereby facilitating student participation and comprehension in EMI settings.

Adaptation strategies are among the strategies utilized by EMI lecturers while teaching academic knowledge in English. These strategies include slowing down the rate of delivery of language, easing sentence structures and content by decreasing the intensity of new information, using supplementary

backup by providing slides and adjusting teaching methods by emphasizing student participation and discussion (Flowerdew, Miller, & Li, 2000; Wilkinson, 2005). These adaptation strategies enable lecturers to make academic content more accessible and to better align instruction with students' linguistic and cognitive needs in EMI classrooms.

Alongside the mentioned strategy types, EMI lecturers also employ classroom discourse strategies as a way of averting unanticipated EMI challenges. As stated by Probyn (2001), EMI teachers adopt discourse strategies such as using body language, waiting longer for students' answers, using appropriate English while responding to students' questions and using gestures and mimics to improve the comprehension of the students.

CONCLUSION

In conclusion, this study shows that EMI lecturers face a wide range of challenges related to language proficiency, classroom interaction, workload, assessment practices, and institutional support. At the same time, the literature demonstrates that lecturers actively develop and use various coping strategies, such as translanguaging, code-switching, rhetorical, non-linguistic, adaptation, and classroom discourse strategies, to manage these challenges and support student learning. These strategies help make academic content more accessible and create a more supportive learning environment in EMI contexts. Overall, the findings suggest that while EMI poses significant demands on lecturers, appropriate pedagogical strategies and stronger institutional support can significantly enhance the effectiveness and sustainability of EMI practices in higher education.

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QUALITATIVE RESEARCH ON PROBLEM BEHAVIORS IN SPECIAL EDUCATION IN TÜRKIYE: A SYSTEMATIC ANALYSIS

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Abstract- This study aims to systematically review qualitative research conducted in Türkiye that focuses on problem behaviors among individuals with special needs. The data set comprises twenty-one qualitative studies published between 2012 and 2025, including nine journal articles, ten master's theses, and two doctoral dissertations. Data were collected using the Research Review Form on Problem Behaviors in Individuals with Special Needs, developed by the researcher. The data were analyzed through categorical analysis, a technique within content analysis approaches. The findings indicate that studies on problem behaviors among individuals with special needs have predominantly focused on the perspectives of teachers and parents. Most of the studies employed a qualitative phenomenological design, with interviews and observation forms being the most frequently used data collection tools. The research was largely conducted at the preschool and primary school levels, and among the types of problem behaviors examined, externalizing/aggressive behaviors and behaviors that disrupt classroom adjustment were particularly prominent. The majority of the studies aimed to examine the types, frequency, and functions of problem behaviors in individuals with special needs, as well as to identify teachers' and parents' perceptions and conceptualizations of these behaviors. In contrast, topics such as classroom and behavior management skills, intervention and prevention strategies, family–school–professional collaboration, and the social and developmental impacts on students were addressed in a more limited number of studies. Based on the findings, it is recommended that the education and awareness levels of teachers and parents be enhanced, intervention strategies be more widely disseminated, and collaboration among stakeholders be strengthened to ensure the effective management of problem behaviors in individuals with special needs.

Keywords: individuals with special needs; problem behavior; qualitative research; teacher and parent perspectives; content analysis

1.Introduction

In contemporary educational systems, taking individual differences into account has become a fundamental principle in educational planning and implementation. An educational approach that places individual differences at its core necessitates the design of learning environments that are responsive to learners' educational, social, and personal needs. Within this framework, special education is defined as a field of education that is specifically planned for individuals who differ from their peers in terms of developmental characteristics and learning needs, aims to enable students with special needs to utilize their potential to the fullest extent, and seeks to prevent disabilities from becoming permanent barriers in individuals' lives (Aktan, 2023). At the same time, special education also aims to support gifted individuals in accordance with their distinctive characteristics and to facilitate the development of capacities through which they can make meaningful contributions to society.

Accurately identifying the educational needs of students with special needs and providing appropriate educational environments and support services play a critical role in promoting their independent, productive, and active participation in social life (Kırcaali-İftar, 1998; Şahbaz & Kalay, 2010). In this context, special education practices adopt a holistic perspective that addresses not only individuals' academic performance but also their social, emotional, and behavioral development.

Problem behaviors frequently observed among individuals with special needs are defined as behavioral patterns that have the potential to cause harm to the individual or to others and that adversely affect learning processes and social interactions (Cooper et al., 2007; Landrum et al., 2003). In this population, problem behaviors are commonly classified into categories such as aggression, self-injurious behavior, stereotypic behaviors, escape–avoidance responses, and noncompliance with rules (Walker et al., 2004). The persistence of such behaviors restricts individuals' participation in educational settings and diminishes the overall effectiveness of instruction (Gresham et al., 1999). Moreover, problem behaviors hinder the development of peer relationships, reduce levels of social acceptance, and negatively affect students' adjustment to the school environment (Walker et al., 2004; Lane et al., 2007).

The emergence and maintenance of problem behaviors are shaped by a range of interrelated factors (Landrum, 2017). Individual developmental characteristics, communication skills, teacher behaviors, classroom management practices, environmental arrangements, and the instructional methods employed during teaching processes are among the key determinants influencing the occurrence of problem behaviors (Dunlap & Fox, 2011; Kokkinos & Kargiotidis, 2016; Myers & Pianta, 2008; Oliver et al., 2011; Shimomura et al., 2020). For this reason, it is widely emphasized in the field of special education that interventions targeting problem behaviors should be planned on the basis of the function of the behavior. Functional behavior assessment provides a systematic process for identifying the functions served by problem behaviors and constitutes the foundation of effective intervention programs (Cooper et al., 2020; Gresham et al., 2001; Melanson & Fahmie, 2023).

A review of the literature indicates that positive behavior support approaches (Beqiraj et al., 2022; Bradshaw et al., 2012; Gore et al., 2013; Morris & Horner, 2016) and interventions grounded in applied behavior analysis have been found to be effective in reducing problem behaviors and enhancing social adjustment (Carr et al., 2002; Fisher et al., 2021; Makrygianni et al., 2018). Rather than focusing solely on direct remediation of problem behaviors, the positive behavior support framework offers a preventive approach that emphasizes the modification of environmental, instructional, and interactional factors that give rise to such behaviors. This approach seeks to systematically promote functional behaviors in learning and social contexts by building on

individuals' strengths, thereby enabling more adaptive, meaningful, and sustainable interactions with their environments (Horner et al., 2005; Sugai & Horner, 2002; Sugai & Horner, 2014). In instructional settings, the establishment of clear expectations, the provision of consistent feedback, and the reinforcement of positive behaviors contribute to reductions in both the frequency and severity of problem behaviors (Collier-Meek et al., 2017; Luiselli et al., 2005). In Türkiye, it can be observed that intervention approaches targeting problem behaviors among individuals with special needs have increasingly become a focus of scholarly inquiry.

Research conducted in Türkiye on problem behaviors within the field of special education has addressed this issue across diverse disability groups, age ranges, and educational settings. Within this context, several studies have examined the effectiveness of specific intervention programs in preventing problem behaviors and promoting positive behaviors (Alpdoğan & Sazak, 2021; Gulboy et al., 2025; Hocaoğlu et al., 2024; Melekoğlu et al., 2017). In recent years, alongside ongoing effectiveness studies, a substantial number of qualitative investigations have been carried out that describe the underlying causes of problem behaviors and propose potential solutions (Ceylan & Yıkmış, 2017; Karakoç & Atbaşı, 2020; Kıyak & Diken, 2018; Yumuş & Metin, 2015). These studies have been conducted with diverse participant groups and have focused on developing a comprehensive understanding of the factors contributing to the emergence of problem behaviors, as well as on formulating multifaceted solution strategies applicable within educational settings.

In recent years, although qualitative research on problem behaviors has increased, comprehensive evaluations regarding their methodological characteristics, sample structures, measurement tools, and the types of problem behaviors addressed remain limited. This gap highlights the need for a systematic analysis to consolidate knowledge in the field. In this context, systematically analyzing research on problem behaviors in special education in Türkiye is expected to make a significant contribution to the literature by identifying prevailing trends, as well as revealing strengths and limitations of existing studies. Findings derived from such a systematic analysis are anticipated to guide future research and support the development of both existing and novel intervention programs for practical application. The purpose of the present study is therefore to systematically examine research on problem behaviors in special education in Türkiye based on predetermined criteria.

2.Method

2.1.Research design

In this study, the descriptive content analysis method, one of the techniques within content analysis, was employed (Neuendorf, 2017). Descriptive content analysis involves systematically examining data according to prede-

termined categories and themes, with the aim of providing a comprehensive description of the current state and identifying research trends (Cohen et al., 2018; Krippendorff, 2018). Accordingly, articles and graduate theses on problem behaviors in the field of special education in Türkiye were analyzed within a systematic framework, allowing for a thorough evaluation of research trends, methodological approaches, sample characteristics, and the types of problem behaviors addressed. This approach aims to facilitate a deep understanding of the existing knowledge base in the field and to establish a systematic foundation to guide future research (Denyer & Tranfield, 2006).

2.2. Data Sources and Inclusion Criteria

The data sources for this study comprised master's and doctoral theses accessible through the YÖK National Thesis Center, as well as articles indexed in TÜBİTAK ULAKBİM DergiPark, Google Scholar, and EBSCOhost databases. A systematic search was conducted to identify Turkish- and English-language publications focusing on problem behaviors among individuals with special needs in Türkiye. For Turkish-language studies, the keywords "problem davranış", "özel gereksinimli birey", "özel gereksinimli bireylerde problem davranış", and "nitel araştırma" were used; for English-language studies, the keywords "problem behavior", "individuals with special needs", "problem behavior in individuals with special needs", and "qualitative research" were applied. This search yielded a total of 67 studies.

The criterion-based sampling method was employed to determine which publications would be included in the study (Creswell & Poth, 2016; Palinkas et al., 2015). Inclusion criteria were: the study employed a qualitative design, was conducted by Turkish researchers, had samples based in Türkiye, was published between 2012 and December 2025, included the predetermined keywords, was published in peer-reviewed national or international journals, and was openly accessible. Studies lacking open access and cases in which both a thesis and a corresponding journal article existed were represented only by the article. Exclusion criteria encompassed studies conducted using quantitative methods, full-text conference proceedings, book chapters, and publications for which the full text was not accessible. Following this selection process, the final data set consisted of a total of 21 studies: 9 journal articles, 10 master's theses, and 2 doctoral dissertations.

2.3. Data Collection and Coding Process

For data collection, the Review Form for Research on Problem Behaviors in Individuals with Special Needs, developed by the researcher, was employed. The form was structured in accordance with the study's sub-objectives and designed to systematically capture the key characteristics of the examined studies. It included sections for: the type of study, year of publication, keywords used, research objectives, educational level in which the study was

conducted, scope of problem behaviors addressed, research method and design, characteristics of the sample group, data collection instruments, analysis techniques, and the findings obtained. During the review process, each study was carefully coded according to these predefined subcategories, and the extracted information was recorded in the form. For the analysis, studies were assigned codes such as Research 1 (R1), R2, …, R23, and these codes were consistently used in the presentation and interpretation of findings, providing a coherent and systematic framework for comparison across studies.

2.4.Data Analysis

The research data were analyzed using the categorical analysis technique, a method within content analysis approaches. Categorical analysis involves dividing the examined events, phenomena, or texts into meaningful subunits, systematically analyzing these units according to predetermined categories, and grouping data with similar characteristics (Mayring, 2014). The categories were developed based on the thematic headings aligned with the study's sub-objectives. Each study included in the review was coded under these structured headings using Microsoft Excel. At the end of the coding process, a raw data table representing the study's dataset was obtained, and findings for each theme were presented through descriptive statistics and tables.

To ensure the validity of the study, all publications meeting the inclusion criteria were accessed whenever possible. The data collection and analysis processes were described in detail. To facilitate systematic and consistent evaluation of the reviewed studies, the researcher-developed review form was used, and data for each study were recorded according to predefined categories. To enhance reliability, a criterion-based sampling method consistent with qualitative research traditions was applied, and studies were coded according to the established categories. The coding process adhered closely to the raw data, and to assess coding consistency, the same dataset was re-coded after a three-week interval. The agreement rate between codings was calculated as 99%, a value well above the acceptable threshold for qualitative research (Creswell & Poth, 2018; Saldaña, 2016).

3.Findings

The findings of the study are presented under headings structured according to the research objectives. Within this framework, the results were systematically organized by considering the demographic characteristics of the reviewed studies, their methodological features, sample structures, the types of problem behaviors addressed, and research trends.

3.1. Distribution of studies by publication year and type

Table 1 presents the distribution of research on problem behaviors in individuals with special needs according to publication year and type. In this table, studies are classified based on their year of publication and type of publication (article, master's thesis, doctoral dissertation).

Table 1. *Distribution of studies by publication year and type*

Year	Master's thesis (f)	Doctoral dissertation (f)	Article (f)	Total (f)
2012	1	-	-	1
2014	-	-	1	1
2015	-	-	1	1
2017	-	-	1	1
2018	1	-	-	1
2019	1	-	-	1
2020	-	-	1	1
2021	1	1	-	2
2022	-	-	1	1
2023	2	-	1	3
2024	3	-	3	6
2025	1	1	1	3
Total	10	2	9	21

As shown in Table 1, the majority of studies on problem behaviors in individuals with special needs were conducted in the form of master's theses (10 studies), followed by journal articles (9 studies) and doctoral dissertations (2 studies). Examining the distribution by year, there is a noticeable increase in the number of studies in 2023 and 2024, with six studies published in 2024 alone. This trend indicates a growing academic interest in the field in recent years and suggests that research outputs have diversified through both graduate theses and journal articles.

3.2. Research objectives

Table 2 presents the objectives of studies focusing on problem behaviors in individuals with special needs. This table systematically summarizes the purposes for which the reviewed studies were conducted.

Table 2. *Research objectives in studies on problem behaviors in individuals with special needs*

Research objective	Related studies	Frequency (f)
Determining teachers' and parents' perceptions, views, and definitions of problem behaviors	R3, R6, R10, R15, R18, R19, R20, R21	9
Examining the types, frequency, contexts, and causes/functions of problem behaviors	R2, R5, R8, R11, R12, R18, R19, R20	9
Evaluating the effectiveness of intervention and prevention strategies for problem behaviors	R1, R9, R16	3
Identifying teachers' classroom and behavior management skills and needs	R3, R4, R11, R15, R16, R21	6
Investigating the importance and status of family–school–expert collaboration in interventions	R7, R17	2
Determining the effects of problem behaviors on students' developmental domains and peer relationships	R9, R14, R18	4
Identifying intervention methods for problem behaviors	R13	1

As shown in Table 2, the majority of studies focused on determining teachers' and parents' perceptions and definitions of problem behaviors, as well as examining the types, frequency, and functions of these behaviors. This is followed by research aimed at identifying teachers' classroom management and problem behavior management skills. Fewer studies have addressed more specific areas, such as evaluating the effectiveness of intervention and prevention strategies or examining collaboration among stakeholders. Additionally, the impact of problem behaviors on students' developmental domains and literature reviews on problem behaviors have been addressed in a limited number of studies.

3.3.Keywords used in the studies

Table 3 presents the keywords employed in research on problem behaviors among individuals with special needs.

Table 3. *Keywords in studies on problem behaviors in individuals with special needs*

Keywords	Related studies	Frequency (f)
Problem behavior / behavioral problems	R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R14, R15, R16, R17, R18, R19, R20, R21	21
Inclusion / Inclusive education	R3, R9, R16, R20, R21	7
Autism / autism spectrum disorder	R2, R5, R8, R14, R18, R19	6
Special education	R6, R7, R10, R11, R16, R19	6
Preschool / early childhood	R1, R6, R10, R14	5
Preventive strategies / prevention	R1, R4, R12, R15, R16	5
Special needs students	R12, R17, R21	4
Teacher / primary school teacher	R3, R15, R17, R21	4
Parental views / mother / family	R2, R8, R14, R18	4
Intervention methods / strategies	R4, R13, R15	3
Social skills	R9	2
Collaboration / cooperation	R7, R17	2
Classroom management	R3, R6	2

As observed in Table 3, the most frequently used keyword in studies on problem behaviors among individuals with special needs is "problem behavior / behavioral problems." This is followed by "Inclusion / Inclusive Education," "Autism / Autism Spectrum Disorder," and "Special Education." Other keywords, such as "Preschool / Early Childhood," "Preventive Strategies / Prevention," "Teacher / Primary School Teacher," and "Parental Views / Family," appear in a more limited number of studies. This distribution indicates that research in the field primarily focuses on defining problem behaviors and addressing students with special needs within the general education context, while topics such as interventions, social skills development, and stakeholder collaboration are explored less frequently.

3.4. Research topics

Table 4 presents the topics examined in studies investigating problem behaviors in individuals with special needs.

Table 4. *Research topics in studies on problem behaviors in individuals with special needs*

Core topic areas	Details addressed	References
Teachers' perceptions and competencies	Classroom management challenges, behavior management in IEP processes, gaps in special education knowledge, need for collaboration, intervention strategies	R3, R4, R6, R7, R10, R11, R15, R17, R20, R21
Parents' experiences and influences	Daily routines, impact on children's developmental domains, home-based preventive strategies, effects of problem behaviors on parents	R1, R2, R5, R8, R12, R14, R18
Intervention programs	Program implementation, preventive classroom management, functional communication training	R1, R9, R16
Social processes and peer relationships	Peer bullying, social acceptance, deficits in social skills, enhancing peer interactions	R2, R9, R13, R20

Table 4 indicates that research on problem behaviors among individuals with special needs is concentrated in four main thematic areas. The largest number of studies focuses on teachers' perceptions and competencies, highlighting issues such as classroom management challenges, behavior management within IEP processes, gaps in special education knowledge, the need for collaboration, and intervention strategies. In the domain of parents' experiences and influences, research has examined children's daily routines, impacts on developmental domains, home-based preventive strategies, and the effects of problem behaviors on parents. Under intervention programs, studies primarily addressed preventive classroom management and functional communication training, while research on social processes and peer relationships focused on peer bullying, social acceptance, and deficits in social skills, with few studies exploring strategies to enhance peer interactions. Overall, the literature demonstrates a predominant focus on teacher and parent perspectives, with comparatively fewer studies addressing intervention programs and social processes.

3.5. Education levels examined in the studies

Table 5 presents the education levels and participant groups involved in research on problem behaviors among individuals with special needs.

Table 5. *Education levels and participant groups in research on problem behaviors among individuals with special needs*

Education Level	Participant group / Environment	References
Preschool/ Early childhood	Kindergartens, preschool classes, early childhood special education services	R1, R2, R6, R10, R14
Primary school	Inclusive classrooms, special education classrooms for grades 1–4	R3, R4, R15, R16, R17, R21
Middle school	Inclusive settings and special education sub-classes	R5, R9, R18
High school	High school students in inclusive education	R20
Adulthood/ Wide age range	Individuals aged 18+, home-based studies for ages 6–24	R8, R12

As shown in Table 5, the majority of research on problem behaviors among individuals with special needs has focused on preschool and primary school levels. At the preschool level, studies were primarily conducted in kindergartens, preschool classes, and early childhood special education services, whereas at the primary school level, inclusive classrooms and special education classes were the main settings. Research in middle and high school settings was more limited, and studies addressing adulthood or broader age ranges were mainly restricted to home environments or individuals aged 18 and above. These patterns highlight ongoing gaps in research across higher education levels and adult populations in this field.

3.6. Qualitative designs used in research

The findings regarding the distribution of research on problem behaviors in individuals with special needs according to qualitative research designs are presented in Table 6.

Table 6. *Distribution of research according to qualitative designs.*

Research Method	Design / Sub-Design	References
Qualitative	Phenomenology	R2, R8, R12, R14, R18, R19
	Case study	R3, R5, R11, R17, R20
	Qualitative descriptive survey	R1, R4, R6, R7, R10
	Action research	R9
Mixed methods	Case study	R16
Review	Systematic review	R13

As observed in Table 6, phenomenology and case study designs dominate research on problem behaviors in individuals with special needs, reflecting researchers' preference for approaches that allow in-depth exploration

of participants' experiences and detailed examination of specific contexts. In contrast, qualitative descriptive surveys and action research designs were employed less frequently, indicating these methods are less commonly used in this area of study.

3.7. Participants/Sample groups of the studies

The findings regarding the distribution of participants/sample groups in research on problem behaviors among individuals with special needs are presented in Table 7.

Table 7. *Distribution of participants/sample groups in studies on problem behaviors among individuals with special needs*

Participant Group	Sample Characteristics	Studies	Frequency (f)
Teachers	Classroom, special education, preschool, and subject teachers	R1, R3, R4, R6, R7, R10, R11, R15, R16, R17, R19, R20, R21	13
Parents	Primary caregivers including mothers, fathers, and grandparents	R1, R2, R5, R8, R12, R14, R18	7
Students	Peers with autism, learning difficulties, intellectual disabilities, and typically developing peers	R5, R9, R12, R16, R20	5
Administrators Experts	School principals, guidance personnel	R1, R7, R9	3

As shown in Table 7, the majority of studies on problem behaviors in individuals with special needs primarily involve teachers. This finding reflects the central role of teachers in managing problem behaviors and developing intervention strategies within educational settings. Parents are the second most frequently included participant group, while students and administrators/experts appear in a more limited number of studies.

3.8. Data collection ınstruments used in the studies

Table 8 presents the data collection instruments employed in research on problem behaviors among individuals with special needs.

Table 8. *Data collection instruments in studies on problem behaviors among individuals with special needs*

Data collection instrument	Detailed tools	Studies	Frequency (f)
Interview forms	Semi-structured, in-depth, focus group interviews	R1, R2, R3, R4, R6, R7, R8, R9, R10, R11, R12, R14, R15, R17, R18, R19, R20, R21	17
Observation forms	ABC recording, anecdotal records, unstructured observation	R5, R9, R11, R16, R19, R20	6

Other	Researcher/teacher journals, official documents, video recordings	R1, R6, R9, R14, R16, R20	6

As shown in Table 8, interview forms are the most commonly used data collection instruments in studies on problem behaviors among individuals with special needs. The majority of studies employed semi-structured, in-depth, and focus group interviews, highlighting the importance of direct access to participants' experiences and perceptions. Observation forms and other data collection tools were used less frequently, primarily to provide supportive evidence through direct behavior observation and document analysis. Overall, the diversity of qualitative data collection techniques contributes to a multidimensional understanding of problem behaviors.

3.9. Data analysis methods used in the studies

Table 9 presents the data analysis methods employed in research on problem behaviors among individuals with special needs.

Table 9. *Data analysis methods in studies on problem behaviors among individuals with special needs*

Data analysis method	Analysis techniques / Software	Studies	Frequency (f)
Content analysis	Inductive coding, thematic categorization, analysis software program	R3, R4, R5, R6, R8, R10, R11, R12, R14, R16, R17, R18, R19	13
Descriptive analysis	Frequency/percentage calculations, direct quotations	R1, R2, R7, R12, R19, R20	6
Thematic analysis	Pattern coding, broad thematic clusters	R15, R21	2

As shown in Table 9, content analysis is the most frequently employed data analysis method in studies investigating problem behaviors among individuals with special needs. Most of these studies utilized inductive coding and thematic categorization techniques. Additionally, software programs were employed to facilitate the systematic analysis of the data. Descriptive analysis was applied in a more limited number of studies, primarily through frequency and percentage distributions along with direct quotations. Thematic analysis, in contrast, was used in only a few studies, with the purpose of pattern coding and constructing broader thematic clusters.

Problem behaviors highlighted in the studies

The types of problem behaviors addressed in research on individuals with special needs are presented in Table 10.

Table 10. *Problem behaviors highlighted in research on ındividuals with special educational needs*

Problem Behavior Category	Specific Behavior Types	Studies	Frequency (f)
Externalizing / Aggressive	Hitting, biting, pushing, spitting, scratching, damaging objects, violent tendencies, temper tantrums, screaming	R1, R2, R3, R4, R5, R7, R8, R10, R11, R12, R14, R17, R18, R19, R21	15
Disruptive classroom / Noncompliant	Wandering without permission, not staying seated, leaving the classroom, shouting, speaking without raising hand, off-task talking, making noise	R1, R3, R4, R5, R6, R9, R11, R16, R17, R20, R21	11
Academic / Task-oriented	Refusal to participate in class, not completing homework, academic disinterest, inattention, playing with materials inappropriately, sleeping	R4, R6, R11, R13, R16, R19, R20	7
Stereotypic / Sensory	Hand-flapping, rocking, vocal stereotypy, echolalia, pica, masturbation, object fixations	R2, R5, R7, R8, R11, R14, R18, R19, R20	9

As shown in Table 10, problem behaviors among individuals with special needs are most frequently concentrated in the externalizing/aggressive category. Behaviors such as hitting, biting, pushing, damaging objects, and temper tantrums are particularly prominent. This is followed by disruptive classroom and noncompliant behaviors, which commonly include wandering without permission, not staying seated, and off-task talking. Academic and task-oriented behaviors, such as refusal to participate in class or complete homework, are addressed in a more limited number of studies. Stereotypic and sensory behaviors, including hand-flapping, rocking, echolalia, and pica, were examined with relatively high frequency.

4.Discussion and Conclusion

The findings of this study indicate a notable increase in research on problem behaviors among individuals with special needs in Turkey in recent years. Studies published particularly in 2023 and 2024 clearly reflect the growing academic interest in this field. When examining the types of research, the majority are master's theses and journal articles, whereas doctoral-level studies remain limited. This suggests a lack of advanced research that could provide deeper theoretical and methodological contributions to the field. Most studies primarily aim to describe teachers' and parents' perceptions, with a focus on the types and functions of problem behaviors, indicating that desc-

riptive research predominates in the literature. Keyword analysis supports this trend: descriptive terms such as "problem behavior," "inclusive education," "autism," and "special education" are most frequently represented, whereas concepts related to intervention, prevention, collaboration, and social skill development are less prominent. These findings imply that multifaceted and preventive approaches to addressing problem behaviors among individuals with special needs have yet to gain sufficient visibility in the literature.

Regarding thematic focus, the majority of studies center on teachers' perspectives and competencies as well as parents' experiences. Research on teachers often emphasizes classroom management challenges, problem behaviors during Individualized Education Program (IEP) processes, and gaps in special education knowledge. Parent-focused studies highlight the impact of problem behaviors on family life and strategies for coping at home. In contrast, studies that focus on intervention programs and peer relationships are limited, indicating a significant gap in addressing problem behaviors within their social context.

The findings regarding educational levels indicate that the majority of studies have been conducted at the preschool and primary school levels. This focus on early childhood underscores the critical importance of preventing and addressing problem behaviors at an early stage. However, the limited number of studies targeting middle school, high school, and adulthood highlights the need for longitudinal and later-stage research that examines the developmental continuity of problem behaviors. The predominance of research at preschool and primary levels also supports the significance of early intervention in preventing the chronicity of problem behaviors (Dishion et al., 2014). Conversely, the scarcity of studies at middle and high school levels may suggest either a decline in problem behaviors as children age or insufficient investigation of behavioral issues at these educational stages. In terms of participant distribution, teachers are predominantly represented, confirming their central role in developing behavior management and intervention strategies within educational settings (Dunlap & Carr, 2007; Feuerborn & Chinn, 2012). In contrast, the relatively limited participation of parents, students, and administrators indicates that a multi-stakeholder approach and family-school collaboration are insufficiently addressed in the literature. Multi-stakeholder involvement is, however, critical for enhancing the effectiveness of intervention strategies and supporting behavioral development (Minke & Anderson, 2005; Sugai & Simonsen, 2012).

Methodologically, most studies employ qualitative designs, with phenomenology and case study approaches being particularly prevalent. This suggests that researchers aim to understand problem behaviors through a contextual and experience-based lens. Notably, designs such as mixed-methods and action research, which could provide direct practical contributions, re-

main limited. When examining the distribution of problem behavior types, externalizing and aggressive behaviors are the most frequently highlighted categories. This finding indicates that behaviors directly affecting classroom order and safety are prioritized by researchers. Disruptive classroom behaviors and stereotypic/sensory behaviors also receive significant attention, while academic and task-oriented behaviors are relatively less studied. This suggests that behaviors indirectly affecting learning processes have been secondary in research focus, aligning with observed trends regarding teachers' classroom management challenges and the educational success of students with special needs. Furthermore, systematic classification and functional analysis of problem behaviors are critical for designing and implementing effective intervention strategies.

Based on the findings of this study, several recommendations can be proposed. First, it is essential to diversify research examining teachers' and parents' perceptions and experiences of problem behaviors. Additionally, studies should be expanded to cover different educational levels and types of special needs. The findings indicate that research has primarily focused on externalizing and disruptive classroom behaviors, whereas academic/task-oriented and socially interactive problem behaviors have received comparatively less attention. Therefore, it is recommended to increase qualitative studies that explore the causes and potential solutions for problem behaviors affecting students' academic and social development. Finally, linking qualitative findings to collaborative, multi-stakeholder intervention strategies could enhance the practical contributions of future research.

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A META-SYNTHESIS OF RESEARCH ON PROBLEM BEHAVIORS IN INDIVIDUALS WITH SPECIAL NEEDS IN TURKEY

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1.Introduction

Individuals with special needs are defined as those who differ significantly from their peers in terms of developmental characteristics, learning pace, cognitive capacities, or behavioral traits, and therefore require individualized support in educational processes (Hallahan et al., 2013). Special education is an area of education aimed at supporting the academic, social, and emotional development of these individuals, enhancing their independent living skills, and promoting societal participation (Hornby, 2014). However, this process is often impeded by problem behaviors exhibited by the individuals, which negatively affect instructional processes, learning environments, and social interactions.

Problem behaviors encompass patterns of behavior that have the potential to cause harm to oneself or others, disrupt learning processes, and negatively impact social interactions (Emerson, 2001). In individuals with special needs, problem behaviors may manifest in various forms, including aggression, classroom disruption, task avoidance, and stereotypic or sensory behaviors, directly affecting both social functioning and educational engagement (Matson & Rivet, 2008; Newcomb & Hagopian, 2018). These behaviors are influenced not only by individual characteristics but also by a range of factors such as environmental arrangements, instructional methods, family attitudes, and school climate (Carr et al., 2002; Kurtz et al., 2020; Medeiros et al., 2014; O'Brennan et al., 2014; Zhang & Wang, 2020). In this context, problem behaviors must be examined through a multidimensional perspective to understand under which conditions, how, and why they emerge.

The role of contextual factors in the emergence and maintenance of problem behaviors necessitates a multidimensional approach to intervention in special education (Emerson & Einfeld, 2011). In particular, functional behavior assessment, positive behavioral supports, and preventive classroom management strategies have emerged as effective methods for reducing problem behaviors (Crone et al., 2015; Dunlap et al., 2010; Sugai & Horner, 2002). These approaches conceptualize problem behaviors as indicators of an individual's communicative or environmental needs and structure interventions accordingly (Beqiraj et al., 2022). A common feature of these strategies is their functional perspective, which considers problem behaviors within the framework of person–environment interaction. Consequently, the development of preventive strategies and the implementation of sustainable, proactive, and instructionally integrated interventions in educational settings are emphasized.

Research on problem behaviors in the field of special education in Turkey has shown a notable increase in recent years (Kaya et al., 2021). In addition to experimental intervention studies (Gulboy et al., 2025; Hocaoğlu et al., 2024;

Melekoglu et al., 2017), there has been a significant rise in qualitative studies examining teachers' and parents' perceptions of problem behaviors (Ceylan & Yıkmış, 2017; Karakoç & Atbaşı, 2020; Yumuş & Metin, 2015). These developments suggest that research on problem behaviors among individuals with special needs in Turkey has begun to diversify both quantitatively and qualitatively, reflecting a deepening academic interest in the field. Within the national literature, findings related to the types, causes, and management of problem behaviors are addressed across various contexts and methodological designs, including different sample groups and educational levels. Notably, studies that synthesize qualitative research on this topic within a comprehensive framework remain limited. This highlights existing gaps in the field and identifies priority areas for future research for both scholars and practitioners.

Systematically examining qualitative studies on problem behaviors in individuals with special needs can provide valuable insights for both researchers and practitioners. Identifying commonalities among teachers' classroom experiences, parents' challenges in daily life, and students' behavioral needs can inform the design of more functional intervention strategies. Furthermore, understanding which types of problem behaviors are most frequently studied, which educational levels are relatively underrepresented, and which methodological approaches are predominantly employed can guide future research directions. Additionally, the findings of meta-synthesis studies are expected to deepen both theoretical and practical knowledge regarding the understanding and management of problem behaviors in special education, while also highlighting gaps in the literature to inform subsequent studies. Within this context, the aim of the present study is to systematically review qualitative research on problem behaviors in individuals with special needs in Turkey using a meta-synthesis approach, thereby providing a comprehensive overview of research trends and existing findings in the field.

2. Method

2.1. Research Design

This study is a meta-synthesis aimed at systematically examining and interpreting qualitative research focusing on problem behaviors in individuals with special needs in Turkey. Meta-synthesis is a comprehensive research approach that allows for the re-evaluation of findings from multiple qualitative studies to identify overarching themes (Sandelowski et al., 2007; Walsh & Downe, 2005). Within the scope of this study, qualitative research findings examining problem behaviors in the context of special education in Turkey were analyzed, and the core themes, shared findings, and trends in the field were interpreted using the meta-synthesis approach.

2.2. Data Sources and Inclusion Criteria

The data sources for this meta-synthesis comprised articles indexed in national and international databases that focused on research addressing problem behaviors in individuals with special needs in Turkey. Criterion sampling, a purposive sampling strategy, was employed to systematically select studies with specific characteristics (Etikan et al., 2016). Inclusion criteria for the studies were: (a) publication between 2012 and 2025, (b) focus on problem behaviors in individuals with special needs, and (c) use of a qualitative research design. Studies for which full texts were inaccessible, those with only abstracts available, and book chapters were excluded from the analysis. Following a comprehensive screening process based on these criteria, a total of 21 qualitative studies were included in the meta-synthesis. Table 1 presents information on the studies included in the meta-synthesis.

Table 1. *Studies Included in the Meta-Synthesis*

Study Code	Year	Qualitative Design	Participant Group	Sampling Method	Data Collection Tool	Data Analysis Method
R1	2012	Descriptive Design	11 teachers, 11 parents, 6 guidance counselors	Purposive Sampling (6 preschools in Eskişehir)	Semi-structured interviews, diaries, field notes	Descriptive analysis
R2	2014	Phenomenology	50 parents	Criterion Sampling	Semi-structured interview form	Descriptive analysis
R3	2015	Case Study	6 classroom teachers	Purposive Sampling (Ankara)	Semi-structured in-depth interviews	Inductive analysis
R4	2017	Not specified	25 classroom teachers	Snowball Sampling	Semi-structured interview form	Content analysis (NVivo 10)
R5	2018	Holistic Single Case Design	8 students, 8 parents, 3 teachers	Not specified (1 school in İzmir/ Konak)	Semi-structured interviews, observation	Content analysis
R6	2019	Not specified	12 preschool teachers	Criterion Sampling	Interviews, diaries, demographic form	Inductive analysis
R7	2020	Not specified	15 special education teachers	Voluntary participation (Sivas)	Semi-structured interview form	Descriptive analysis
R8	2021	Phenomenology	20 mothers	Criterion Sampling	Semi-structured open-ended interviews	Content analysis

R9	2021	Action Research	Students, teachers, staff, parents	Criterion Sampling	Field notes, observation, interviews, diaries, scales	Inductive and quantitative analysis
R10	2022	Not specified	30 preschool teachers	Criterion Sampling	Semi-structured interview form	Inductive content analysis
R11	2023	Case Study	30 special education teachers	Similarity Sampling	Interviews, observation, demographic form	Content analysis
R12	2023	Phenomenology	20 parents	Purposive Sampling	Interview form and case examples	Descriptive and content analysis
R13	2023	Review Method	Literature (articles and books)	Literature review	Literature review	Systematic review/ synthesis
R14	2024	Phenomenology	12 mothers	Criterion Sampling	Interviews, researcher diary	Content analysis
R15	2024	Not specified	28 primary school teachers	Voluntary participation (Purposive)	Survey questions, focus group	Thematic analysis
R16	2024	Not specified	5 teachers, 4 students	Purposive Sampling	Observation form, rating scales, interviews	Content and quantitative analysis
R17	2024	Case Study	20 primary school teachers	Criterion Sampling	Semi-structured interviews	Content analysis
R18	2024	Phenomenology	21 parents	Criterion Sampling	Semi-structured interview form	Deductive analysis
R19	2025	Phenomenology	8 special education teachers	Voluntary	Interviews, demographic form	Content analysis
R20	2025	Embedded Single Case Design	12 teachers 12 students	Criterion Sampling	Interviews, observation, document analysis	Inductive method
R21	2025	Interpretative Qualitative Research	28 primary school teachers	Voluntary participation (Criteria)	Focus group interviews	Thematic analysis

2.3. Data Analysis

In this study, thematic analysis was employed to systematically examine the findings of the studies included in the meta-synthesis. Thematic analysis is a flexible approach that enables researchers to identify patterns within qua-

litative data, organize these patterns into meaningful categories, and interpret the phenomenon under investigation in depth (Braun & Clarke, 2006). Particularly in meta-synthesis studies, which aim to integrate the results of multiple qualitative studies to identify common themes, the use of thematic analysis preserves data integrity and enhances the reliability of interpretations (Joffe, 2011). During the analysis process, the findings of each study were carefully reviewed. Similar content was grouped to generate initial codes, from which subthemes were developed. Expert opinions from the field were also consulted during the development of subthemes. Finally, the resulting themes were interpreted in line with the research objectives, and the findings were reported and supported with direct quotations from the original studies.

2.Findings

In this study, qualitative research focusing on problem behaviors in individuals with special needs in Turkey was examined using the meta-synthesis method. The findings were organized under six main themes: the types and classification of problem behaviors, the causes and functions of problem behaviors, issues arising from teacher and parent attitudes and competencies, intervention strategies and their effectiveness, the academic and psychosocial impacts of interventions, inclusion- and collaboration-related challenges, and family-centered practices. The findings related to each theme are presented sequentially below.

3.1.Types and effects of problem behaviors

Table 2 presents the subthemes, codes, and study sources related to the theme of types and effects of problem behaviors.

Table 2. *Findings on the types and effects of problem behaviors*

Theme	Sub-Theme	Codes	Studies
Types and effects of problem behaviors effects of problem behaviors	Observed types of problem behaviors	Physical aggression / harm (hitting, pushing, spitting, self-injury [biting, head-banging], property destruction, rough behavior)	R7, R14, R19, R11, R17, R5, R2, R12
		Disruption of class/lesson (unauthorized roaming/ standing in class, talking to peers/interrupting, playing with irrelevant objects, tearing/throwing learning materials, not following instructions)	R5, R16, R4
		Internalizing / stereotypic behaviors (crying/anger outbursts, stereotypic movements [hand-flapping, rocking], vocal repetitions, obsessive/stubborn behaviors, unresponsiveness, self-stimulation)	R14, R8, R2, R5, R19, R12
	Negative effects	Adverse impact on learning, peer interaction, and classroom management	R1, R3, R9

The findings presented in Table 2 indicate that problem behaviors observed in students with special needs manifest in both internalizing forms (e.g., anxiety, stereotypic movements, self-injury) and externalizing forms

(e.g., physical aggression, disruption of classroom activities). Among these, the most frequently reported behaviors and those with the most pronounced impact in educational settings are physical aggression and behaviors that disrupt the learning process. These problem behaviors negatively affect students' learning experiences and peer interactions, while also complicating classroom management and thereby hindering the overall functioning of the educational environment. Selected direct quotes from studies on the theme of types and effects of problem behaviors are provided below:

"Problem behaviors negatively affect the student themselves, other students, and the teacher; as a result, classroom management becomes more challenging…" (R1).

"The most frequently encountered problem behaviors are students harming themselves, harming their peers, and constantly roaming around the classroom" (R7).

Causes and functions of problem behaviors

Table 3 presents the sub-themes, codes, and study sources related to the causes and functions of problem behaviors.

Table 3. *Findings related to the theme of causes and functions of problem behaviors*

Theme	Sub-Theme	Codes	Studies
Causes and functions of problem behaviors	Function of behavior	Attention-seeking (Behaviors aimed at attracting the attention of teachers/parents)	R2, R12, R10, R18
		Escape/Avoidance (Avoiding difficult tasks, boring activities, communication, or aversive situations)	R2, R5
	Factors contributing to behavior	Family-related factors (Inconsistent or inappropriate parenting, e.g., overindulgence; family problems/violence; lack of attention or affection)	R3, R4, R6, R11, R12
		Diagnosis-related factors (Student's disability/diagnosis, limited communication skills)	R4, R6, R10, R5
		Environmental/Educational factors (Boredom during lessons, unstructured time, lack of materials, inadequate physical environment, large class sizes)	R3, R4, R6, R11

The findings presented in Table 3 indicate that problem behaviors are not merely observable reactions but also have underlying causes and serve functional purposes. The studies reveal that these behaviors are primarily exhibited for attention-seeking and escape/avoidance functions. Students engage in such behaviors to gain the attention of teachers or parents, or to avoid challenging, monotonous, or socially demanding situations. When examining the

factors contributing to these behaviors, inconsistent parenting practices and a lack of affection or attention emerge as prominent family-related influences. Communication difficulties associated with the student's diagnosis represent a significant source of problem behaviors. Educational and physical environment inadequacies, boredom during lessons, and large class sizes are also identified as environmental risk factors. Some direct quotes from the studies regarding the causes and functions of problem behaviors are presented below:

"It is noteworthy that obtaining attention was the most frequently cited reason for exhibiting problem behaviors" (R2).

"The causes of problem behaviors observed in children include inability to express themselves, environmental factors, desire for attention, their diagnoses, and parental attitudes" (R10).

"Viewing problem behavior as a natural characteristic of the diagnosis" (R6).

"During interviews, teachers indicated that the inadequate physical structure and crowdedness of their classrooms influenced the problem behaviors observed" (R3).

Teacher and parent attitudes and competency-related issues

Table 4 presents the findings related to issues arising from teacher and parent attitudes and competencies, including sub-themes, codes, and study sources.

Table 4. *Findings on issues arising from teacher and parent attitudes and competencies*

Theme	Sub-theme	Codes	Studies
Issues arising from teacher and parent attitudes and competencies	Teacher competency issues	Limited knowledge and skills in classroom management	R3, R4, R15
		Insufficient or lack of pre-service/in-service training	R3, R15
	Teacher attitudes and biases	Negative views/attitudes toward inclusive education (preference for segregated settings)	R3, R6, R9
		Use of threats, yelling, punishment, and labeling language in response to problem behaviors	R9, R20
	Parent experiences and needs	Psychological distress/burnout due to problem behaviors	R1, R14, R18
		Social isolation of families caused by problem behaviors	R12, R18
		Lack of knowledge and need for expert support	R1, R12, R18

Analysis of Table 4 reveals that, regarding teacher competencies, limited classroom management skills and inadequate or absent pre-service and in-service training emerge as key factors hindering effective management of problem behaviors. In terms of teacher attitudes, the presence of negative perceptions toward inclusive practices, as well as inappropriate responses such as threats, yelling, punishment, or labeling language, is notable. From the perspective of parents, problem behaviors contribute to increased psychological distress and burnout, social isolation, and a need for expert guidance due to lack of sufficient knowledge. These findings underscore the importance of enhancing teachers' professional competencies and establishing sustainable support mechanisms for parents to effectively manage problem behaviors. Some direct quotes from the studies on this theme include:

"General education teachers working in inclusive classrooms reported 'limitations in knowledge and skills regarding inclusion' and experienced 'difficulties in classroom management in inclusive settings'" (R3).

"Teachers employed reactive strategies such as withholding recess or assigning extra written work" (R9).

"Parents of children with ASD experienced emotional impacts, intense anxiety, fear, sadness, and a sense of burnout due to observed problem behaviors" (R14).

"…participating in parent training programs that could support child-rearing and managing problem behaviors" (R1).

"They do not possess the knowledge and competencies necessary to intervene in problem behaviors of students with special needs" (R17).

Intervention strategies for problem behaviors and their effectiveness

Table 5 presents the findings related to intervention strategies for problem behaviors, including sub-themes, codes, and study sources.

Table 5. *Findings related to the theme of ıntervention strategies and effectiveness for problem behaviors*

Theme	Sub-theme	Codes	Studies
Intervention strategies for problem behaviors and their effectiveness	Commonly used reactive strategies	Verbal warning/advice	R11, R4
		Secondary punishment/deprivation	R11, R1, R16
		Ignoring/time-out and response cost	R11, R1, R10
	Preventive and systematic approaches	Use of reinforcement	R11, R4, R10
		Environmental arrangement and conditional agreements	R4, R11
	Systematicity and effectiveness assessment	Teachers do not employ record-keeping techniques or systematically evidence-based strategies	R4, R11, R15
		Applied methods are generally short-term or ineffective	R1, R4
		Systematic positive behavioral support and daily goal feedback programs are effective in reducing problem behaviors and enhancing social skills	R9, R16

The examination of Table 5 indicates that interventions for problem behaviors predominantly rely on reactive strategies. Verbal warnings, advice, punishment or deprivation, ignoring, time-out procedures, and response cost are widely implemented by teachers. However, these approaches are largely immediate and situation-specific responses, lacking a foundation in systematic planning and evaluation. Preventive and systematic methods, including reinforcement, environmental adjustments, and conditional agreements, are applied less frequently. Regarding systematicity and effectiveness, it has been reported that teachers rarely employ record-keeping or data-driven decision-making processes, and the methods implemented are generally short-lived or do not achieve the expected outcomes. Conversely, systematic positive behavioral support combined with daily goal feedback programs has been shown to effectively reduce problem behaviors and enhance social skills. Some direct quotations from the studies on intervention strategies and their effectiveness are as follows:

"Classroom teachers did not utilize any strategies applied systematically and based on scientific evidence…" (R4).

"Regarding the outcomes of the techniques applied by teachers in response to problem behaviors, some were reported as 'effective,' five as 'short-term effective,' and three as 'ineffective'" (R1).

"Seventeen teachers participating in the interviews stated that they did not use any record-keeping techniques during the evaluation process" (R4).

"Codes developed for intervention strategies used by special education teachers in response to problem behaviors in their classrooms included secondary punishment (f=28), differential reinforcement, verbal warnings, ignoring…" (R11).

Academic and psychosocial effects of interventions

Table 6 presents findings on the academic and psychosocial effects of interventions for problem behaviors, including sub-themes, codes, and associated studies.

Table 6. *Findings related to the theme of academic and psychosocial effects of interventions for problem behaviors*

Theme	Sub-theme	Codes	Studies
Academic and psychosocial effects of interventions	Academic achievement	Increased active participation in lessons	R9, R16, R20
		Homework completion habits	R16, R20
		Lesson follow-up and note-taking skills	R9, R16
		Exam performance	R9, R13
	Social acceptance	Reduction in peer bullying	R9, R13, R20
		Development of friendship relationships	R1, R9, R13, R18
		Breaking social isolation	R13, R20
	Individual / psychosocial	Reduction of parental stress	R1, R2, R8
		Increase in self-confidence	R1, R12
		Improvement in parental quality of life	R1, R2, R12, R14

The findings presented in Table 6 indicate that interventions targeting problem behaviors produce significant and multidimensional effects on students at both academic and psychosocial levels. Academically, the interventions were associated with increased active participation in lessons, improved homework completion habits, enhanced lesson-following and note-taking skills, and higher exam performance. In terms of social acceptance, notable outcomes include a reduction in peer bullying, the development of friendship relationships, and the breaking of social isolation. Regarding individual and psychosocial effects, reductions in parental stress, increases in student self-confidence, and improvements in parental quality of life were observed. These findings underscore that systematic and effective interventions for problem behaviors not only mitigate behavioral issues but also holistically support students' academic success, social adaptation, and the psychosocial well-being of their families. Some direct quotations from the studies include:

"Positive behavioral support applications led to improvements in the social skills of students in inclusive settings and reductions in problem behaviors…" (R9).

"Through positive behavioral support interventions, special needs and at-risk students in inclusive settings demonstrated increased social skill levels, decreased problem behaviors, and improved friendship relationships…" (R1).

"Following the implemented educational program, teachers' preventive classroom management skills improved" (R16).

"Parents reported that the program allowed them to spend higher-quality time with their children" (R1).

Inclusion practices and collaboration-related issues

Table 7 presents findings on inclusion practices and collaboration-related issues in interventions for problem behaviors, including sub-themes, codes, and associated studies.

Table 7. *Findings on inclusion practices and collaboration-based challenges in interventions for problem behaviors*

Theme	Sub-theme	Codes	Studies
Inclusion and Collaboration-Based Challenges	Importance and status of collaboration	Collaboration is critical in interventions for problem behaviors	R7, R17
		Collaboration is essential for the maintenance and generalization of behavior change	R7, R17
		Collaboration is most frequently established with families (primarily mothers) and guidance counseling services	R7, R4
	Barriers to collaboration	Families' lack of interest or reluctance to collaborate, or denial of problem behaviors	R7, R17, R9
		Difficulties in collaboration due to teachers' insufficient knowledge	R17
		Socioeconomic variables such as income level, educational background, and gender influencing collaboration with families	R7
	School- and system-level challenges	Overcrowded classrooms and inadequate physical environments	R3
		Time constraints in addressing problem behaviors	R3
		Lack of collaboration among school stakeholders	R3

The findings presented in Table 7 indicate that collaboration constitutes a fundamental component for effective intervention in problem behaviors within inclusive education settings. The reviewed studies emphasize that collaboration among teachers, families, and school stakeholders enhances the effectiveness of interventions and plays a critical role in ensuring the maintenance and generalization of acquired behaviors. In current practices, collaboration is most commonly carried out with families particularly mothers and school

guidance counseling services. However, several barriers hinder effective collaboration, including families' reluctance to engage, denial of problem behaviors, and teachers' insufficient knowledge and competencies related to behavioral intervention. Additionally, sociodemographic factors such as family income level, educational background, and gender were reported to influence the degree and quality of collaboration. At the school and systemic levels, overcrowded classrooms, inadequate physical conditions, limited time for intervention, and insufficient coordination among school stakeholders emerged as significant challenges that constrain the effectiveness of inclusive practices. Some direct quotations from the included studies are presented below:

"All participating special education teachers emphasized that collaboration is important and particularly crucial in special education. Collaboration is essential for making desired behaviors permanent and for behavior change" (R7).

"Most teachers reported that they lack the knowledge and competencies required to intervene in problem behaviors of students with special needs, and therefore meaningful collaboration is not possible without these competencies" (R17).

"Overcrowded classrooms, time constraints, and the inability to provide additional support to students with special needs…" (R3).

"The majority of participating teachers stated that income level affects collaboration with families, noting that higher income levels are associated with different perspectives" (R7).

Family-centered practices in İnterventions for problem behaviors

The sub-themes, codes, and study sources related to family-centered practices in interventions addressing problem behaviors are presented in Table 8.

Table 8. *Family-centered practices in interventions for problem behaviors*

Theme	Sub-theme	Codes	Studies
Family-centered practices in interventions for problem behaviors	Necessity and benefits of family-centered practices	School–family collaboration is essential and vital for preventing problem behaviors	R1, R12
		Parental involvement is fundamental for the generalization and maintenance of gains	R12
		Families are indispensable resources, possessing the most comprehensive knowledge about the child's behavior	R12, R2
	Implementation process of family-centered practices	Interventions should be implemented in the child's natural environment through a systematic process	R1, R12
		Programs provide parents with opportunities to spend quality time with their children	R1
		Implementation success depends on partnership between professionals and families and on consistency of practice	R1, R12
	Challenges and needs related to family involvement	Parents experience psychological and emotional strain and burnout due to problem behaviors	R1, R14
		Families lack knowledge about how to cope with problem behaviors and require professional support	R1, R12, R18

The findings presented in Table 8 demonstrate that family-centered practices constitute an indispensable component of interventions targeting problem behaviors. The reviewed studies emphasize that school–family collaboration is essential and of vital importance for the prevention and effective reduction of problem behaviors. In particular, parental involvement plays a central role in ensuring the generalization and sustainability of intervention outcomes, as families are the primary stakeholders who possess the most comprehensive and in-depth knowledge of their children's behavioral patterns. The findings further indicate that family-centered interventions should be implemented within the child's natural environment and maintained through a systematic process. Such programs offer parents meaningful opportunities to engage in quality interactions with their children. The effectiveness of these practices is closely linked to the establishment of collaborative partnerships between professionals and families and to the consistent implementation of intervention strategies. At the same time, the studies reveal significant challenges associated with family involvement. Parents frequently experience psychological and emotional exhaustion and report feelings of burnout due to persistent problem behaviors. In addition, families often express uncertainty about how to manage these behaviors and highlight a strong need for profes-

sional guidance and support. These findings underscore the necessity of integrating structured family education and ongoing professional support into interventions addressing problem behaviors. Selected direct quotations from studies addressing family-centered practices in interventions for problem behaviors are presented below:

"Without parental input, the gains achieved through interventions will not be maintained over time, and the acquired skills cannot be generalized to new environments" (R12).

"Findings related to the emotional impact of problem behaviors observed by parents of children with ASD include intense anxiety, fear, sadness, and feelings of burnout" (R14).

"Eight parents stated that they needed support in the form of participating in family education programs that could help with child-rearing and coping with problem behaviors" (R1).

"In response to the question 'What would your needs be if support were provided for solving problem behaviors?', seven teachers stated 'professional support' and seven teachers reported a need to 'learn effective programs for preventing problem behaviors'" (R1).

4.Conclusion and Discussion

In this study, the meta-synthesis of qualitative research on problem behaviors among individuals with special needs in Turkey enabled a comprehensive examination of the types of problem behaviors, their underlying causes, intervention strategies, academic and psychosocial outcomes, and the dimensions of family–school collaboration. The findings are consistent with the existing literature and indicate that problem behaviors emerge not only from individual characteristics but also through interactions shaped by family-, teacher-, and environment-related factors (Myers & Pianta, 2008; O'Connor et al., 2011; Sutherland et al., 2008; Yasui & Dishion, 2007). These results underscore the importance of adopting a multidimensional perspective in both understanding problem behaviors and developing effective intervention strategies.

Findings related to the types and effects of problem behaviors reveal that physical aggression and behaviors that disrupt classroom flow constitute the most prominent and frequently encountered forms within educational settings. This result aligns with the literature emphasizing that externalizing problem behaviors are more readily observed and therefore tend to receive priority in intervention efforts (Smith et al., 2014; Wilson & Lipsey, 2007). Nevertheless, internalizing and stereotypical behaviors were also found to exert negative effects on students' learning processes and social relationships. In this context, problem behaviors not only complicate classroom management

for teachers but also adversely affect students' academic and emotional development (Amstad & Müller, 2020; Grossman, 2003; Smolleck & Duffy, 2017). These findings suggest that problem behaviors do not merely disrupt instructional processes but also play a decisive role in students' holistic development. Accordingly, interventions should be designed in a comprehensive and systematic manner that addresses both externalizing and internalizing behaviors.

The findings of the study indicate that problem behaviors are predominantly exhibited in line with the functions of attention seeking and escape or avoidance. This result is consistent with several studies in the literature that have examined the functions underlying problem behaviors (Karal et al., 2026; Nipe et al., 2018; Noel and Rubow, 2018). These findings further underscore the significance of a function based assessment approach (Hanley et al., 2003; Melanson and Fahmie, 2023). In particular, inconsistent parenting practices, lack of affection and attention, and communication deficits associated with diagnostic characteristics emerge as primary risk factors contributing to problem behaviors. Environmental factors such as inadequate educational and physical settings, boredom during instruction, and overcrowded classrooms also play a substantial role in the emergence and maintenance of these behaviors. Collectively, these results demonstrate that problem behaviors are rooted in multidimensional causes and that reliance on a single intervention approach is unlikely to be sufficient. Function based assessment enables a clearer understanding of the purpose served by behavior while guiding the selection of effective intervention strategies, thereby allowing teachers and families to develop targeted and sustainable practices. Moreover, incorporating family and environmental variables into intervention planning is a critical prerequisite for enhancing the generalizability and long term effectiveness of behavioral interventions.

According to the metasynthesis findings, problems related to teacher and parent attitudes and competencies highlight the critical role of both teachers and families in the management of problem behaviors among students with special educational needs. Teachers' limited knowledge and skills in classroom management, intervention for problem behaviors, and inclusive education practices often lead to the use of reactive, short term, and low impact strategies (Taylor et al., 2025a). The literature similarly emphasizes that teachers frequently experience difficulties in managing problem behaviors in inclusive classrooms, which in turn negatively affects overall classroom management (Sarkar and Kundu, 2021). From the parental perspective, problem behaviors contribute to psychological strain, social isolation, and feelings of burnout, while also increasing families' need for professional support. These findings indicate the necessity of strengthening teachers' professional competencies while simultaneously establishing psychological and social support mechanisms for families. Effective management of problem behaviors requires te-

achers to implement systematic and function based intervention strategies, as well as the active and informed involvement of families throughout the process (Duan et al., 2022; Rose et al., 2024). Collectively, these results underscore the importance of enhancing teachers' skills in problem behavior management and developing comprehensive psychological and social support systems for parents.

When examining intervention strategies, it is evident that reactive approaches such as verbal warnings, punishment, and time-out are commonly employed; however, these methods are generally short-term or insufficiently effective. The literature similarly reports that teachers frequently rely on reactive strategies to address problem behaviors (Donaldson et al., 2013; Lieneman and McNeil, 2023), yet these approaches have been found to be largely ineffective in preventing such behaviors (Delaney, 1999; Taylor et al., 2025b). In contrast, systematic positive behavioral support and daily goal feedback programs have been shown to effectively reduce problem behaviors and enhance social skills. This finding aligns with international studies that confirm the efficacy of preventive and structured intervention approaches (Bambara and Kern, 2021; Horner and Sugai, 2015; Vannest et al., 2010). These results highlight that the selection and implementation of intervention strategies play a critical role in mitigating problem behaviors. The limited and short-term effectiveness of reactive approaches indicates that teachers often resort to immediate, ad hoc solutions, which fail to produce lasting behavioral change. Conversely, structured and data-driven interventions, such as systematic positive behavioral support and daily goal feedback programs, meaningfully reduce problem behaviors while fostering students' social skills. This underscores the indispensable role of preventive and planned interventions in promoting sustainable positive change within educational settings.

Effective interventions targeting problem behaviors have been found to increase students' classroom engagement, improve exam performance, and strengthen homework completion habits. Socially, positive outcomes include a reduction in peer bullying, the development of friendship relationships, and a decrease in social isolation. According to metasynthesis findings, the academic and social development outcomes of effective interventions are consistent with results reported in the literature (Caprara et al., 2014; Kelm et al., 2014). Additionally, findings such as reduced parental stress, increased self-efficacy, and improved quality of life support the psychosocial benefits of family-centered approaches. This evidence indicates that interventions targeting problem behaviors not only promote behavioral change but also enhance the overall well-being of both students and their families.

According to the research findings, inclusive practices and collaboration-related challenges highlight the critical importance of cooperation in the management of problem behaviors. Collaboration among teachers, families,

and school stakeholders plays a decisive role in the sustainability and generalization of intervention outcomes. However, parental reluctance to collaborate, teachers' knowledge gaps, and structural issues such as class size present significant barriers to effective cooperation. This finding emphasizes that collaboration is not only beneficial but essential for successfully managing problem behaviors in inclusive settings. The literature similarly supports that effective communication and the development of shared attitudes within the teacher-family-school triad enhance the efficacy of interventions and the sustainability of their outcomes (Paju et al., 2022; Smith and Leonard, 2005). Conversely, parental reluctance and insufficient teacher competencies can cause substantial disruptions in the intervention process, while class size and inadequate physical environments act as structural constraints, further complicating the management of problem behaviors. Therefore, strengthening stakeholder collaboration and improving classroom and school conditions are critical for enhancing the effectiveness of problem behavior management in inclusive settings.

The study highlights family-centered practices as an indispensable component in the management of problem behaviors. Parental involvement is critical for the generalization and sustainability of intervention outcomes. Findings indicating that families experience psychological and emotional strain and require professional support to cope with problem behaviors underscore the need for family-centered interventions to be planned as a holistic approach addressing both the child and the parent. In this context, the systematic implementation of programs that strengthen school-family collaboration and parent training can be regarded as a fundamental requirement for effective management of problem behaviors. The research findings demonstrate that family-centered interventions play a crucial role in the effective management of problem behaviors, and that parental involvement, together with strong school-family collaboration, supports the sustainability of children's behavioral and academic gains. These results are consistent with similar outcomes reported in the literature (Movahedazarhouligh, 2021; Rose et al., 2024; Stormshak et al., 2018). Accordingly, active parental participation and psychoeducational support are considered essential for the generalization and long-term maintenance of behavioral improvements.

In light of the findings of this study, it is recommended that systematic, function-based, and holistic intervention approaches be developed to prevent and manage problem behaviors among students with special educational needs. To strengthen teachers' knowledge and skills in classroom management and intervention for problem behaviors, curricula in both pre-service and in-service training programs should include content on positive behavioral support, functional behavior assessment, and preventive strategies. Similarly, to enhance families' capacity to cope with problem behaviors, systematic and

sustainable parent training programs grounded in school-family collaboration can be implemented. In inclusive classrooms, establishing an effective collaboration mechanism among teachers, families, and school guidance units can increase the sustainability and generalizability of interventions. In this context, collaboration frameworks can be developed under the leadership of the school's Individualized Education Program development unit.

5.References

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INVESTIGATION OF PREPARATORY SCHOOL STUDENTS' DEMOTIVATION, SELF-EFFICACY AND ANXIETY TOWARDS ENGLISH

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INTRODUCTION

The focus on teaching English, which has become the world's language of communication and science, continues to increase (EURYDICE, 2008, Can & Can , 2014) , in this regard, preparatory schools come to the fore in universities and intensive education is provided to increase students' four basic skills (YÖK, 2016). Despite this, foreign language teaching in universities is not considered sufficient (Can & Can, 2014) . In 2014, Türkiye ranked 47th in the world and last among 24 countries in Europe in the English Proficiency Index (EPI) (TEPAV, 2015). One of the many reasons for this failure is student motivation. Therefore, it is important to examine students' motivation levels and the variables affecting it.

Motivation refers to people's desire and effort to choose, maintain and pursue doing something (Dörnyei & Ushioda, 2013). A motivated individual is cognitively, affective and behaviorally ready to perform an action. While intrinsic motivation is related to internal dynamics such as self-efficacy, interest, knowing, understanding, need, etc. accompanied by autonomy that meets the psychological needs of the individual's inner life; extrinsic motivation is related to external factors and their effects such as environmental conditions, teachers, reward, punishment, pressure, request, etc. (Dilekmen & Ada, 2005, Deci & Ryan, 2000). The effects of external factors on internal dynamics are also undeniably great (Dörneyi, 1994). These two types of motivation can affect each other.

Students' low motivation or unwillingness to learn is explained by the concept of demotivation. Demotivation is the unwillingness to learn a subject due to negative factors affecting pre- existing motivation (Bekleyen, 2011; Dörnyei & Ushioda, 2013; Yan, 2009). Deci and Ryan (2008) explain this definition as "the absence of purpose and motivation" and although it is similar to the concept of amotivation, there are some differences.

It is observed that students who are demotivated have poor concentration, lack belief in their own abilities, do not put effort into learning, have the "What good will this do?" syndrome, exhibit laziness, give negative or empty answers to be praised, are reluctant to cooperate, do not bring materials to class, make excuses and do not want to do homework (Chambers, 1993). It

is seen that the factors that cause demotivation are related to the teacher, the course and the use of materials, the fear of being evaluated/failure, interest in the course, anxiety and self-efficacy beliefs (Dörnyei, 1998; Ghadirzadeh, Pourabolfathe Hashtroudi, & Shokri, 2012; Ikeno, 2002, as cited in Ikeno, 2002). Ghadirzadeh, Pourabolfathe Hashtroudi, & Shokri, 2012).

When the literature is examined, it is seen that foreign language anxiety, self-efficacy and some demographic characteristics of students are important variables that affect their motivation (Aida, 1994, Dörnyei, 1994, Herron, Pajares, & Mills, 2007). Foreign language anxiety, which is stated to be effective on demotivation, can be defined as the anxiety experienced by the language learner in the classroom or in the environment where the language is used (Gardner & McIntyre, 1993, p. 159). Studies on motivation show that as the level of anxiety increases, motivation towards learning and language decreases (Aida, 1994; Gardner & MacIntyre, 1991a, 1991b; Horwitz, 2001).

In addition to anxiety, self-efficacy beliefs also affect motivation towards language learning (Aşıcı, 2016; Demir, 2018; Herron, Pajares, & Mills, 2007). Bandura (1991) states that the higher the perceived self-efficacy, the higher the goal difficulty that individuals set for themselves and the tighter the commitment to the goal. Bandura (2001) and Dörnyei (1994) stated that there is a strong interaction between motivation and self-efficacy beliefs. Increasing self-efficacy will reduce students' anxiety levels in language classes (Herron, Pajares, & Mills, 2007), which in turn will positively affect their motivation. Similarly, Yıldırım (2011) states that as students' self- efficacy increases, their motivation to learn also increases. Some demographic characteristics are also known to have an effect on students' motivation to learn. These can be listed as gender, socio-economic status and educational status of parents (Akbaba, 2006; Feinstein, Duckworth, & Sabates, 2004; Savaş, Taş, & Duru, 2010).

It is seen that the studies conducted in Türkiye are generally at the primary and secondary education level and the number of studies at the higher education level is quite low (Aşıcı, 2016; Aygün, 2017; Çekirdek, 2014; Demir, 2018; Şanlı, 2016; Talayhan, 2018; Tugan, 2015). However, it is very important to understand the demotivation of students who focus on language learning in preparatory schools at the beginning of their university education and to examine the relationship between this demotivation and other variables. In

this way, it can contribute to the elucidation of the causes of the problems experienced in English language teaching and the development of solutions.

It is seen that studies on demotivation are more common in the international literature than in the Turkish literature (Alsamani & Daif-Allah, 2014; Hu, 2011). In the literature in Türkiye, it is seen that there are not many studies on demotivation in foreign language learning and these studies focus on a few variables (Aygün, 2017; Çekirdek, 2014; Şanlı, 2016; Ünal & Yanpar, 2016). However, motivation is a multidimensional structure affected by many variables (Dörnyei, 1994; Nahavandi & Mukundan, 2013, Şanlı, 2016, Takan, 2014, Çekirdek, 2014; Şanlı, 2016; Ueki & Takeuchi, 2012). Therefore, knowing to what extent variables affect student motivation and their interaction with each other is very important in explaining general motivation and achievement. Among the studies in the domestic literature, there is no university-level study that examines the relationship between anxiety, self-efficacy, and demographic characteristics, which are said to be effective on motivation and demotivation, and there are few studies that examine some of these variables together (Çekirdek, 2014; Demir, 2018; Tugan, 2015; Şanlı, 2106; Yıldırım, 2011). For this reason, studies that examine the variables affecting students' foreign language demotivation together are very important in terms of understanding the variables affecting students' demotivation as a whole.

The aim of this study is to determine the demotivation of foreign language preparatory students towards foreign language and to examine the relationships between students' demotivation and their foreign language anxiety, foreign language self-efficacy beliefs, parental education levels, faculties of education, gender, language level, socio-economic status and general achievement levels. Considering that the variables that may be related to demotivation have not been addressed holistically and that demotivation studies at higher education level are limited, this study is expected to make significant contributions to the literature.

METHOD

In this study, exploratory correlation survey type, one of the quantitative

research designs, was used. The population of the study consisted of a preparatory school in a state university in Izmir, while the sample consisted of 392 volunteer students who were determined by random and stratified sampling. Some demographic information is presented in Table 1.

Table 1: Demographic information

Gender	N	Faculty	N
Woman	248	Science	167
Man	133	Engineering	55
Language levels	**N**	Economics and Business	64
A1	91	Nursing	83
A2	240	Other faculties	23
B1 and above	56		

Data Collection and Analysis

The data were obtained by using personal information form, Demotivation Scale (Ünal & Yanpar, 2016), English Self-Efficacy Belief Scale (Hancı Yanar & Bümen, 2012) and Foreign Language Classroom Anxiety Scale (Gürsu, 2011). The data were collected in English classes at the preparatory school under the supervision of the researcher with the permission of the course teacher. The data were analyzed using frequency and percentage counts, t-test and ANOVA tests, and it was seen that the assumptions of normal distribution and multicollinearity were met before the analysis.

FINDINGS

When the demotivation levels of the students were analyzed, it was seen that the demotivation scores in both dimensions were at a high level. The highest demotivation score was observed in the teacher dimension of the scale ($\bar{X}=81$). This was followed by indifference towards the course ($\bar{X}=74$), classroom environment/material use ($\bar{X}=72$) and failure experience ($\bar{X}=69$).

When the mean scores of the anxiety scale of the students are examined, it is seen that the highest anxiety is in the dimensions of disinterest ($\bar{X}=3.08$) and speech anxiety ($\bar{X}=3$). The mean total anxiety score of the students was

also at a moderate level ($\bar{X}$=2.93). When we look at the mean scores of the students on the İÖİÖ; it is seen that they have a moderate level of self-efficacy perception ($\bar{X}$=3.21). When the four foreign language skills were analyzed separately, it was seen that the students developed a moderate level of self-efficacy perception in reading ($\bar{X}$=3.37), writing ($\bar{X}$=3.10), listening ($\bar{X}$=3.35) and speaking ($\bar{X}$=3.02) skills

After examining the descriptive statistics of the variables, secondly, it was examined whether the mean scores of the students differed according to the demographic characteristics. The results obtained are presented in Table 2.

Table 2: Comparison of DS Scores According to Demographic Variables

Variable	Demotivation				Variable				
	N	$\bar{X}$	Sd	F		N	$\bar{X}$	Sd	F
University entrance success ranking					Gender				
1-50.000	15	73.85	.61		Woman	248	75.8	.67	13.14**
50.000-100000	50	73.30	.76		Man	133	70.6	.69	
100000-150000	119	74.86	.69	.95	Language levels				
15000-200000	187	76.41	.67		A1	91	75.8	.65	
Faculty					A2	240	74.4	.70	1.9
Science	167	75.94	.67		B1 and above	56	71.2	.67	
Engineering	55	74.64	.62		Monthly Family Income				
Economics and Business	64	72.65	.81	.80	0-2500 TL	145	75.6	.67	
Nursing	83	74.58	.65		2501-5000 TL	153	74.8	.65	6.07**
Other faculties	23	72.57	.67		5001 TL-ve üstü	81	69.4	.74	
Father's Education					Mother's Education				
Primary School	77	75.4	.61		Primary School	121	76.4	.60	
Middle School	69	74.2	.65	1.01	Middle School	81	72.6	.72	1.89
High School	151	74.6	.69		High School	123	73.4	.70	
Undergraduate and Postgraduate	93	72	.75		Undergraduate and Postgraduate	65	72.8	.74	

*p<.05, **p<.01

The mean demotivation score of male students ($\bar{X}$=70.6) was lower than that of female students ($\bar{X}$=75.8) (t=13.14, p<.01). The effect size calculated for this difference is moderate (Cohen's d= .38). In addition, students' demotivation scores also differed according to the monthly income of the family (f=6.07, p<.005). As the monthly income of the family increases, the demotivation scores of the students decrease, that is, their motivation for language learning increases. The source of this difference was examined with the LSD test and it was seen that the third group (with a monthly income of 5001-7500) differed significantly from both one (with a monthly income of 0-2500) and two (with a monthly income of 2501-5000). The effect size of the difference between groups one and three was calculated as .44, and the effect size of the difference between groups two and three was calculated as .38. Apart from this, students' demotivation score averages do not show statistically significant differences according to their university entrance success ranking, faculties, language levels and mother and father education levels.

After examining the differences in the scores of the participants according to the demographic characteristics of the participants, the correlations between the scores of the Demotivation Scale, the Self-Efficacy Scale, and the Foreign Language Classroom Anxiety Scale were examined. The results obtained are presented in Table 3.

Table 3: The Relationships between the Scores of the scales (n=392)

		Demotivation Total	Demotivation Teacher	Demotivation Disinterest	Demotivation Experience of Failure	Demotivation Classroom Environment and Material
Self-Efficacy in Reading	Pearson K	-.05	.08*	-.11*	-.23**	.09*
	Sig(2 tiled)	.17	.05	.02	0	.03
Self-Efficacy in Writing	Pearson K	.01	.05	.01	-.17**	.09*
	Sig(2 tiled)	.47	.16	.42	.00	.04
Self-Efficacy in	Pearson K	-.07	.02	-.08*	-.23**	.05

Listening	Sig(2 tiled)	.09	.33	.05	0	.17
Self-Efficacy in Speaking	Pearson K	-.07	.02	-.10*	-.21**	.09*
	Sig(2 tiled)	.09	.37	.02	0	.04
Self-Efficacy Total	Pearson K	-.05	.05	-.08*	-.24**	.09*
	Sig(2 tiled)	.15	.17	.05	0	.04
Speaking Anxiety	Pearson K	.10*	.00	.06	.21**	.03
	Sig(2 tiled)	.03	.48	.10	0	.29
Interest towards language class	Pearson K	-.06	-.11*	-.05	.01	-.03
	Sig(2 tiled)	.10	.02	.15	.39	.28
Anxiety of Talking with Native Speaker	Pearson K	-.06	-.12*	-.05	-.12**	.10*
	Sig(2 tiled)	.12	.01	.18	.01	.03
Anxiety Total	Pearson K	-.04	-.14**	-.04	-.00	.07
	Sig(2 tiled)	.22	.00	.23	.48	.09

*p<.05, **p<.01

As a result of the correlational analysis, no significant relationship was found between the total scores of demotivation and the total scores of self-efficacy belief in foreign language (r= .048, p>.05). There was also no significant relationship between demotivation total scores and foreign language anxiety total scores (r=-.04, p>.05). When the relationships between the sub-dimensions were examined, a significant relationship was found only between demotivation total scores and speaking anxiety in the classroom, one of the sub-dimensions of foreign language anxiety (r=.04, p<.05). The results also indicate that as classroom speaking anxiety increases, demotivation will increase *(r=.10, p<.05)*.

When we look at the demotivation "Teacher" dimension, we observe a low correlation with self-efficacy reading (*r=049*, p<.05) and a moderate correlation with the disinterest dimension of anxiety (r=.02, p<.05) and with the anxiety of speaking with native speakers *(r=.01, p<.05)*. In addition, there was a significant relationship between total anxiety scores and teacher demotivation dimension. As anxiety increases, the level of demotivation caused by the teacher decreases (*r=.002 p<.05*).

There is a significant relationship between the dimension of demotivation, "Disinterest towards the lesson" and the dimensions of self-efficacy in reading *(r=.02, p<0.05)*, self-efficacy in listening *(r=.049, p<.05)* and self-efficacy in speaking *(r=.02, p<.05)*. There is also a significant relationship between total self-efficacy scores and disinterest *(r=.048, p<05)*.

There is a significant relationship between the dimension of demotivation "Failure experience" and all dimensions and total score of foreign language self-efficacy. A significant relationship was found between the total score of self-efficacy beliefs towards foreign language and the failure experience of demotivation *(r=-.239, p<.01)*. According to the analysis; it is seen that the relationship between demotivation "Failure experience" dimension and reading *(r=-.231, p<.01)*, writing *(r=-.165, p<.01)*, listening *(r=-.229, p<.01)*, speaking *(r=-.211, p<.01)* dimensions of self- efficacy is significant. A significant relationship was also observed between classroom speaking anxiety and demotivation total scores *(r=.205, p<.01)*. Failure experience also showed a negative relationship with anxiety about speaking with native speakers of English *(r=-.124, p<.05)*. As the demotivation due to the experience of failure increases, the anxiety of speaking to native speakers of English also increases.

Finally, significant relationships were observed between the "Classroom environment and use of materials" dimension of demotivation and self-efficacy beliefs in reading *(r=.93, p<.05)*, self-efficacy in writing *(r=.88, p<.05)*, self-efficacy in speaking *(r=.87, p<.05)* and total self-efficacy *(r=.90, p<.05)* scores. As students' self-efficacy beliefs in reading, writing and speaking skills increase, their demotivation due to the classroom environment and the use of materials also increases. When the total scores and dimensions of anxiety are analyzed, there is a significant correlation between the "Classroom environment and use of materials" dimension of demotivation and only "Anxiety about speaking with native English speakers" *(r=.98, p<.05)*. As the demotivation for using classroom environment and materials increases, the anxiety of speaking with native speakers of English also increases.

DISCUSSION

In this study, the demotivation levels of prep students towards English

were examined and its relationship with English language anxiety, self-efficacy and some demographic variables were analyzed. As a result of the analyses, high level of demotivation, moderate level of foreign language anxiety and foreign language self-efficacy were found in the students. There is no significant relationship between the total scores of foreign language demotivation and the total scores of both foreign language anxiety and foreign language self-efficacy. On the other hand, significant relationships were found between the sub-dimensions of the demotivation scale and some self-efficacy and anxiety sub-dimensions and total scores. When the relationships between demotivation and demographic characteristics are examined, it is seen that the relationships between demotivation and gender and socio-economic status variables are statistically significant.

One of the prominent findings of this study is that students' mean demotivation scores are high, that is, their motivation towards language learning is low. It is seen that experiencing teacher-induced demotivation is the most effective factor on overall demotivation. This is followed by demotivation due to lack of interest in the lesson, use of materials in the classroom and failure experience. Similarly, Aygün (2017) stated that students' motivation for language learning is low and this is due to past experiences and personal reasons.

When the findings of the study are analyzed, it is seen that the factor with the lowest mean motivation is the teacher-related demotivation dimension. In studies on the problems in foreign language teaching and the effectiveness of teachers, it is stated that the teacher factor may cause lack of motivation (Aygün 2017; Can & Can, 2014; Dörnyei, 1994; Eryılmaz, 2013; Herron, Pajares, & Mills, 2007). There is a significant relationship between the teacher dimension of demotivation and self-efficacy belief in reading. As students' self-efficacy belief in reading increases, teacher-induced demotivation decreases. In other words, as students' self-efficacy in reading increases, the negative effect of negative teacher attitudes on student motivation decreases. Herron, Pajares, and Mills (2007) also state that teachers can make significant contributions to increasing students' self-efficacy beliefs. However, students' reading habits are said to be linked to socio-economic status and lack of motivation (Genç, 1995). In this case, there is a social and cultural interaction

between these variables.

Another variable associated with the teacher dimension of demotivation is anxiety. As anxiety total scores increase, teacher-induced demotivation scores decrease. In other words, as anxiety increases, the positive effect of the teacher on motivation becomes more important. In foreign language education, anxiety is known to include fear of negative evaluation, test anxiety and teacher-student interactional anxiety (Liu & Huang, 2011; Tugan, 2015). It has been observed that the fear of negative evaluation is even higher than test anxiety in foreign countries (Liu & Huang, 2011), and the most important anxiety after test anxiety in Turkish students who focus on the test is the communication breakdown between student and teacher (Tugan, 2015). Students with low self-efficacy and fear of being negatively evaluated by teachers and peers may not participate in class (Çekirdek, 2014). This may increase demotivation.

It was found that the disinterest dimension of anxiety was related to the teacher-induced lack of motivation dimension of the demotivation scale. Demotivation decreases as disinterest anxiety towards the lesson increases and students with anxiety may be more interested in the lesson in some cases (Bekleyen, 2004). In Bekleyen's (2004) study, it was stated that one of the coping strategies of students who felt high and medium level teacher-related anxiety was to prepare for the lesson in advance. It is said that there is behavioral, emotional and cognitive participation in terms of class participation (Eryılmaz, 2013). In this case, it is possible that the act of learning does not achieve its purpose. The teacher can reduce anxiety and disinterest in the classroom, find students' problems and help anxious students' language acquisition by creating a positive learning environment (Aida, 1994).

Another dimension of the demotivation scale, the classroom environment and the use of materials, also had high scores. It is known that the learning environment is effective in directing student motivation (Atay, 2004; Dörnyei, 1994). Beyond the physical environment, it can be said that especially the classroom climate will increase learning motivation, and motivation has a positive effect on classroom harmony. Bayraktar (2015) states that classroom management is based on the personal and psychological needs of students and that students can be motivated to learn by organizing

the learning environment and experiences in the classroom with the help of the teacher.

In addition to teacher-induced demotivation, the classroom environment and the use of materials are also important sources of demotivation. It is known that using the right materials in the classroom positively affects students' motivation (Aygün, 2017; TEPAV, 2015). It is stated that the use of materials has an important role in foreign language teaching (Çekirdek, 2014; Talayhan, 2018). In this study, there is a significant relationship between students' demotivation due to the use of materials in the classroom and their self-efficacy beliefs. It can be said that as self-efficacy beliefs increase, students have more expectations about the use of materials and classroom situations. In addition, as demotivation about the classroom environment and the use of materials increases, anxiety about speaking with native speakers also increases. Takan (2014) reported that 90% of the participants' speaking anxiety was caused by the teacher.

Anxious students may not be able to organize the use of materials and may not know how to use them for their own benefit (Aida, 1994). According to the findings of the study, another important reason for students' low motivation is their experiences of failure, which is another sub-dimension of the scale. In studies examining the effect of achievement on motivation, it is seen that students' self-efficacy beliefs towards foreign language in the four skills interact with this dimension of motivation (Çekirdek, 2014; Şanlı, 2016, Tugan, 2015; Talayhan, 2018). As a result of many studies, it is said that as students' self-efficacy beliefs increase, their demotivation due to the experience of failure decreases (Demir, 2018; Pajares, 2003). In other words, self-efficacy belief increases achievement (Bandura, 2001; Demir, 2018; Dörnyei, 1994; Yıldırım, 2011), and experiencing success increases motivation in students (Yıldırım, 2011).

The other dimension of the demotivation scale and another source of students' demotivation is the lack of interest in the course and language. Individuals participate more willingly in situations in which they are interested and enjoy (Ünal & Yanpar, 2016). Considering the findings of this study, as students' self-efficacy beliefs about their reading, listening and speaking skills increase, their demotivation due to lack of interest in the course

decreases. Bandura and Schunk (1981) stated that the higher the students' self-efficacy beliefs, the higher their internal interest.

In addition to demotivation, students' English self-efficacy beliefs were also examined and found to be at a moderate level. Although no significant relationship was found between the total scores of the English self-efficacy scale and the total scores of the demotivation scale, its effect on motivation is clearly seen when examined in terms of the relationships in the sub-dimensions. The finding that self-efficacy belief positively affects achievement and motivation is found in many studies (Demir, 2018; Pajares, 2003). It is known that a good self-efficacy perception has a motivating effect on students.

When the anxiety scores of the students are analyzed, it is seen that their foreign language anxiety is at a moderate level and there is no significant relationship between the total scores of demotivation and total scores of foreign language anxiety. The studies investigating the anxiety factor on motivation give very varied results. Although some researches in the literature state that anxiety has a negative effect on performance (Gardner & MacIntyre, 1994; Clement, Dörnyei, & Noels, 1994; MacIntyre & Gardner, 1991b), some researches also said to have a positive effect (Alpert & Haber, 1960; Young, 1992). In some studies that students have moderate anxiety, it was found that motivation was affected and motivation was at moderate level and above (Çekirdek, 2014; Takan, 2014; Ueki & Takeuchi, 2012). However, similar to the result of this study, there are also studies that did not find a corelation between anxiety and motivation (Gardner, Day, & MacIntyre, 1992; Tugan, 2015; Yıldırım, 2011). In this study, considering the general demotivation of the students, the relationship between anxiety scores and demotivation scores may not be significant since the students were not interested in the course. It is also possible to consider the fact that individuals are not anxious about a subject they are not interested in and do not care about as a possible result. When we look at the anxiety scores of the students, it is noteworthy that the highest average was collected in the dimension of indifference towards the foreign language classroom.

According to the findings obtained in the study, it is seen that the mean demotivation scores differ in favor of male students. When the studies in the literature are examined in general, there is a significant difference in favor of

female students (Baker & MacIntrye, 2000; Nahavandi & Mukundan, 2013). In one of the studies in which male students' motivation was found to be higher, Arshad, Shahbaz, and Al-Bashabsheh (2015) state that the gender difference in Pakistan is due to the traditional and cultural structure of the male-dominated society and that women are more shy when talking to strangers. In addition, Turkish students are said to be more prone to instrumental motivation (Talayhan, 2018; Yılmaz, 2013). Based on this argument, it can be said that for Turkish students, the future use of the language causes this result for male students due to the need to find a job in a competitive environment.

Among the findings of the study, it is also seen that motivation towards foreign language is affected by socio-economic status. Socio-economic status is known to be effective on motivation towards foreign language (Akram & Ghani, 2013b; Wong, 2007). The fact that socio- economic status has an effect on students' motivation can be interpreted as the fact that due to their economic status and educational opportunities, students' cognitive skills are developed with the influence of the environment and they are more interested in the language and more familiar with the language with more exposure to the language or they can receive support for language learning (Bozavlı, 2015, p.80).

CONCLUSION.

As a result, in this study, students' demotivation levels were found to be high and therefore their motivation levels were found to be low. According to the sub-dimensions of the scale, the reasons for this demotivation are the teacher, the classroom environment, lack of interest in the course and the experience of failure. When the sub-dimensions of the scale and the total demotivation scores are examined, it is seen that some of the factors affecting these situations are students' low self-efficacy beliefs towards foreign language, anxiety about speaking with foreign native speakers, gender and socio-economic status. When the results of the study are examined, it is seen that motivation is a multivariate process and can be affected by many direct or indirect factors (Çekirdek, 2014; Dörnyei, 1994; Talayhan, 2018; Ueki & Takeuchi, 2012).

The sample of the study was limited to volunteer students studying at a preparatory school of a state university in Izmir, and the data collection tools were limited to the demographic characteristics form and three measurement tools. The diversity of the faculties where male and female students come from is an important delimitation of the study. Despite these limitations and delimitations, some research and practice suggestions can be presented in the light of the findings.

First of all, the demotivation scores of the students were found to be quite high and it can be said that their motivation is low. One of the important reasons for low motivation was determined as inappropriate classroom environment. For this reason, it is recommended that students should be provided with appropriate classroom environment and course materials and that teaching should be related to real life (Richards, 2006; Talayhan, 2018).

Another reason for low motivation is the difficulty of using students' language skills in out-of- school settings. Considering that students in Türkiye mostly prefer instrumental motivation style (Talayhan, 2018; Yılmaz, 2013), career orientation programs can also be effective. Planning a good orientation process in order to increase students' willingness towards the course by using motivation may also be considered necessary to increase their motivation towards foreign language.

According to the findings, another reason for students' low motivation is seen as teacher-related factors. The teacher is important in terms of organizing the classroom atmosphere in accordance with language learning (Aşıcı, 2016; Dörnyei, 1994;Richards, 2006). It is important for teachers to prepare the right classroom environment for students' language acquisition and to provide them with self- efficacy, self-confidence and self-regulation strategies for language (Oroujlou & Vahedi, 2011).

Since student motivation can be increased with effort, it is an important factor that can contribute to motivation when teachers appropriately use intrinsic methods (such as making students love the target language, using materials, classroom activities) instead of extrinsic motivational tools (such as reward and punishment) (Atay, 2004).

Another reason for low motivation is disinterest towards the lesson. The

disinterest dimension of anxiety was found to be related to the teacher-induced lack of motivation dimension of the demotivation scale. The teacher can help anxious students' language acquisition by reducing anxiety and disinterest in the classroom, finding students' problems and creating a positive learning environment (Aida, 1994). Another reason for lack of motivation is the experience of failure. If the right classroom environment, strategy and interest-oriented studies are carried out, it is possible to positively affect students' motivation towards the lesson.

In addition, it is important to increase the number of studies on motivation in terms of literature. With multidimensional and in-depth studies, it may be possible to determine the effects of the dimensions of motivation on students and to make correct inferences and solutions in order to take measures to increase their interest. Since motivation is a complex process related to internal dynamics and external influences, it may be beneficial to study different samples in order to better understand its dimensions and effects over time and space. It can be said that descriptive studies that define specific sample groups to determine student motivation and provide situational problem determination and experimental studies that examine the effect of various solution-based teaching practices on motivation will contribute to the domestic literature.

The study was conducted at a universities school of foreign languages. It covers a limited number of students. It should be tested on a larger number of students for its generalizability. This study shows that demotivation is an important variable in foreign language learning and that comments can be made about students' motivation types and demographic characteristics from the sub-factors. In addition, the need for further in-depth research in terms of the sample is the most valuable information provided by the researchers. This study, like other academic studies, is a valid study and aims to explain the effect of motivation on students and how other variables are related to motivation.

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Chapter 11
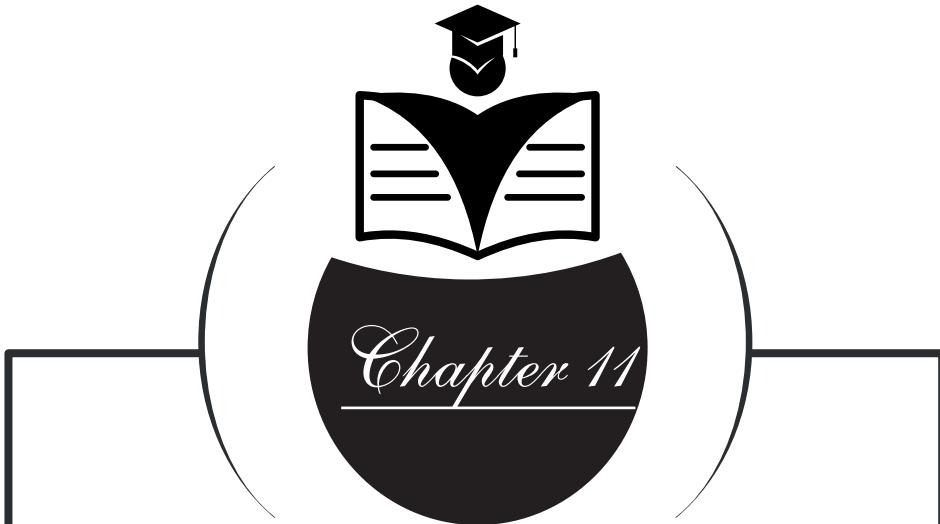
INVESTIGATION OF PRIMARY TEACHERS' TEACHING MOTIVATION LEVELS[1]

Dilay BULUT KAHYA[2]
Pınar ÇAVAŞ[3]

Introduction

The knowledge, skills, and competencies that teachers possess are among the most important determinants of educational quality. Teachers are not merely transmitters of knowledge but professionals who guide students' cognitive, affective, and social development, foster their motivation to learn, and shape the overall learning environment. Consequently, teachers' professional attitudes—particularly their level of teaching motivation—play a critical role in the effectiveness and sustainability of educational processes.

In today's rapidly changing social, technological, and pedagogical landscape, teachers' roles have become increasingly complex. These transformations demand that teachers engage in continuous professional development and maintain high levels of motivation to adapt to emerging educational needs. Understanding teachers' motivation, identifying the factors that influence it, and developing strategies to enhance it are essential for both educational policy and practice.

In the field of educational psychology, several contemporary theories continue to guide motivation research. These include self-determination theory (Ryan & Deci,2017, 2020), (situated) expectancy-value theory (Eccles, 1983; Eccles & Wigfield, 2020), social cognitive theory) (Bandura, 1997; Schunk & Benedetto, 2020), achievement goal theory (Elliot &Hulleman, 2017; Urdan & Kaplan, 2020), and the control-value theory of achievement emotions (Pekrun,2006) (cited in Murayama & von Keyserlingk (2025). Motivation is commonly defined as an internal process that initiates, directs, and sustains individuals' behaviors toward specific goals (Ryan & Deci, 2000; Schunk, Pintrich, & Meece, 2014). Expectancy–value theory, one of the most frequently referenced motivational frameworks in educational research, emphasizes the multidimensional nature of motivation (Eccles & Wigfield, 2002). It posits that teaching behavior is shaped not only by individuals' self-efficacy or their expectancy beliefs regarding successful task performance, but also by the perceived values and costs associated with the task itself. Moreover, recent research has highlighted the potential interaction effects among the key components of expectancy–value theory in influencing individuals' motivation and behavior (Wigfield et al., 2017). In educational settings, teachers' motivation has been recognized as a key determinant of their professional efficacy and primaryperformance (Guay, Ratelle, & Chanal, 2008). Teachers with high teaching motivation are more likely to employ student-centered and innovative instructional strategies, foster a positive primaryclimate, and experience greater professional satisfaction (Han & Yin, 2016; Klassen et al., 2012). Conversely, low motivation levels can lead to reduced instructional quality, decreased student engagement, and teacher burnout (Skaalvik & Skaalvik, 2010, 2011).

Teaching motivation is typically examined through three primary di-

mensions: intrinsic, extrinsic, and altruistic. Intrinsically motivated teachers engage in teaching because they find it enjoyable and personally fulfilling. Extrinsically motivated teachers are influenced by external incentives such as salary, recognition, or career advancement. Altruistically motivated teachers, on the other hand, are driven by the desire to contribute to society and shape future generations through education.

The Purpose of the Study

The education system is a crucial mechanism for shaping the future of society, and primary school teachers constitute one of its cornerstones. They play a vital role in supporting students' academic, social, and emotional development. The level of teachers' motivation is influenced by numerous individual, institutional, and contextual factors, including job satisfaction, working conditions, administrative support, student achievement, and opportunities for professional growth. Given the strong relationship between teacher motivation and the quality of education, examining the teaching motivation of primary school teachers is of great importance. This study aims to identify the factors that affect teachers' teaching motivation, explore their implications for the teaching–learning process, and suggest strategies that can enhance sustainable teacher motivation and overall educational quality. Within this context, the problem of the research is stated as: What are the teaching motivation levels of primary school teachers? The sub-problems are :

1. What are the teaching motivation levels of primary school teachers?

2. Do the teaching motivation levels of primary school teachers differ in terms of gender, professional seniority, age, school type, number of seminars attended during the year, and faculty of graduation variables?

Method

In this study, which aims to determine the teaching motivation levels of primary school teachers, the survey method, one of the quantitative research models, was used. A survey study is a study that aims to collect data to determine certain characteristics of a group of people. It is an important advantage that it allows data to be collected from a sample consisting of a large number of individuals (Büyüköztürk, Kılıç Çakmak, Erkan Akgün, Karadeniz and Demirel, 2017).

Sample

The population of this research consists of primary school teachers working in official primary schools affiliated to the Ministry of National Education in Kocaeli province in the 2020-2021 academic year. In the process of creating the sample of the research, the cluster sampling method was used. Among the clusters, primary schools affiliated to the Ministry of National

Education were determined by using the simple random sampling method, one of the random sampling methods. Primary school teachers working in the determined primary schools constitute the sample of the research. Some demographic information about the primary school teachers is given in Table 1.

Table 1. *Demographic Profile of Participating Primary School Teachers (Gender, Age, School Location)*

Gender	N	%
Female	305	71.3
Male	123	28.7
Age		
20-29	42	9.8
30-39	169	39.5
40-49	137	32.0
50 and over	80	18.7
Place of Duty		
City Center	77	18.0
District	312	72.9
Village	18	4.2
Town	21	4.9
Postgraduate Education Status		
Master's Degree	35	8.2
Doctorate	-	-
I didn't do it	393	91.8
Graduated School		
Faculty of Education	342	79.9
Faculty of Arts and Sciences	41	9.6
Higher Teacher School	8	1.9
Education Institute	10	2.3
Other	27	6.3
Seniority		
1-4	40	9.3
5-9	48	11.2
10-14	88	20.6
15-19	88	20.6
20 and over	164	38.3
Grade Level		
1st grade	110	25.7
2nd grade	104	24.3

3rd grade	114	26.6
4th grade	100	23.4
Total	428	100

Instruments

Personal Information Form

A personal information form consisting of a total of 7 questions was used. This form contains seven questions that inquire about information such as the name of the school where the primary school teachers work, the location of the school, gender, and teaching seniority. In addition, there are two open-ended questions designed in a fill-in-the-blank format aimed to reveal primary school teachers'teaching motivation. These questions are "I chose to become a teacher because…" and "My teaching motivation is high/low because...".

Teaching Motivation Scale (TMS)

"Teaching Motivation Scale (TMS)" is another measurement tool used in the study. It was developed by Kauffman, Yılmaz Soylu and Duke in 2011 and adapted into Turkish by Güzel Candan and Evin Gencel (2015). TMS was prepared to determine the motivation levels of teacher candidates in two different areas, namely intrinsic and extrinsic teaching motivation. Cronbach's alpha reliability coefficient was examined while performing reliability analyses. In the English form of the scale, Cronbach's alpha values for intrinsic, extrinsic, and the total scale were.84,.80, and.90, respectively, while in the Turkish form, Cronbach's alpha values were.90,.79, and.92, respectively. When these values are examined, it is seen that the reliability result of the form adapted into Turkish is high.

Analysis of Data

The data obtained from the research sample were analyzed using the SPSS 25.0 package program. Reliability and normality analyses of the scales used in the research were performed. According to the Kolmogorov-Simirnov test results obtained from the 21st Century Teaching Skills Usage Scale, it was concluded that it showed a normal distribution (p>0.05). According to the Kolmogorov-Simirnov test results obtained from the Teaching Motivation Scale, it was observed that it did not show a normal distribution (p<0.05). In addition, the skewness and kurtosis values of the scales were examined. Since the skewness and kurtosis values of both scales and sub-dimensions, except for the supportive skills sub-dimension, are between -1.00 and +1.00, they have a normal distribution. The supportive skills sub-dimension results do not show a normal distribution because the kurtosis value (3.391) is not within the criterion values.

Descriptive statistics (frequency, percentage, arithmetic mean and standard deviation), t-test, ANOVA, Mann-Whitney U test, Kruskal Wallis H test and correlation analysis were used in the data analysis.

FINDINGS

The question "I chose to become a teacher because…" was asked to the primary school teachers included in the research. The reasons for the participants' choice to become teachers were analyzed based on the factors in the "Factors Influencing Teaching Choice, FIT-Choice Scale" developed by Watt and Richardson (2017) and adapted into Turkish by Kılınç, Watt and Richardson (2012). According to this scale, the motivation to become a teacher has 12 sub-dimensions. Within the framework of these categories, the intrinsic professional career (37%) sub-dimension had the highest rate among the answers given by the teachers, followed by working with children and adolescents (26.1%), shaping the future of children-adolescents (11.5%), backup career (10.4%), professional competence (4.4%), social impact (3.4%), job security (2.3%), previous learning and teaching experiences (2.1%), social service (1.6%), ensuring social equality (0.7%) and time allocated to family (0.5%) sub-dimensions.

In the study, primary teachers were asked, "My teaching motivation is high/low because…" According to the descriptive analysis results regarding the answers given by the primary teachers to this question, 97.8% (N=419) of the primary teachers stated that their teaching motivation was high. Only 2.1% (N=9) stated that their teaching motivation was low.

Most teachers stated that their teaching motivation was high because they loved their profession, their children, and teaching. A few of the teachers expressed their views as follows:

"I love my profession and children."

"I love children and teaching."

"I love my job and students."

Apart from their affective characteristics, teachers also explained the reason for their high teaching motivation as the social pressure of the work they do. A few of the teachers expressed their views as follows:

"I pursue this profession out of a commitment to serving my country and its people".

"The children I educate engender in me a moral responsibility toward my country and toward myself".

"I aim to cultivate responsible future generations and well-rounded individuals".

"It gives me professional fulfillment to disseminate my knowledge and, through it, to contribute to the development of an educated society".

Teachers generally explained the reasons for their low teaching motivation as not being valued by the society, not being supported in this regard, and not being given importance. A few of the teachers expressed their views as follows:

"The attitude we are in and shown to us spoils my enthusiasm a lot. This attitude is both student and parent attitude."

"I don't think teachers have the reputation they used to have. My new generation of parents is open to anything. They can complain about the teacher and spoil their motivation for ridiculous reasons, even just for their egos. There is no respect left. The profession has been turned into a jigsaw puzzle between incompetent administrators and ignorant parents. I think it will get worse in the future."

The first sub-problem of the research was expressed as "What are the teaching motivation levels of primary teachers?". Table 2 presents the findings on the teaching motivation levels of primary teachers.

Table 2. Descriptive Findings of Teaching Motivation Levels of Teachers

Scale/Sub-Dimension	Min.	Max.	X	Ss
Teaching Motivation	1.00	6.00	3.71	.82
Intrinsic Motivation	1.00	6.00	4.11	.93
Extrinsic Motivation	1.00	6.00	3.15	.91

Descriptive findings indicate that teachers' overall teaching motivation level is moderate to high ($\bar{X}$ = 3.71, SD = .82). Among the sub-dimensions, intrinsic motivation ($\bar{X}$ = 4.11, SD = .93) was higher than extrinsic motivation ($\bar{X}$ = 3.15, SD = .91), suggesting that teachers are mainly motivated by internal factors such as personal satisfaction and professional interest rather than external rewards or pressures.

The second sub-problem of the research was expressed as "Do the teaching motivation levels of primary teachers differ in terms of gender, professional seniority, age, school type, number of seminars attended during the year, and faculty of graduation variables?" In line with the purpose of the second sub-problem, findings on various demographic and professional variables are presented under sub-headings.

Teaching Motivation Levels of Primary Teachers According to Gender Variable

Independent Samples t-test was used to test the differentiation in teaching motivation levels of primary teachers according to gender. These findings are presented in Table 3.

Table 3. t-Test Results of Primary Teachers' Teaching Motivation by Gender

Scale/Sub-Dimension	Groups	N	X̄	Ss	T	p
Teaching Motivation	Female	305	3.7992	.77704	5.193	.000*
	Male	123	3.4817	.88021		
Intrinsic Motivation	Female	305	4.2496	.87273	.594	.553
	Male	123	3.7468	.98599		
Extrinsic Motivation	Female	305	3.1685	.89402	3.489	.001*
	Male	123	3.1106	.96163		

*p<0.05

According to Table 3, female teachers show significantly higher overall teaching motivation scores than male teachers (t=5.19, p<.05). Cohen's d statistic was used to determine the effect size of the determined significant difference and it was found to be 0.55. This value indicates that it has a large effect size (Büyüköztürk et al., 2017). While intrinsic motivation does not differ significantly by gender (p>.05), extrinsic motivation is significantly higher among female teachers (t=3.49, p<.05). Cohen's d effect size was found to be 0.37. It was determined that the significant difference has a medium effect size. These findings suggest that female teachers tend to be more motivated overall, particularly in externally driven aspects of teaching motivation.

There is a significant difference in the extrinsic motivation levels of primary teachers based on gender (t=3.49, p<0.05). The extrinsic motivation levels of female primary teachers (X̄=3.17) are higher than those of male primary teachers (X̄=3.11). (Büyüköztürk et al., 2017).

Teaching Motivation Levels of Primary Teachers by Age

One-Way Analysis of Variance (ANOVA) was used to determine the levels of teaching motivation. The findings obtained in this regard are given in Table 4.

Table 4. ANOVA Results of PrimaryTeachers' Teaching Motivation Levels by Age

Scale/Sub-Dimension	Group	N	X̄	Ss	F	p
Teaching	20-29	42	3.9940	.78958	2.531	.057
Motivation	30-39	169	3.6252	.87003		
	40-49	137	3.7512	.79334		
	50 +	80	3.6583	.74235		

Intrinsic Motivation	20-29	42	4.3639	.81926	2.734	.046*
	30-39	169	3.9637	.98000		
	40-49	137	4.1804	.92862		
	50 +	80	4.1363	.86494		
Extrinsic Motivation	20-29	42	3.4762	1.01015	2.688	.043*
	30-39	169	3.1515	.92415		
	40-49	137	3.1504	.88808		
	50 +	80	2.9850	.84839		

p<0.05

When Table 4 is examined, it is determined that there is no significant difference in teaching motivation levels according to age (p>0.05). There is a significant difference in intrinsic and extrinsic motivation levels according to age (p<0.05). According to Scheffe test results, the extrinsic motivation of primary teachers in the 20-29 age range ($\bar{X}$=3.48) is higher than that of primary teachers aged 50 and over ($\bar{X}$=2.99). According to Tamhane test results, the intrinsic motivation of primary teachers in the 20-29 age range ($\bar{X}$=4.36) is higher than that of primary teachers in the 30-39 age range ($\bar{X}$=3.96).

Teaching Motivation Levels of PrimaryTeachers by Graduation Field

One-Way Analysis of Variance (ANOVA) was used to test the differentiation in the teaching motivation levels of primary teachers according to their field of graduation. The findings regarding the ANOVA test are given in Table 5.

Table 5. ANOVA Results of PrimaryTeachers' Teaching Motivation Levels by Graduation Field

Scale/Sub-Dimension	Group	N	$\bar{X}$	Ss	F	p
Teaching Motivation	Faculty of Education	342	3.6791	.82208	1.157	.329
	Faculty of Arts and Sciences	41	3.8862	.75156		
	Higher Teacher School	8	3.5208	.79026		
	Education Institute	10	4.0583	.80990		
	Other	27	3.7284	.88753		
Intrinsic Motivation	Faculty of Education	342	4.0606	.93769	1.875	.114
	Faculty of Arts and Sciences	41	4.2613	.86479		
	Higher Teacher School	8	4.0179	.73018		
	Education Institute	10	4.7714	.78304		
	Other	27	4.2116	1.01586		
Extrinsic Motivation	Faculty of Education	342	3.1450	.91171	.904	.462
	Faculty of Arts and Sciences	41	3.3610	.86397		
	Higher Teacher School	8	2.8250	1.02783		
	Education Institute	10	3.0600	1.06270		
	Other	27	3.0519	.92419		

It can be seen from Table 5, mean scores ranged between 3.52 and 4.06 across groups for the overall Teaching Motivation scales. Teachers who gradu-

ated from Education Institutes had the highest mean score (M = 4.06), while those from Higher Teacher Schools had the lowest (M = 3.52). However, the difference among the groups was not statistically significant (F = 1.157, p = .329). Regarding the Intrinsic Motivation sub-dimension, the highest mean was observed among teachers who graduated from Education Institutes (M = 4.77), and the lowest among those from Higher Teacher Schools (M = 4.01). Despite this variation, the ANOVA results revealed no statistically significant difference among the groups (F = 1.875, p = .114). Similarly, for the Extrinsic Motivation sub-dimension, mean scores varied slightly across groups (ranging from 2.82 to 3.36), with the Faculty of Arts and Sciences graduates showing relatively higher extrinsic motivation levels. Yet, the differences were again not significant (F = .904, p = .462). Overall, these findings indicate that teachers' motivation levels—both intrinsic and extrinsic—do not significantly differ based on their field of graduation.

Teaching Motivation Levels of PrimaryTeachers by Professional Seniority (Year)

One-Way Analysis of Variance (ANOVA) was conducted for unrelated samples to determine the teaching motivation levels of primaryteachers. The findings regarding the ANOVA test are given in Table 6.

Table 6. ANOVA Results of Primary Teachers' Teaching Motivation Levels by Professional Seniority (Year)

Scale/Sub-Dimension	Group	N	X̄	Ss	F	p
Teaching Motivation	1-4	40	3.8958	.72936	1.175	.321
	5-9	48	3.7726	.90698		
	10-14	88	3.5824	.84234		
	15-19	88	3.6761	.91649		
	20 +	164	3.7276	.74118		
Intrinsic Motivation	1-4	40	4.3036	.69021	1.675	.155
	5-9	48	4.0357	1.06803		
	10-14	88	3.9269	.91301		
	15-19	88	4.0763	.99399		
	20 +	164	4.1882	.87917		
Extrinsic Motivation	1-4	40	3.3250	1.03149	1.624	.167
	5-9	48	3.4042	.88533		
	10-14	88	3.1000	.92823		
	15-19	88	3.1159	1.01062		
	20 +	164	3.0829	.81607		

When Table 6 is examined, it is determined that there is no difference according to professional seniority between teaching motivation and its sub-dimensions, intrinsic and extrinsic motivation levels (p>0.05).

CONCLUSION AND DISCUSSION

This study examines teachers' teaching motivation levels and analyzes whether motivation differs according to variables such as professional experience, gender, and field of graduation. According to the findings obtained, it was concluded that primary teachers' teaching motivation and intrinsic motivation levels are high, and extrinsic motivation levels are moderate.

It was concluded that the reasons why teachers choose to become teachers are mostly instinctive professional career, working with children and adolescents, shaping the future of children-adolescents, and being a backup career. At the same time, 97.8% of teachers stated that their teaching motivation is high. They explained that the reason for their high teaching motivation levels is generally their love for children and teaching, and social pressure. They stated that the reason for their low teaching motivation is that they are not valued by society, there is no support for teachers in this regard, and sufficient importance is not given.

In line with the research results, it has been determined that primary teachers' teaching motivation and extrinsic motivation levels from the sub-dimensions differ significantly according to gender, but intrinsic motivation levels do not differ. It was concluded that the significant differences in teaching and extrinsic motivation levels are in favor of female teachers. However, some motivation studies indicate that gender does not make a difference in teachers' motivation to teach (Güloğlu Demir et al., 2017; Akpolat & Oğuz, 2022; Bozan & Bozan, 2023). The study reveals that there is no significant difference in motivation levels according to teachers' age, field of graduation, and professional seniority. This finding shows that teachers can maintain their motivation in the following years as much as they did when they first started the profession. Similarly, there was no statistically significant difference between teachers' teaching motivation levels according to their field of graduation. This situation suggests that teaching motivation can be shaped independently of individual and professional factors. In other words, whether a teacher graduated from a Faculty of Education or another faculty, their overall teaching motivation levels remain similar. This result suggests that factors beyond academic background—such as professional experiences, school climate, administrative support, and interpersonal relationships within the school—may play a more substantial role in shaping teachers' motivation (Deci & Ryan, 2000; Han & Yin, 2016). The result of the study also indicate that primary teachers' professional seniority does not significantly affect their teaching motivation, either intrinsically or extrinsically. These findings suggest that motivation is a relatively stable construct among teachers over time. This outcome is consistent with prior research emphasizing that while teachers' motivation may fluctuate slightly during different career phases, it generally remains stable in the absence of major contextual or organizational changes (Han & Yin, 2016;

Jesus & Lens, 2005). Consistent with these findings, Akpolat and Oğuz (2022) concluded that teachers' gender, educational background, and professional seniority exerted no statistically significant influence on their motivation levels. In a similar vein, Tulunay Ateş and Buluç (2018) also determined that professional seniority had no significant effect on teachers' motivation.

The findings of the study suggest that it is essential to develop strategies aimed at enhancing teachers' motivation. Educational policies and school administrations should implement practices that foster both intrinsic and extrinsic forms of motivation. For instance, professional development opportunities, a supportive school culture, and well-designed career incentives can play a significant role in strengthening teachers' motivation and engagement.

Future research could explore in greater depth how motivation to teach varies across different school types and socioeconomic contexts. Moreover, a more comprehensive examination of the psychological and institutional factors influencing teacher motivation may provide valuable insights for shaping evidence-based and sustainable educational policies.

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Chapter 12

A THEORETICAL PERSPECTIVE ON THE DEVELOPMENT OF CHILDREN'S SCIENTIFIC THINKING AND SCIENCE PROCESS SKILLS WITHIN THE SCOPE OF EARLY CHILDHOOD SCIENCE EDUCATION

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Early Childhood Education is a period covering children in the 0-6 age range, where formal education begins and children change very rapidly developmentally (Bakioğlu & Karamustafaoğlu, 2022). Attainments in early childhood education form the basis of an individual's subsequent learning. It is a critical point for the educational content planned for this period to support all developmental areas in the acquisition of future life skills (Basit, 2020). It is known that the specific characteristics of children in this period are wondering, questioning, researching, and exploring. Due to these characteristics, the first steps and experiences related to science begin to form in this period (Babaroğlu & Metwalley Okur, 2018). At this point, as children's experiences increase, it can be described as the golden age of life for both accelerating cognitive development and taking the first steps towards scientific inquiry. The most effective and permanent learning for children in this period is experiential learning (Ünal & Aral, 2014). Teachers' full knowledge of the developmental characteristics specific to children in this period and their interest in scientific subjects improve their ability to convey scientific content and develop insights into how to convey it (Davis & Stephens, 2022).

According to National Science Education standards, "Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work" (National Research Council, 1996). The aim of science education in early periods is to enable the child to ask questions such as "why, what for, how, how much, when" and to provide support for metacognitive and life skills (Bayar, 2023). Providing science education in the early period is an important point for taking a strong step toward developing science concepts and scientific thinking (Çelik & Uzel, 2023). Specifically, children in the 2-7 age range experience learning many words, counting and reasoning, understanding different people's emotions and ways of thinking, and the learning of scientific branches, concepts, and facts (Gelman, 2005). Therefore, the child's ability to recognize and make sense of the planet and environment they live in will occur through science education in the early childhood period (Doğanay Koç, 2024).

The reason for centering science especially in this period stems from the existence of many elements that can affect children positively or negatively. The most critical of these is, of course, the interpretation of children's potential for thought and learning. It is emphasized in the literature and applications that children have a strong ability to learn what they thought beforehand, and that learning environments also affect this learning process. In addition, science in the preschool period prepares a foundation for children to adopt scientific thought in later years and is decisive in the development of primary attitudes and skills related to science (Bulut Öngen & Ersay, 2022). Especially in these early periods of life, enriching and deepening interests with science

makes a valuable contribution to children acquiring focus and inner control skills (Bowman, Donovan & Burns, 2001). The most natural and prominent results of being exposed to science education in early periods are that children will gain research skills and start the next education levels as students with high readiness for the purpose of deepening science education (Aktaş Arnas, 2002). Along with this, practices acquired especially in this early period are also predictors of children's high scientific performance in subsequent stages (Bulut Öngen & Ersay, 2022).

Today, as technological developments and scientific research increase and raise the development levels of countries, the importance of scientific skills and science education aimed to be acquired in the early period has come to the fore even more, especially as it is a critical period (Doğanay Koç, 2023). In a qualified science education, there is a need for education leaders and parents who know how to respond to children's questions and how to support and direct their curiosity. This is because the dominant factor affecting children's lives is the reality of teachers and parents (Ceylan, Kahraman & Ülker, 2015). In this case, early childhood educators have more influence on the formation of children's science concept schema compared to educators at other levels (Çelik & Uzel, 2023). When studies in the literature are analyzed, it is seen that there is a relationship between early childhood teachers' belief in their competencies and the frequency of implementing science activities and children's belief in their own competencies (Oppermann et al., 2019). At this point, it is stated that preschool teachers have a great responsibility and should adopt an inquiry-based teaching perspective in the early period to provide support for science learning (Speldewinde, 2024). With inquiry-based science teaching, children's scientific thinking skills develop, and they are enabled to find answers to scientific inquiries and act like scientists. These scientific inquiries of children develop their skills to solve problems, inquire, and explore through games in nature (Hesterman & Hunter, 2021).

According to Önal & Sarıbaş (2019), early childhood teachers should have three primary qualities in science education: The teacher must master the field and the developmental characteristics of children. They should make a preliminary preparation compatible with the educational content and include themes appropriate to the children's level. They should prepare an environment suitable for the child, the theme, and science education. In Okur & Okur Akçay's (2021) study, the method early childhood teachers felt most inadequate in was project work, followed by study trips and analogies. This state of feeling inadequate caused teachers not to use the methods they struggled with in scientific activity processes. The teachers who participated in this research claimed that they were easy techniques and stated that they mostly used game, experiment, and drama activities. Teachers need to be aware of their inadequacies and improve them, and they also need to prepare

themselves so that children adopt a positive attitude toward science. In the study conducted by Öner & Ercan (2023), early childhood teachers evaluated the expression of science as science, formal sciences, and technology, and did not include social sciences. According to this finding, it was stated that educators' perceptions of science largely consist of conducting experiment, science, and math activities.

A child with a positive attitude toward science becomes ready for the process as an individual who is competent in learning subsequent scientific information and confident in their learning experiences at all stages of education (Yıldız & Zengin, 2021). The importance of playing games in the early childhood period is known. A positive attitude toward science is achieved by children enjoying science-related experiences during game-playing processes (Hesterman & Hunter, 2021). Generally, children's curiosity and exploration goals encourage them to play in nature and to research by playing; this process prepares the ground for science learning (García-González & Schenetti, 2022).

The effect of science education on children is evaluated from two aspects: The development of scientific concepts that begin to deepen in the early childhood period with science education supports the learning of other concepts. Scientific thinking skills are acquired by supporting mental development (Bayar, 2023). For these to turn into practice, qualified science education must be offered. Qualified science education in children: creates a positive attitude toward science, increases children's self-confidence, makes children inquiring individuals, supports children's mental development, leads to deep learning as opportunities for learning by experience are given, and supports metacognitive development (Bayar, 2023). Regarding the content of science education and its effect on cognitive development, Özpir Mantaş (2018) stated some of the components that will enable early childhood children to learn science content better as follows: triggering the child's motivation for learning, activating many senses, including multi-faceted stimuli, offering the opportunity to observe, ensuring the acquisition of life skills, and providing support for children in constructing what they have learned. These components also make learning permanent by making it easier (Ültay & Ültay, 2022).

The Scientific and Technological Research Council of Turkey (TÜBİTAK, 2018) defined science centers as follows: "Science centers are centers that bring together individuals from different age groups and backgrounds with science, making science and technology understandable and accessible for society, encouraging their visitors to try and explore with an interactive teaching approach, aiming to increase the importance of science and technology in the eyes of society, containing experimental and applied activities, observing public benefit, not established for profit, and financed by public and/or private sector resources". While science centers increase the awareness of science

among visitors of all ages, they also present the place of science in our daily lives in an understandable and experiential way.

The environment where science education takes place should be prepared considering children's developmental level and educational content. Materials in the educational environment should be in a way that can attract children's interest and not contain danger (Dağlı, 2014). Materials thought to be necessary in the science center in the classroom can be exemplified as: geometric shapes, clock, magnet, scales, magnifying glass, maps, various stones, insects, skeletal system, organs, tooth and jaw models, dried plants, germination materials, batteries, and animal pictures (Orhan, 2019). Apart from these, scientific activities can also be carried out outside the classroom. The out-of-classroom environments early childhood teachers visit within science education are quite diverse. They generally benefit from the school garden a lot; besides this, visited areas include libraries, museums, and cinemas (Öner & Ercan, 2023); animal nests in nature, markets, and planetariums are out-of-classroom environments where scientific activities can be done (Bayar, 2023). Another area used for science education in out-of-classroom environments is blue wetland areas. These areas are not preferred very often for science learning. However, in such a science education environment, children can recognize rocks and sandy terrain structure, have discussions with their peers about the chemical structure of water, or gain new information about the biodiversity of the area (Speldewinde, 2024). At the same time, through visits to science centers, the scientific concepts and information children acquire become concrete, trigger their curiosity by providing encounters with various perspectives, and offer the opportunity to learn by experience.

Just as the importance of environments in science learning, the educational program carried out must also be prepared in a qualified manner by taking it into account (Öner & Ercan, 2023). In educational programs, examples with traces of daily life should be presented especially. In this case, before meeting actual life problems, children experience the situation at a more basic level and get a chance to produce solutions accordingly. Thus, children perform a rehearsal regarding life problems that may arise in future periods (Ünal & Aral, 2014). Preschool education programs generally cover all developmental areas of children, put children at the center, allow children to learn for themselves, and prepare a framework compatible with the situation as a guide for them in this process (Akgündüz & Akpınar, 2018).

Consequently, dealing with science in early periods: forms the basis of children's perspective on science and scientific knowledge; producing science is a natural and important part of early period learning; gives momentum to children's spontaneous curiosity and explorative games; meets the need to make sense of the environment, facts, and materials with this natural curiosity; and forms the basic step of starting to learn with an inquiring approach. By

providing opportunities for scientific exploration in the preschool period, children form a multi-faceted ground in working with peers, ensuring control of motor skills, and being able to use and develop linguistic, social, and early period math perception skills (Worth, 2010).

It has emerged as a result of examining related studies that the formation process of the concept of science has a detailed and long history in preschool education literature. Many of the field researches have focused on the way the concept of science is formed in the early childhood period (Fragkiadaki et al., 2023). From the first years of their lives, children form many sophisticated understandings about the world around them by gaining daily experiences in the environments of various social institutions such as family, society, and education. However, there is very little information about the formation of scientific concepts in these first years (Köksal Tuncer & Sodian, 2018). In studies conducted, it is stated that systematic science learning begins in infancy and early childhood years (O'Connor et al., 2021). Years ago, the idea that 2-year-old children could think like scientists would have been found meaningless (Köksal Tuncer & Sodian, 2018). Jean Piaget, considered a pioneer in the field of cognitive development, proposed that the way of thinking of children in the early childhood period was the exact opposite of a scientific perspective. According to him, children in early childhood are individuals who do not think logically (Beins, 2012). Today, it has been revealed by studies that these statements have no share of truth. In fact, experimental studies have shown that children in infancy and early childhood periods have an intuitive understanding of the events around them and the earth they are in (Gopnik, 2012).

In science education, early learning can become practical when it is meaningful for children, and the effect of education emerges clearly. Children's complex scientific perceptions do not form independently; on the contrary, they are in a mutual relationship with children's daily realities and natural life needs. Children in the infancy period learn to understand the codes of the language of science besides the linguistic codes of the society they are in. The perception of science's narratives begins with being able to think scientifically (Fragkiadaki et al., 2023). In field research, the importance of qualified child-parent interaction in children's early inclusion in the scientific process is emphasized. It has been stated that gaining scientific understanding for children and ensuring children actively take part in the scientific process will lead the child to apply the skills intended to be gained while being aware of them. In addition, the relationship between the reasons for play and the urge to learn science actually emphasizes the important task of games in children's involvement with science. On the other hand, during early childhood, children approach the world and everything around them in a very curious and interested way. Therefore, it becomes important to present

learning environments where they can deepen and expand this exploration process and scientific understanding. Thus, children will establish a dialectical relationship between existing information and what they learn from daily life. All these understandings form the basis of scientific thought in science (Köksal Tuncer & Sodian, 2018).

The primary aim of science education is to provide early childhood children with the ability to think scientifically. Scientific thinking is a part of 21st-century skills (Klahr & Dunbar, 1988). Scientific activities that should be included early form a basis for more sophisticated ways of thinking in later periods of life (Kampeza & Delserieys Pedregosa, 2024). In dominant developmental paradigms, it is assumed that science learning is a dynamic process of change. Therefore, qualified practical acquisitions are needed for science learning, and the understanding that adults should create the conditions for children to be included in this process is dominant (McWayne & Melzi, 2023). In their research, Trundle (2015) stated that young children are instinctive researchers and that teachers and field experts should keep these abilities of children alive and guide their spontaneous curiosity. According to Johnston (2009), the mutual interaction children form among themselves through group work in the preschool period and the relational bond between them and the adults who support the process are among the critical elements that provide support for the acquisition of scientific skills in this period. In this context, studies state that preschool teachers do not have sufficient information regarding science education, and furthermore, their self-efficacy and confidence regarding the teaching and presentation of science in a practical context are at an insufficient level (Chen et al., 2022). Early period science education research suggests teaching language with scientific thought in order to build children's thought processes and direct their actions. This is because studies have shown that experimental and evidence-based assessment competence can be predicted (Koerber & Osterhaus, 2019). Science education is not a point handled separately in preschool education but rather a format presented intertwined with different learning areas (McNerney et al., 2020).

In this scope, scientific thinking is a process of consciously making an informational discovery, such as being able to ask questions, test hypotheses, make observations, define stereotypes, and make inferences (Kuhn, 2002). It is stated in the literature that children enter this process at young ages by making inquiries for exploration purposes. At this point, it can be said that children are quite successful and effective in reaching the answers to what they are curious about in the context of the questions they ask. Children make inferences about the effectiveness of their questions, reason, and can make inferential decisions about who they need to reach in order to access information (Ronfard et al., 2018). Scientific thinking, a critical mental skill of the early childhood period, has a primary role in the acquisition of basic skills

toward the solution of problems throughout life (Salahova, 2023). Along with being able to pursue scientific thinking and scientific questions, curiosity has an important function in developing motivation regarding the process (Jirout & Klahr, 2012). With the development of children's scientific thinking skills, their existing curiosity is fed and they are enabled to use it within the process. This is important for the development of children's intellectual side (Salahova, 2023). It is thought that making systematic and continuous interventions in children's thought tendencies will have a positive contribution to the development of scientific thought and the upbringing of children who can think uniquely (Tekerci & Haktanır, 2023).

Scientific thinking, integrated with seeking information for a specific purpose and the integration of theories and facts, covers many stages and primary skills. For example, components such as asking various questions, conducting research, proposing hypotheses, modeling the experimental process, analyzing data, and making inferences form the focus point of scientific thinking. Acquiring these components in the early period will support young children's critical and analytical thinking skills in subsequent periods (Salahova, 2023). Acquiring information specific to scientific fields through scientific inquiries is an important quality for increasing scientific thinking skills (Zimmerman, 2007). However, this situation can occur when children know how hypotheses can be produced and tested (National Research Council, 2012). Recent research on causal learning in the exploratory play process in the preschool period has been interpreted to support the view that "the learning and thinking skills of very young children are strikingly similar to many learning and thinking in science": Children test hypotheses with data and make causal inferences, learn from statistics and informal experiments..." (Gopnik, 2012, s. 1623). Along with this, studies on how children can explore concepts and phenomena related to their environment indicate that children embody their thoughts and experiences by making drawings in order to participate in the scientific thinking process (Hall, 2009). Regarding how curiosity improves scientific thought, there are three mechanisms through which "children's curiosity can support the development and continuity of scientific thinking": curiosity can (1) motivate information-seeking behavior, which (2) leads to question-asking and other information-seeking behaviors, and (3) can activate relevant prior knowledge and support deeper learning (Jirout, 2020). Studies reveal that encouraging curiosity in the preschool period can contribute to creating intrinsic science motivation in later periods and science success in the high school period (Gottfried et al., 2016).

In the study titled "Symbolic Representation of Young Children in Science: Insights into Preschool Children's Drawings of Change of State of Matter," it was intended to determine the type of situations that children between 4-6 years old can draw using the drawing method in early childhood science

education. With this goal, it was aimed to clarify the scaffolding to be created for the support of semantic creation. At the end of the study, it was stated that young children used iconic and symbolic representations depending on various situations (Kampeza & Delserieys Pedregosa, 2024). Along with the information parents previously acquired and the scientific beliefs they adopted, providing cooperative parent-child interaction (Callanan et al., 2020) also affects the level of scientific reasoning of young children. There are various researches regarding the significant relationship of children's scientific reasoning skills with factors of education levels of family and parents. In a research conducted by Osterhaus & Koerber (2023), as a result of causal analyses, it was put forward that the effect of parents' education level on scientific reasoning appeared based on the scores of children in kindergarten and that parents' education level mediated the development of scientific reasoning. It is stated in the study that at least one member of families in the high education level category has a university diploma. This situation shows that a parent's interest and proximity to science in the family makes an important contribution to the child's scientific reasoning.

Scientific Content in Preschool: In the research conducted by Williams & Sheridan (2018), it is emphasized that children constantly encounter scientific content in children's games and daily situations, but it is rare for early childhood teachers to notice these situations and turn them into science learning opportunities. Scientific activities are not always planned before the education process; considering children's spontaneous explorations and observations (Eshach, 2011), teachers need to evaluate such opportunities and increase their own scientific competencies and awareness in order to improve children's science learning (Tunnicliffe & Gkegouskou, 2020). Finally, in order to evaluate the early scientific thinking tendencies of children at the preschool education level in our country, the scale titled "Scale for Evaluating Scientific Thinking Tendency in the Early Period," whose validity and reliability study was conducted by Tekerci & Haktanır (2023), can be suggested for the use of field experts.

The early childhood period is valuable in that it is a time slice when children start learning science and science concepts, and at the same time, when scientific thinking skills are acquired and ways to reach scientific information are explored (Aktaş Arnas, 2002). Scientific processes in early childhood emerge as a result of trial-and-error and inquiries that children experience in their games. For example, experiences such as children noticing that a sound comes out by hitting objects against another material in the infancy period or observing floating and sinking objects while taking a bath can be assumed to be the first scientific process attainments. Thus, children enter into an interaction with those around them and start to form a foundation in the acquisition of a scientific perspective by exploring (Genç Kumtepe, 2011).

Science process skills are expressed as skills that support children's ability to understand events in the world and nature they live in, to comprehend, to conduct investigations, to interpret, to notice problems, and to find answers to these problems (Yüzbaşıoğlu et al., 2023). These skills are among the primary skills children use while reaching information, examining problems, establishing information in their minds, and establishing relationships between outputs at the end of the process (Lindt, 2000). The use of these skills becomes an important part of children's lives within the process and at the same time provides a mental habit for children (Erol et al., 2022). With the use of scientific skills, hypotheses are produced regarding unknowns, and an observational, experimental, and interpretative approach comes along with these hypotheses (Kartal & Arslan, 2022). In science's coming to the fore in the social arena, which is an indicator of how developed nations are, the value the members of that society attribute to scientificness, how and how much science process skills are used, and the importance given to scientific knowledge appear as criteria (Aral & Kadan, 2022). Science process skills, which have an important role in experiencing the most basic life experiences related to science, facilitate the conceptualization of science and also provide the activation of developmental areas in the curriculum (Adsız & Kutluca, 2023).

Science process skills are divided into two: basic skills and integrated-advanced skills. The foundation of advanced science process skills begins to develop in the preschool period. Basic process skills are classified as measuring, classifying, observing, inference, prediction, and communicating; while advanced science process skills are classified as hypothesizing, controlling-interpreting data, experimenting, and model designing (Yüzbaşıoğlu et al., 2023). From these skills, basic process skills can be gained by children in the preschool age group (Soydan, 2017). The thinking skill that conscious guidance will provide in the preschool period will affect children's learning processes in later times in a positive way. Therefore, it should be aimed to provide skills such as making observations and measurements through various activities, recording data, making inferences from data, and interpreting these for the acquisition of science process skills in preschool (Yılmaz et al., 2022). Children examine everything carefully in the process of exploring those around them. In this process, rather than giving rote answers to children's questions, children's experience should be supported by including science process skills in exploration regarding reaching answers (Güvenir & Türkmen, 2023). Basic science process skills form the basis of scientific reasoning and are critical skills that must be acquired and mastered before advanced science process skills are gained (Sezer & Arslan, 2023).

Observation: Observation skill is the most basic skill children acquire by observing the first information. For example, while a child has not yet

encountered and tasted papaya, a tropical fruit, they express what papaya is, its color, shape, description, or what it looks like based on their observations (Padilla, 1990; Sezer & Arslan, 2023). Observation is among the primary skills used in daily life along with its scientific use. Children in the preschool period can share their observations and ideas with other people, listen to others, and blend their thoughts with others' ideas (Güvenir & Türkmen, 2023). Through this skill they acquire, children can also classify objects by comparing them and distinguishing their similar and different features (Lind, 2005; Erol et al., 2022).

Classification: It is the skill of separating and placing objects according to certain characteristics or types suitable for a group (Sezer & Arslan, 2023).

Prediction: Prediction skill is defined as making meaningful explanations based on acquired information regarding an event thought to occur in the future. For predictions to be meaningful, there must be preliminary information about the event (Güvenir & Türkmen, 2023).

Inference: With the aim of explaining the subject observed or the events occurring, a conclusion is tried to be reached using evidence (Sezer & Arslan, 2023). Making an inference can be said to be reaching a conclusion by basing the expected result of a new experience on the data of the previous experience, i.e., evidence, using data related to information we learned through experience, so to speak. Children in the preschool age group can express what they think about the causes of events. Using this skill generally requires asking many questions and having more experience (Güvenir & Türkmen, 2023).

Measurement: Measurement can be expressed as describing objects quantitatively. At the same time, it is also called the skill of determining quantitative features by observing events or objects at a basic level (Güvenir & Türkmen, 2023). While these features are determined, standard and non-standard measurement tools are used in the measurement skill (Sezer & Arslan, 2023).

Communication: Children use communication skills to make sense of what they encounter regarding both scientific and daily life issues. This skill ensures the sharing of ideas through ways such as drawing pictures and graphics, performing enactments, speaking, and listening (Maranan, 2017). It can be stated that actions such as keeping notebooks or diaries, drawing pictures, and using photographs from online sources are indicators that children record data along with using communication skills (Güvenir & Türkmen, 2023).

As a result, the internalization of scientific content and the effective practicalization of process skills are largely associated with children's cognitive abilities. Using these skills in an integrated way can ensure that

children grow up as individuals who can produce solutions to both their own problems and the problems of the society they are in in subsequent periods. At this point, educators and children need to practicalize their scientific skills and ensure the continuity of the learning process to support the development of an innovative society model (Oluwaseun & Ademola, 2020).

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SCIENTIFIC LITERACY IN EARLY CHILDHOOD IN THE LIGHT OF THOMAS KUHN'S THE STRUCTURE OF SCIENTIFIC REVOLUTIONS

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Thomas Samuel Kuhn, a philosopher and historian of science, was born on July 18, 1922, in the United States. He completed his doctoral studies in physics at Harvard University. Beyond physics, Kuhn developed a strong interest in the philosophy and history of science. Over time, this interest profoundly influenced the history of science and philosophy, culminating in the publication of his revolutionary work The Structure of Scientific Revolutions in 1962. In 1962, he continued his academic career as a professor of the philosophy and history of science at Princeton University, and later, in 1979, at the Massachusetts Institute of Technology (MIT). Due to his contributions to the history of science, he was awarded the George Sarton Medal. In the final years of his life, he was diagnosed with cancer and passed away in 1996 (Karaköse, 2020).

Questions concerning the nature of scientific knowledge, how it is produced, and how it changes over time constitute one of the core areas of debate in science education. In this context, Thomas Kuhn's The Structure of Scientific Revolutions challenges the traditional view that science progresses in a linear and cumulative manner, instead demonstrating that science develops within a paradigm-based, historical, and social structure. The concepts of normal science, paradigm, and scientific revolution proposed by Kuhn have had profound effects not only on the philosophy of science but also on research in science education and pedagogical approaches. These effects have particularly contributed to the strengthening of constructivist approaches that center on learners' interactions with knowledge.

The paradigm concept introduced by Kuhn regarding the nature of science emphasizes that science education is not merely a process of content transmission; rather, it underscores that knowledge is constructed within historical, cultural, and social contexts. In early childhood, scientific literacy is conceptualized as a dynamic structure that involves process skills such as curiosity, questioning, observation, generating explanations, and developing alternative ideas, rather than the rote memorization of scientific concepts. According to the Cambridge Dictionary (2024), "literacy" is defined as the ability to read and write. While many dictionaries adopt this definition, emerging forms of literacy in recent years encompass additional elements. One such form, "scientific literacy," refers to the understanding of scientific concepts and processes. This understanding enables individuals to cope with everyday scientific problems and supports their integration into a society that embodies the competencies required by the contemporary world (Kähler et al., 2020). Another definition characterizes scientific literacy as the ability to use acquired knowledge to understand evolutionary processes and innovative developments occurring in science and nature, to make decisions regarding these developments, to identify problems, and to draw evidence-based conclusions in a multidimensional manner (Firman, 2007). Similarly, PISA

defines scientific literacy as the ability to understand changes caused by various activities and to make inferences by using scientific knowledge in decision-making processes (Woodward, 2009). The concept was first introduced by Hurd in 1958 (Turgut, 2005) and has remained relevant and prominent in scientific research since that time.

The components of the acquisition process of scientific literacy, which align with Kuhn's understanding of knowledge, reflect the notion that children are not passive recipients of scientific knowledge but active agents who construct meaning based on their own experiences. In this respect, scientific literacy in early childhood can be associated with Kuhn's idea of conceptual change. Children enter learning environments with preconceptions derived from their daily experiences, and these conceptions are reconstructed through new scientific experiences. The paradigm concept enables the explanation of the development of scientific literacy in early childhood through cognitive transformations in children's ways of understanding the world. Moreover, Kuhn's perspective, which emphasizes the cultural and social dimensions of scientific knowledge, demonstrates that science education in early childhood cannot be considered independent of family, environment, and cultural context. In this sense, Kuhn's understanding of science provides a strong theoretical framework for fostering scientific literacy in early childhood by supporting children's meaningful, inquiry-based, and context-oriented engagement with science at an early age.

Early childhood is a critical developmental period during which individuals' ways of understanding the world are shaped and fundamental concepts and thinking habits are formed. During this period, scientific literacy is regarded as a multidimensional competency that involves curiosity, questioning, observation, establishing cause–effect relationships, and making sense of experiences, rather than memorizing scientific information. Kuhn's epistemological perspective is significant in explaining how children develop scientific concepts not as fixed and absolute truths but as dynamic meaning systems constructed through their own experiences. Within this chapter, scientific literacy in early childhood is examined in the context of Kuhn's understanding of science, and perspectives are offered on children's conceptual change processes, the role of learning environments, and the cultural and social dimensions of science. Accordingly, it is argued that early childhood science education should be approached in a more inquiry-based, meaning-oriented, and holistic manner in light of a Kuhnian perspective.

THOMAS S. KUHN'S VIEWS ON SCIENCE AND SCIENTIFIC KNOWLEDGE AND THE POSITIVIST APPROACH

From the 1950s to the 1980s, the dominant view regarding the nature of science was the positivist conception of science. According to this view, science is free from prejudice and objective; it has its own distinctive method, and the roles of theories and laws are clearly defined. Observation and experimentation are considered sufficient to support theories. Scientific knowledge is viewed as absolute, certain, and cumulative. Scientists are assumed to be unaffected by social, historical, and cultural factors, to evaluate data from the same perspective, and to exclude irrational elements from their work (Yardımcı, 2022, p. 32). Thomas Kuhn articulated his critique of this approach in the preface of his book as follows:

"A fortunate accident that led me to participate in work related to a university course introducing physics to non-scientists enabled my first encounter with the history of science. This initial acquaintance with past scientific theories and practices unexpectedly and profoundly shook the fundamental conceptions I then held about the nature of science and the reasons for its remarkable success. These conceptions had partly arisen from scientific education itself and partly from my longstanding amateur interest in the philosophy of science. Despite their pedagogical usefulness and abstract plausibility, these views proved wholly incompatible with the image presented by the historical approach" (Kuhn, 2017, p. 61).

According to Kuhn, contrary to the logical positivist approach, the nature of science is influenced by non-cognitive and external factors. Science is reliable, yet always fallible; it cannot be reduced to a logical operation based solely on data and theoretical generalizations. Science gains meaning only when evaluated within its historical context and belongs to a specific community. Scientific knowledge is grounded in observations (which are themselves subjective), empirical evidence, rational arguments, and skepticism. Observation and experimentation alone are insufficient to support or falsify a theory. Moreover, science cannot be independent of prejudice. Scientific knowledge is not absolute but constantly changing. There is no single universal scientific method, and different scientists may interpret the same experimental data in different ways. Science and scientific knowledge are influenced by personal, social, cultural, political, and ethical factors, as well as by scientists' social and political interests (Yardımcı, 2022, pp. 38–39). Scientific progress occurs through scientific revolutions, whereby one competing paradigm disrupts the existing flow. Thus, it is impossible to speak of the absoluteness or objectivity of scientific knowledge; all knowledge undergoes change and development. As Kuhn stated, "Scientific knowledge, like language, is intrinsically the common property of a group or else nothing at all. To understand it, we must know the special characteristics of the groups that create and use it" (Kuhn, 2017, p. 320).

THE STRUCTURE OF SCIENTIFIC REVOLUTIONS

Thomas Kuhn's analyses of the nature of science and scientific knowledge are examined in depth through the concepts of paradigm, normal science, crisis, and scientific revolutions. In The Structure of Scientific Revolutions, published in 1962 and regarded as a classic in modern science and philosophy, Kuhn discusses the macro-level revolutions and transformations in the history of science, focusing on paradigm-driven periods. These periods include pre-paradigmatic science, normal science, the emergence of paradigms, the appearance of anomalies, crisis, and the emergence of scientific revolutions (Anlı & Yılmaz, 2019).

Kuhn's perspective represents both a critique of positivism and an effort to develop an alternative understanding of scientific knowledge. According to Kuhn, scientific development does not occur in a linear fashion but through radical transformations in which one paradigm replaces another as a result of scientific revolutions (Denktaş, 2015). This work also addresses the idea of progress—one of the fundamental values and assumptions of Western intellectual history and democratic societies—and the core assumptions underlying experimental scientific practice (Kuhn, 2017).

1. The Path to Normal Science

Normal science refers to research firmly grounded in past scientific achievements accepted by a particular scientific community to ensure continuity in practice (Kuhn, 2017). The pre-normal science period involves competing perspectives within a scientific field and the accumulation of factual knowledge without consensus on a systematic approach or problem-solving framework (Topdemir, 2002; Yardımcı, 2022). The subsequent phase, characterized by systematic knowledge production, is referred to as the period of normal science.

The Concept of Paradigm

Paradigms provide scientists with a framework that defines the components of the universe, their possible behaviors, the questions that can be asked about nature, and the techniques through which these questions can be most effectively investigated (Kuhn, 1977). By clarifying scientific direction, paradigms function as instrumental tools that facilitate scientific work (Güzel, 2010). Kuhn later clarified that he used the concept of paradigm in two distinct senses. In its primary sense, as a "disciplinary matrix," a paradigm integrates the beliefs, values, and techniques shared by a particular group. In its secondary sense, it refers to exemplary problem solutions or models that replace explicit rules in normal science (Yardımcı, 2019).

Kuhn defined scientific revolutions as the replacement of an old scientific tradition with a new one, emphasizing that the choice between competing

paradigms is largely a social–psychological process rather than a purely rational one (Kuhn, 2017, p. 16). Paradigms serve as models that generate further exemplars. Although paradigms lack absolute immutability, they persist as long as they offer plausible solutions to existing problems and outperform competing approaches in coherence and explanatory power (Denktaş, 2015).

Although paradigms do not possess absolute permanence in terms of explanatory scope and content, what sustains a paradigm—unless a scientific revolution occurs—is its potential to provide solutions to problems under existing conditions. Another important feature that renders a paradigm significant is its ability to offer more successful and coherent explanations for critical problems compared to competing approaches (Denktaş, 2015). As an example, Aristotle's view of the universe—asserting that the Earth is at the center—occupied a dominant position during the period in which scholasticism prevailed, owing to the internal consistency of its explanatory system within prevailing conditions. During the medieval period, the dominant religious climate embraced the existence of a creator or a prime cause as a fundamental presupposition in explaining nature. This situation prevented scientists from adopting deterministic and materialistic approaches in explaining natural phenomena. Given the dominance of scholastic thought, religious explanations outweighed scientific ones and were widely accepted (Denktaş, 2015).

Formation of the Paradigm

Thomas Kuhn emphasizes that an individual's background plays a decisive role in paradigm selection and argues that paradigms or theories cannot be directly compared, as scientists base them on different foundational assumptions (Yeniçırak, 2013).

Certain paradigms gain acceptance because they are more successful than competing paradigms in solving significant problems. A paradigm also serves as an early indicator of the anticipated success expected from selected but still incomplete exemplars, while normal science represents the realization of this expectation. For normal science to advance, the paradigm's knowledge concerning instructive phenomena and the congruence between these phenomena and the paradigm's predictions must be strengthened, and the paradigm itself must be further articulated. Kuhn refers to this process as "articulation," noting that it has both empirical and theoretical dimensions (Topdemir, 2002).

The empirical dimension consists of three stages: the examination of facts revealed by the paradigm concerning the nature of objects; the investigation of facts that can be directly compared with the paradigm's predictions; further empirical studies aimed at articulating the paradigm, particularly addressing problems previously identified but not resolved (Topdemir, 2002).

The theoretical dimension of normal science can similarly be categorized. In this dimension, the aim is either to demonstrate new applications of the paradigm or to increase the degree of precision of previously established applications. However, Kuhn notes that scientists tend to resist the articulation of paradigms at both empirical and conceptual levels, as deviation from predicted outcomes is perceived as failure. Consequently, during the normal science period, scientists primarily engage in puzzle-solving activities (Kuhn, 2017).

This raises the question: if this is the case, what is the source of innovation within the scientific process? According to Kuhn, during a game governed by established rules, unexpected situations may arise, leading to the development and adoption of new rules. Kuhn refers to empirical innovations as discoveries and theoretical innovations as inventions. Discovery, in this sense, involves recognizing the existence of a phenomenon that contradicts the dominant paradigm of normal science. Kuhn asserts that discoveries share common characteristics (Kuhn, 2017). Every discovery process involves: the perception of an anomaly; the clarification of the anomaly at both conceptual and observational levels; the emergence of changes—often resisted—that affect paradigm categories and applications. From these observations, Kuhn concludes that paradigms are the most effective tools in the emergence of innovations. Once scientists adopt a paradigm, they tend to engage in increasingly abstract formulations, become more professionalized, narrow and rigidify their perspectives, focus on greater detail, and develop specific expectations. Situations in which these expectations are not empirically confirmed may then arise (Kuhn, 2017).

1.1. The Nature of Normal Science

The period of normal science consists of research conducted in accordance with the dominant paradigm and built upon existing or past achievements (Tümkaya, 2018). Unlike the pre-normal science phase, normal science operates under a primary paradigm capable of addressing problems and resolving puzzles. According to Kuhn, the emergence and success of a paradigm enable scientists to enter the phase of normal science. This period is characterized by growing commitment to and confidence in the successful paradigm.

The dominant paradigm guides the prevailing scientific perspective of the period and establishes the rules and standards for research. Rather than seeking new paradigms, scientists focus on refining, deepening, and extending the existing one (Tümkaya, 2018). The role of scientists during this period is to adhere to the dominant paradigm, reflecting a consensus and determination regarding its validity (Yardımcı, 2022).

According to Kuhn, problems arising during the normal science period are addressed using the tools and suggestions provided by the dominant paradigm. This process is referred to as puzzle-solving and is a defining characteristic of both normal science and scientific practice (Tümkaya, 2018).

Because paradigms lack absolute certainty, the emergence of problems that cannot be resolved is inevitable. As unresolved problems accumulate during the normal science period, contradictions—referred to by Kuhn as anomalies—arise. This leads to a decline in confidence and commitment to the dominant paradigm, initiating a search for alternatives and ushering in a new phase known as crisis. During this crisis phase, efforts to find new solutions mark a departure from normal science, eventually replacing it. Thus, normal science can be said to begin with the establishment of a paradigm and to end prior to its collapse (Denktaş, 2015).

1.2. Crisis and the Emergence of Scientific Theories

In this section, Kuhn discusses the invention of new theories and the crisis process, which resemble discovery but result in more profound transformations. The crisis phase arises when the existing paradigm fails to resolve emerging problems, prompting efforts to consolidate a new paradigm. Kuhn notes that although scientists' confidence in the prevailing paradigm diminishes during this period, abandoning it remains difficult despite the presence of anomalous examples (Kuhn, 2017).

In response to anomalies, scientists attempt to eliminate contradictions by modifying the internal structure of the existing paradigm. This process resembles repairing a damaged tool to restore its functionality. For scientists who interpret nature and phenomena through the dominant paradigm, transitioning toward a fundamentally new paradigm represents a significant and challenging shift. Following the crisis phase, the previous paradigm is abandoned, and after a period of theoretical exploration, the newly emerging paradigm begins to gain acceptance within the scientific community (Demir, 2012).

1.3. Scientific Revolutions

Scientific revolutions are not cumulative. They are part of a developmental process in which the dominant paradigm of normal science is replaced by a new and fundamentally different paradigm. The new paradigm does not build upon the old one but directly supplants it. At this point, Kuhn draws an analogy between scientific and political revolutions. Political revolutions arise when dominant systems fail to provide effective solutions to prevailing problems, leading to systemic change. Similarly, scientific revolutions occur when the existing paradigm loses its functional capacity. In both cases, the prerequisite for revolution is the recognition that the current system is no longer effective.

Just as societies must choose between competing regimes following a crisis, scientists must choose between competing paradigms during scientific revolutions. These choices are influenced by sociological and psychological factors. Consequently, scientific knowledge production cannot be considered independent of the beliefs, values, and decisions of knowledge producers (Kuhn, 2017).

During this process, competing paradigms interpret problems through different conceptual lenses, rendering direct comparison impossible. Since paradigms are based on fundamentally different assumptions, they lack a common standard and are therefore incommensurable (Yeniçırak, 2013). When a new paradigm replaces an old one, all associated concepts, criteria, and measurements undergo transformation. Even fundamental terms may carry different meanings across paradigms. For example, the concept of mass differs between Newtonian and Einsteinian paradigms: while Newtonian mass is invariant and conserved, Einsteinian mass is always convertible into energy (Kuhn, 2017, p. 194). Similar examples include the reclassification of the sun from a planet to a star following the Copernican revolution, and the differing interpretations of oxygen by Lavoisier and Priestley. Thus, revolution represents a transformation in worldview—a paradigmatic shift analogous to biological mutation driven by contextual conditions.

Thomas Kuhn's approach to scientific revolutions is grounded in the view that science does not progress linearly or cumulatively but undergoes conceptual, methodological, and epistemological transformations through paradigm shifts. This perspective underscores that scientific knowledge production is inseparable from human, social, and cultural factors and that engagement with science should not be confined solely to experts. In this context, the concept of scientific literacy aligns meaningfully with Kuhn's perspective. Scientific literacy requires individuals to understand science not as a collection of absolute truths but as a human activity evolving through changing paradigms, debates, and social contexts. As with scientific revolutions, scientific literacy necessitates questioning existing modes of thought, evaluating alternative perspectives, and generating innovative solutions to complex problems. The incommensurability of paradigms demonstrates that scientific literacy cannot be reduced to mere knowledge acquisition but must encompass scientific attitudes such as critical thinking, curiosity, creativity, and patience. In this sense, scientific literacy constitutes a competency domain that shapes individuals' relationships with scientific knowledge and influences their judgments and decisions, as emphasized by Kuhn.

Recent scientific and technological advancements have brought increased attention to the concept of scientific literacy, positioning it as a cornerstone of 21st-century skills (Bartan, 2020). Scientific literacy does not require individuals to become scientists; rather, it necessitates a comprehensive

understanding of the rapid development of science. Thus, scientific literacy addresses all members of society. The National Science Education Standards define scientific literacy as the capacity to make informed personal decisions, participate in cultural and societal affairs, and possess knowledge of scientific concepts and processes necessary for economic productivity (Welch, 2012). Research indicates that while students with lower levels of scientific literacy can solve routine problems, those with higher levels are capable of addressing more complex and unconventional problems (Fıtria, 2018).

The American Association for the Advancement of Science defines a scientifically literate individual as one who understands the interconnections, strengths, and limitations of science, mathematics, and technology; is familiar with the natural world and its diversity; internalizes scientific principles; and uses scientific knowledge and methods for social purposes (AAAS, 1989). Individuals possessing these characteristics can comprehend the relationship between scientific and social issues, recognize scientific work ethics and the nature of science, understand core scientific concepts, and distinguish between science and technology (Laugksch, 2000). These definitions demonstrate that scientific literacy extends beyond knowledge to include scientific skills and attitudes. Attributes such as a passion for learning, a critical stance, and the pursuit of evidence reflect the expressive and complex nature of scientific attitudes (Demirbaş & Yağbasan, 2006). Scientific attitude represents a critical outcome of acquiring scientific literacy and requires educators to consider the nature of inquiry and questioning. Four key attitudes are emphasized: curiosity, creativity, critical thinking, and patience—interdependent dispositions that cannot be considered in isolation (Fıtria, 2018).

In PISA 2006, scientific literacy was conceptualized across four dimensions (Woodward, 2009): Contextual dimension: encompassing individual, family, social, and global contexts; Content dimension: involving core scientific terms necessary to understand ecological phenomena and anthropogenic changes; Competency dimension: including inquiry skills, logical reasoning, and analytical abilities, with subcomponents of identifying scientific questions, explaining phenomena scientifically, and using scientific evidence;

Attitudinal dimension: addressing attitudes toward science, motivation for scientific careers, and lifelong application of scientific concepts and techniques.

Scientific literacy has also been examined across three dimensions: acquisition of scientific process skills, understanding the societal impacts of science and technology, and comprehension of fundamental scientific terms and concepts (Miller, 1983). Aktamış and Ergin (2007) expanded this framework to seven dimensions, including understanding the nature of science, mastery of key scientific concepts, knowledge of scientific methods,

comprehension of science–technology–society–environment relationships, acquisition of scientific process skills, recognition of core scientific values, and the development of interest and attitudes toward science.

Due to rapid societal and technological changes, scientific literacy has become increasingly important. It facilitates young children's adaptation to a constantly evolving world and supports their understanding of scientific expressions (Chen et al., 2021; Bozanoğlu et al., 2022). Scientific literacy enhances problem-solving capacities and is particularly critical in addressing contemporary challenges such as climate change, global health issues, and sustainability (OECD, 2018). Adaptation to these developments has become a necessity, and early childhood—when foundational learning experiences occur—represents a critical period for acquiring scientific literacy. Children's experiences in environments such as homes and preschools significantly influence this acquisition (Kähler et al., 2020). Introducing scientific literacy early in children's lives contributes to the development of a more qualified society and individuals capable of practical problem-solving (OECD, 2018). While scientific literacy evolves during later childhood, its roots lie in early childhood education (Morgan et al., 2016), and individual differences in preschool scientific literacy levels persist into primary education (Kähler et al., 2020).

Scientific literacy also serves as a tool for strengthening children's character. PISA emphasizes character development as an integral component of scientific literacy, highlighting attributes that can be fostered through the learning process (Fıtria, 2018). These include observation skills associated with honesty, discipline, diligence, creativity, independence, cooperation, curiosity, and responsibility; classification skills reflecting similar traits; communication skills fostering friendliness, democratic values, tolerance, compassion, and social responsibility; measurement skills reinforcing honesty and discipline; and prediction and inference skills promoting creativity and curiosity.

Children's initial scientific schemas are known to form during early childhood, and experts emphasize the importance of acquiring scientific literacy and scientific attitudes at a young age. At this juncture, early childhood teachers play a critical role. Preschool teachers must themselves possess strong scientific literacy skills, as these competencies positively influence children's attitudes toward science and serve as role models (Bartan, 2020). Scientific literacy is among the educational priorities of many countries worldwide (Tekin, Aslan, & Yağız, 2016), and early childhood programs in Turkey incorporate learning outcomes that form the foundation of scientific literacy. The responsibility for fostering these skills lies with early childhood educators (Şahin Kalyon, 2020), who should design activities that support children's natural curiosity, encourage questioning, observation, data collection, and conceptual discovery (Fıtria, 2018). Literature reviews indicate that preschool-

focused literacy studies constitute a relatively small proportion of overall research, underscoring the need for increased emphasis and deeper exploration of scientific literacy in early childhood education (Oğuz Hacat & Demir, 2019; Şahin Kalyon, 2020).

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Chapter 14
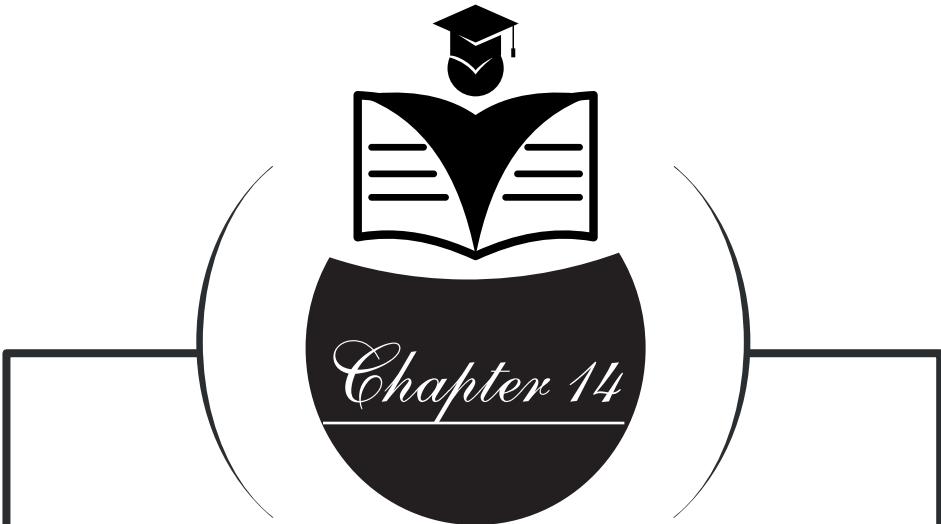
THE EFFECT OF MUSIC ON LANGUAGE DEVELOPMENT

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1. INTRODUCTION

Language and music cannot be considered as separate elements. Sound, one of the fundamental building blocks of music, occupies a primary position in the systematic development of language. Furthermore, both language and music possess a specific rhythmic and tonal structure (Ertek- Babaç & Yıldız, 2018). Language and speech ability, as an innate characteristic, clearly distinguishes humans from other species. The need for language is fundamental for humans to communicate verbally with each other and share their thoughts and experiences. The development of this ability is a continuous process that begins at birth and continues throughout an individual's entire life (Öztürk, 2005).

Children's language development progresses in parallel with their overall development. The main reason for this is that children engage in more thinking, questioning, and therefore more learning activities during their language development period. The structures that make up language are grouped under the headings of sound system, sequence (syntax) system, and meaning (content) system. The sound system explains the composition of the smallest sound units called phonemes in each language and how the language is built on these sounds. The sequence (syntax) system is concerned with the meaningful arrangement of words within a sentence. Meaning (content) information details how words are conveyed through symbols and what meaning they express (Temiz, 2002).

Psychologists have proposed three different fundamental approaches to how language is acquired:

Behaviorist Theory (Skinner), Social Interaction Theory (Vygotsky), and Psycholinguistic Theory (Chomsky). According to these theories, the way language is learned differs: Behaviorist theory explains the process through reinforcement by the environment; Social Interaction theory suggests that it occurs through social interactions such as imitation, observation, reinforcement, and feedback; while Psycholinguistic theory argues that humans are born with a genetic, innate ability to learn language (Karacan, 2000; Selçuk, 2004). This section of the book examines the effects of music on children during their developmental stages, the role of music in language development, the pre-speech period, and the speech period, and discusses the importance of language and music.

2. MUSIC IN CHILDREN'S LANGUAGE DEVELOPMENT

Language and music attract interest due to their similarities. The fact that sound is fundamental to both fields and that both serve as means of communication are among the foremost of these similarities. When examining research in our country, although there is sufficient work in both language development and music, the number of studies examining the relationship

between language development and music is quite limited (Ertek- Babaç & Yıldız, 2018).

Bingöl (2006), In his study, he pointed out that there is a certain rhythmic and tonal structure in both language and music. However, despite this similarity, he stated that while grammar rules are fundamental in language, aesthetic rules are fundamental in music. In this context, the impact of music on children's language development processes is of paramount importance.

Çaydere (2006), In his research examining the effect of music on language development and reading education, he has thoroughly reviewed studies on the connection between reading, language, and music education. The study has shown that music is a critical tool in children's individual language development. Furthermore, it is a proven finding from various studies that singing positively develops language skills. On the other hand, while verbal and nonverbal communication skills develop, which of these skills takes precedence over the other is still a matter of debate.

In a similar way, Hargreaves ve Zimmermann (1992) In their research, they found that children over the age of 5 learn the lyrics of songs first, then the rhythm, and finally the musical sounds (melody) during the song acquisition process (Akt. Yıldız ve Nacakcı, 2016).

Güneş (2010), In his study, he noted that almost all lullabies of unknown origin were composed by women and that mothers conveyed their love to their children through this medium. He concluded that lullabies, which were once sung solely for the purpose of putting children to sleep, have recently been used for educational purposes as well. This research is important in terms of linking language development, which plays a critical role in the development process, with music, bringing the field of "music in language development," which has been studied more intensively abroad than in our country, to the forefront in our country as well, and thus contributing to the literature. Starting with the question of where, how, and in what way music is involved in language development periods and the factors that influence language development, the research question was defined as "What is the role of music in language development?". Welch, Sergeant ve White (1998), In their research titled "The Role of Language Proficiency in Song Acquisition," they focused on the interaction between singing in early childhood and language development. To this end, they taught two simple songs to 184 children aged five, six, and seven and, at the end of the process, used voice tests to examine whether the children prioritized lyrics, rhythm, or melody in learning songs. The study ultimately concluded that students tended to learn the lyrics of the song first. Music played in a manner appropriate to the child's age and developmental level contributes significantly to language development. A child's musical development begins while still in the womb, with the perception of sounds

from the outside world. The beginning of language development is considered to be the first cry at birth. Based on these starting points, this paper attempts to explain the role of music in the different stages of language development (Ertek- Babaç & Yıldız, 2018).

Lullabies also play a significant role in language development in children. Lullabies contain fundamental elements of music such as rhythm, melody, and emphasis, thereby enhancing infants' phonological awareness and auditory discrimination skills. These rhythmic and auditory stimuli during the early period lay the groundwork for learning the basic sound structures of language. Furthermore, the repetitions found in lullabies increase the baby's familiarity with vocabulary and sentence structure, supporting speech development in the future. Thus, lullabies serve as a musical bridge, making an important contribution to early language acquisition.

Lullabies are of great importance both in terms of passing on cultural values to new generations and advancing children's language skills (Ertek-Babaç & Yıldız, 2018).

Lullabies have been an important part of our culture for centuries. In Divan-ı Lügati't-Türk, one of the oldest dictionaries of the Turkish language, lullabies are defined as "songs sung by women to put babies to sleep in their cradles." From the past to the present, lullabies have been used not only to put children to sleep and calm them down, but also for many different purposes, such as ensuring they live long lives, protecting them from the evil eye, and helping them grow quickly. The traditional expressions in lullabies help children learn about culture, traditions, and customs. These songs contribute to the development of language structure, word and syllable recognition, and speaking skills. In addition, lullabies support children's social skills and character development, while their melodic structure also positively affects their physical development. The themes of motherhood, family love, and tolerance in their content help children develop feelings of love and tolerance. For this reason, lullabies are a valuable teaching tool for early childhood (Kabadayı 2009; Çek-Cansız, 2010).

3. THE FİRST YEAR OF LANGUAGE DEVELOPMENT İN INFANTS (0-1 YEARS)

Babies, especially in the first few months, have the opportunity to repeat the lip, jaw, and tongue movements necessary for sound production through their crying and whining behaviors. Through this process, they learn to regulate their voice and breathing; at the same time, they begin to effectively use the sound-breath coordination and speech organs that form the basis for language development (Yavuzer, 2010b).

In the first months after birth, the baby tries to make sense of the sounds

coming from its surroundings and plays characteristic games with its own voice by making sounds similar to these sounds (Hargreaves, 1986; Howe vd. 1998; Trevarthen, 1999). For babies who establish their first communication through crying, listening to soothing music that includes classical music and nature sounds during the first months of life can help calm them. As the child begins to babble around 6 months of age, a decrease in crying behavior is observed. Mothers can hum songs and lullabies to support the child's sense of rhythm. In addition, attempting to talk to the baby by making various sounds, then listening to and imitating the sounds the baby produces, will encourage the child to make new sounds. By the time the baby reaches 10 months, they can demonstrate the ability to make rhythmic syllables with two-syllable words and imitate animal sounds.

In this way, the child engages in their first linguistic communication behavior through sound. Over time, their desire to express themselves progresses with the discovery of new words and the ability to form sentences, marking an important stage in language development. Experiments have proven that by the middle of their first year after birth, babies can hear and distinguish musical parameters (rhythm, melody, etc.) (Demany, 1982; Trehub, 1987, Trehub vd., 1993; Zentner vd., 1996).

4. AGES 1-6 (LANGUAGE ACQUİSİTİON STAGE)

Children continuously expand their vocabulary at an average learning rate of 5 to 8 words per day between the ages of one and six. During this period, when sounds are associated with specific symbols, children may use expressions such as "beep" for car or "choo choo" for train (Yavuzer, 2010a).

At this stage, the importance of songs that introduce symbols becomes apparent. For example, children's songs such as "Choo choo train, is anyone getting on? If anyone is getting on, come quickly..." can help the child associate the symbol "choo choo" with the concept of a train. In addition, reading musical picture stories can develop both the child's visual and auditory skills. When the child reaches the age of two, the questioning period begins; they constantly use question phrases such as "who?" or "where?". At this point, songs such as "Little frog, where is your tail?" or "Moon, where is your house?" can stimulate the child's curiosity and contribute to their language development. When the child reaches the age of three, their vocabulary and pronunciation skills have matured, so they can easily memorize age-appropriate songs and build their own repertoire (Başer, 2004). The age range when egocentric speech is frequently observed is between 3 and 4 years old. During these years, when stuttering problems can intensely emerge in children, the child's language development should be carefully monitored (Temizyürek, 2008).

Four-year-olds enjoy being able to demonstrate a skill on their own and being praised for it. At this age, there is also a noticeable increase in their

desire to sing songs by themselves (Akkaş, 1996:91. Akt. Başer, 2004:). The use of music in a child's educational process during early childhood positively contributes to their language development (Aral ve Can Yaşar, 2015).

During this age period, it is important to show interest without pressuring children and to allow them to sing popular and fun songs that they listen to freely. At the same time, when children ask, they should be made to feel how enjoyable and valuable singing together can be. Children who learn to have fun with their friends and play together in environments such as kindergarten or daycare may eventually also enjoy singing together and playing musical games.

5. THE CONTRİBUTIONS OF MUSİC TO LANGUAGE DEVELOPMENT.

Music, which expresses feelings and thoughts through sound, rhythm, and melody, plays a major role in children's lives and is a shared value. Actions such as keeping rhythm, singing songs, and dancing to music are innate and instinctive behaviors for children. This innate tendency in children can be used as an effective educational tool. For this reason, music is now recognized as an educational method in its own right in many countries. A properly guided musical experience from an early age positively supports children's development and contributes to them becoming happier and more successful individuals in their future lives. For this reason, music must be present in children's lives (Deleş & Kaytez, 2020).

The effective development of an individual's language skills acquires a healthy and lasting quality thanks to the interconnected and simultaneous progress of their "native language" and "musical language (Saraç, 2006).

Music, nursery rhymes, and songs are used during early childhood to make significant contributions to a child's development (Soysal, 2012). During this period, when children hear familiar words in songs, their brains establish connections between the sounds they hear and the words they say. Activities such as singing songs, reading poetry, and reciting rhymes support the development of children's early reading and writing skills (Güler, 2008).

Especially during early childhood, the proper use of music significantly supports not only the child's cognitive development but also other areas of development (social-emotional, language, and motor development) (Aral ve Can Yaşar, 2015).

Research has shown that children who receive music education learn to read more easily and develop more advanced problem-solving skills compared to their peers who do not receive such education. It has also been concluded that children who are able to correctly pronounce musical

notes also pronounce letters more easily and accurately. Furthermore, various music-based activities during early childhood also support the child's exploration and creativity skills (Gün Duru ve Köse, 2012).

Gordon (2000) He stated that there is a meaningful relationship between rhythm and language and reading proficiency in infancy. Through music, children learn to use sounds correctly and pronounce words accurately. Language is also defined as the starting point for socialization and human relationships. All children born healthy are equipped for language development from birth and are talented in language learning. The language development process progresses simultaneously with the child's other areas of development. Even though children are born with this equipment, the environmental stimuli provided to them are of great importance. One of the environmental stimuli provided to children is music (Kılıç, 2012).

Educational studies conducted in the field of language development have shown that elements found in music, such as rhythm and sound patterns, play a supportive role in learning spoken language (Jakobson, Cuddy ve Kilgour, 2003).

Language is defined as a fundamental means of communication that enables individuals to mutually convey their thoughts, knowledge, and skills (Karagöz ve İşcan, 2016).

Language development is often perceived primarily as the advancement of vocalization or speaking skills, but its most critical aspect is actually hearing and listening. This relationship between hearing, listening, and speaking skills forms a structure that parallels music. Indeed, thinkers such as Herder, Rousseau, and Spencer also emphasize this parallelism between music and language development (Selçuk, 2004). Music holds an indispensable place in human life. As children grow up, they encounter music in many areas of life and use it in different ways. They incorporate music into their lives through nursery rhymes in games and songs they hear on television. Not only educators in schools but also parents need to be aware of the impact of music on child development (Tutkun, 2023).

Music activities enrich children's vocabularies. Even if children do not know the meaning of many words in songs at that moment, they memorize these words and understand their meaning over time. In addition, music helps children adjust their tone of voice and speak more fluently (Babaç ve Yıldız, 2018).

Music, which plays an important role in the education of children with special needs, is also included in early intervention programs developed for these children. Music therapy, in particular, is a method frequently used by educators to support the social, mental, and language development of children

with special needs (Çadır ve Avcıoğlu, 2013).

Additionally, language is described as the fundamental element that forms the basis of socialization and human relationships. Every child born healthy possesses the innate equipment and ability to learn language. Language development progresses simultaneously with the child's other areas of development. Although children have sufficient equipment for language development from birth, the environmental stimuli provided to them are of great importance. Music is at the forefront of environmental stimuli for children (Kılıç, 2012).

When it comes to language development, although it is often perceived primarily as an indicator of speech production or speech development, the most vital aspect of speech is hearing and listening. The existing relationship between hearing, listening, and speaking skills has a structure that parallels music. Indeed, prominent researchers such as Herder, Rousseau, and Spencer have particularly emphasized this parallelism between music and language development (Selçuk, 2004). Including music in a child's educational processes during early childhood provides positive and significant contributions to language development (Aral & Can Yaşar, 2015).

During this period, when children hear familiar words in songs, they can establish a connection in their brains between the sounds they say and the sounds they hear. Activities such as singing songs, reciting rhymes, and reading poetry significantly help children develop their early reading and writing skills (Güler, 2008).

Music activities help expand a child's vocabulary; even if the child does not know the meaning of a word at that moment, they store it in their memory and gradually develop the ability to understand its meaning over time. Additionally, music plays an extremely important role in helping a person adjust their tone of voice and speak fluently (Tutkun, 2023).

6. RESULT

The fact that language and music share common structural features such as sound, rhythm, and tonal patterns clearly demonstrates that these two fields cannot be considered separately. Throughout the lifelong process of language development, which begins at birth, music plays a significant role both as a powerful environmental stimulus and as an effective educational tool.

Just as humans are born with the capacity to learn language, behaviors such as keeping rhythm, singing, and dancing also emerge naturally in children. These instinctive tendencies in children can be effectively utilized to support language development. The foundation of language development is laid with crying, while the foundation of musical development is laid with auditory perception, which begins in the womb. Exposure to classical music,

nature sounds, and lullabies during a baby's first year contributes to calming, developing breath-voice coordination, and forming the ability to distinguish musical characteristics.

During the language acquisition period between the ages of 1 and 6, music significantly supports both cognitive and linguistic development. Children's songs and musical stories expand vocabulary by strengthening the relationship between concepts and symbols. Research shows that children pay attention to lyrics first when learning songs, demonstrating the central role of music in language learning. The rhythms and repetition patterns offered by lullabies, nursery rhymes, and songs play a major role in developing phonological awareness and auditory discrimination skills.

In conclusion, music is not merely a supporting element in early childhood education, but a fundamental requirement for the effective development of language skills. It is known that children who receive music education develop reading skills more quickly and strengthen their ability to correctly pronounce letters and notes. Furthermore, music contributes to the child's social adaptation process by promoting cognitive, social, and emotional development. Therefore, it is crucial for parents and educators to actively incorporate music into language education to help children acquire healthy and lasting communication skills.

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