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The New Crisis of The Modern World: New Generation Parenting and Changing Parental Roles

Research Article

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ABSTRACT

Global economic and social advancements have reshaped education, a pivotal component of the societal structure. The globalization-induced transformation of education into a market commodity has led to perceiving it as a buyable and sellable product, resulting in shifts in parental roles. The proliferation of private schools has sparked heightened expectations from parents toward their children and educational institutions. This surge in expectations has given rise to the overbearing and perfectionist approach, commonly referred to as 'helicopter parenting,' emerging as a new crisis in the modern world. This excessively intrusive parenting style, stemming from changes in the mindset and daily practices of the new middle class, has become a detrimental factor negatively impacting the social, psychological, and academic development of children. This study delves into the evolving parenting roles, exploring the phenomenon titled 'new generation parenting' as manifested in students' developmental processes. Its aim is to uncover the social causes of the overbearing parenting style and its effects on students. Following the phenomenology design, a qualitative research approach, this study selected 8 participants through criterion sampling. Examining the individual and social reasons behind the helicopter parenting approach, the focus of this research, holds significance in preventing situations that could hinder students' development and alter parental roles in a broader context.

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Keywords:

Parenting, New Generation Parenting, Helicopter Parenting, Parenting Roles, Education

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Introduction

As one of the new crises of the modern world, parents' over-involvement and over-interventionist approaches to their children have become one of the important issues of social life and the educational agenda. This new generation of parenting attitudes, which has emerged as a result of crowded preference lists, uncertainty and fierce competition in every field, has deeply affected parental roles. In addition, the changing and transforming social roles and behaviors due to the transformation of neoliberal discourse into a dominant character in the social sphere have transformed education into a consumption preference and a serious change has occurred in the new generation of parents' perspectives on school and education. Parents' preferences for their children's education are no longer based solely on a rational interest based on economic expectations, but also in terms of providing parents with considerable symbolic capital in the social sphere. As a result, it can be said that the state of educating and being educated, in which parental preferences are one of the most determining factors, has turned into a kind of self-investment outside of its natural course.

In this new era where success and gain have become the most fundamental norm, individuals are forced to constantly change and transform in order not to be left behind and performance triggered by concepts such as lifelong education becomes an obligation for everyone (Gorz, 2011). This environment, in which success is sanctified and those who fail are seen as useless for the market and are excluded, leads to an increase in the anxiety parents feel about their children's future. This increased anxiety has led to the emergence of helicopter parents who focus too much on their children and try to control their children's lives at every moment (Cutright, 2008). Among the prominent characteristics of helicopter parents, high expectations for children's academic success and the effort to control all behaviors of children by closely following their lives come to the fore (Odenweller, Booth-Butterfield & Weber, 2014). This new generation parenting attitude, also defined as 'Overparenting' or 'Tiger Parenting', can be seen as one of the factors that negatively affect children's social, psychological and academic development. Parents who gain a privileged position in the social sphere economically and spare no expense for their children to gain a good future almost exclusively as an economic measure, overlook the fact that a good future cannot be bought. As a result, the struggle of parents who send their children to school to compete and who plan and closely monitor their children's every moment constitutes a problematic behavioral field in terms of the relationship of motherhood and fatherhood with children.

There are many academic studies on changing parenting roles and new generation parenting as a result of the effects of post modernization and globalization. While some of these studies focus on parenting attitudes in the digital age by associating new generation parenting with technological developments (Ayhan & Öztürk, 2021; Kurtoğlu & Uslupehlivan, 2021), other studies focus on the effects of parenting attitudes, which have more say in educational processes with the rise of the urban new middle class, on the development of children (Avcı & Şatır, 2020; Coşkun & Katıtaş, 2021; Yılmaz, 2002). There are also studies focusing on the social reasons for changing parenting roles (Gökler & Atamtürk, 2021), but their number is limited. The aim of this study is to examine the reasons for the change in parenting roles that take all kinds of responsibilities of their children and start to harm their educational processes by focusing too much on their present with the concern of saving their future. The research is considered important in terms of investigating the reasons for the new generation parenting attitudes that lead to a transformation in traditional parenting roles on the basis of social change. With this study, it is aimed to reveal the social reasons for the over-controlling new generation parenting approach, which is described as helicopter parenting, based on the subjective experiences and meanings of parents.

This new generation parenting approach, which also transforms school-family relations, is an issue that needs to be addressed in light of the social and economic transformations taking place across society. If the

reasons that push parents to this approach are analyzed and the cause-effect relationship is established in a healthy way, it will be easier to determine how educators should guide parents.

The general aim of this study is to examine the social reasons for the over-controlling new generation parenting approaches, which are described as helicopter parenting, in line with the views of parents and to find an answer to the following questions;

- How do parents conceptualize the notion of new generation parenting?
- From the perspective of parents, what duties and responsibilities do they attribute to ensuring their children's academic success?
- According to parents' perspectives, what impact does family involvement in education have on children's academic achievements?
- From the standpoint of parents, what apprehensions do they harbor about the future of their children in the contemporary world?

Urban New Middle Class

In terms of social theories, after the 1990s, objective and subjective factors such as property, occupation, authority, education and prestige have been emphasized when classifying social classes (Wacquant, 1991). As a result of the social, cultural and economic changes at the global level affecting all societies, the social group formed due to the expansion in the upper occupational group began to be called the "new middle class" for social scientists in the context of class discussions (Crompton, 1996). The new middle class is characterized by a rise in income due to professional positions and a rising social status. This class is also called the petty bourgeoisie and consists of middle groups in post-industrial societies (Ross, 1978).

Veblen (2005) and Simmel (1950) evaluate leisure time and consumption habits in urban life in the context of people's newly emerging needs and desire to possess things. Changes in lifestyle due to consumption habits are a result of a decrease in belief in ideologies and an increase in disappointments (Breen & Rottman, 1995 & Holt, 1995). The rise of subjectivity and identity construction processes can be seen as the reason for the change in the social and economic needs of the urban new middle class. Veblen (2000) explains the efforts of these newly emerging groups to position themselves differently in society by imitating the old middle class with the concept of conspicuous consumption. Conspicuous consumption is a concept that defines how newly enriched individuals or upstarts instrumentalize consumption. The effort of people who have just made ends meet to imitate people who are in a higher economic position than them results in ostentatious consumption. Thus, the need for ostentation replaces the need for consumption. This group, which reads books, magazines or newspapers for ostentation, uses participation in cultural events for social status, and perceives going on vacation as a status indicator independent of the need for rest, in a sense defines their own lifestyles. For example, shopping malls, which blur the boundaries between consumption, entertainment and ostentation, are one of the spaces designed to satisfy the needs of the new middle class (Martin, 1993). As a result of this changing mentality, it can be said that being a citizen or social acceptance is not based on one's skills or professions, but only on consumer preferences (Bauman, 1999). Bourdieu (1984) analyzes the individual's effort to differentiate himself/herself from other social strata through tastes shaped by social, cultural and economic capitals. Accordingly, the brand of the car owned, the number of rooms in the house, vacation preferences or credit card usage are perceived as factors that determine lifestyle. Cultural activities and leisure time activities not only allow people to categorize their lifestyles but also their tastes and preferences.

In Turkey, the expansion of the economic capital stock of the new urban middle class has a sociological significance in terms of its social consequences and changes in individuals' leisure time and consumption

habits, even though it is perceived as a change at the economic level. In other words, the new middle class can be classified not only on the basis of income but also on the basis of social behavior and preferences. Thanks to the populist culture that has increased its dominance with the widespread use of mass media, the lives of the new middle class are becoming more and more similar to each other, and the tendency to act in accordance with trends in many different areas is increasing (Öncü, 2002).

Schools as the Stage for the New Middle Class: The Parenting Show

Neoliberal policies have accelerated privatization efforts in many sectors in Turkey. Reductions in the state budget allocated for education, regulations to exempt private schools from certain taxes, and incentive loans offered to parents can be seen as factors that accelerated the privatization of education (Gök, 2004). In addition, as the middle class became economically richer, their preference for private schools increased the pace of private schooling in Turkey. This privatization movement in the field of education has had important social consequences. Individuals who did not feel secure in terms of their social position started to change their orientation towards education and education started to be used as a means of reproducing social position for these classes. New middle class families began to feel responsible for planning and closely following their children's entire educational lives. Individuals experiencing economic concerns have started to prefer private schools in order to prevent their children from experiencing the same problems and thus try to achieve privileged social positions (Gök, 2004). In this kind of school context, where knowledge and education have become commodities and exams based on academic achievement are used as almost the only means of measurement, parents and students have become customers and teachers have become sellers or salesmen (Keskin, 2012). This change has of course transformed parental involvement in education into a much more intense and intrusive style compared to previous years. Thus, a new generation of parenting attitudes and behaviors has emerged.

The fact that neoliberal policies have turned education into one of the commodities such as bread, cars and televisions that are bought and sold in the world, which is essentially a huge supermarket, and turned it into a consumption preference is one of the factors that negatively affect the quality of education (Apple, 2000). In order to make the right decision for their children's future, parents, who are torn between dozens of different options, have developed preference fatigue. In some schools, public relations and marketing activities have overshadowed important issues related to education and parent demands have begun to be taken into consideration instead of scientific sources when creating educational programs. As the effects of neoliberalism are felt more prominently in schools, the effort to educate students in line with economic goals is transforming the basic aims of education.

Private schools opened one after another in areas where the new urban middle class is densely populated have created new concepts every day in order to compete, focusing more on showcasing pedagogical science at almost the same pace as technology. In enrollment interviews, swimming pools, clubs and food menus were questioned more than the teaching staff, academic achievements and curricula. Parents' pleasure in being able to buy education with money, along with an "upstart" effect whose negative consequences would be seen much later, changed the structure of private schools. The fact that a private school operating in the Başakşehir district of Istanbul, with the same curriculum and staff structure, is not popular in the Kadıköy district reveals that there are also ideological influences in the new middle class's preference for private schools. In fact, the fact that some private schools affiliated to the same chain use different slogans in their advertising activities in different districts and create a promotional strategy according to the socio-cultural characteristics of the population in their location reveals the importance given to worldview in the criteria of the new urban middle class in school preference.

Helicopter Parenting

The concept of Helicopter Parenting was first used in 1969 by psychotherapist Haim Ginott. This concept, which emerged as a result of a child saying that his mother "spins around like a helicopter", was later included in the book "Parenting Teens with Love and Logic" written by Jim Fay and Foster Cline in 1992 (Peluchette, Kovanic & Partridge 2013). Helicopter parenting attitude defines a parenting approach that interferes too much in the lives of their children and keeps them under constant control (Duygulu, 2018). In this parenting attitude, which focuses exaggeratedly on their children's lives and academic achievements, the expectation of success is very high (Odenweller, Booth-Butterfield & Weber, 2014). This attitude, which is more common in educated parents with few children, has shortened the follow-up distance between children and parents and has led to the perception of normal behavior of parents who make decisions on behalf of their children (Bradley-Geist & Olson-Buchanan, 2014). Since children's preferences and wishes are not taken into account with this type of parenting, it can be said that it is relatively difficult for them to develop initiative. This attitude of parents who spend more effort than necessary to solve their children's problems, protect them against dangers and provide constant support may also harm children's development of self-identity and independence (Hirsch, Goldberger, 2010; as cited in Okray, 2016; Kwon, Yoo & Bingham, 2016). Research has also revealed that children of such parents experience depression and anxiety problems more frequently than their peers (Fischer, Forthun, Pidcock & Dowd 2007).

Helicopter parenting attitude begins to manifest itself when children are still young (Hong et al., 2015). The helicopter parenting process, which starts with the effort to manage the child's eating, drinking and playing habits, is triggered by concerns about academic success when the child starts school and is directed towards education. Behaviors such as finding the best school for the child, researching teachers in great detail, and providing disproportionate support for the child to do homework and projects in the most perfect way become evident at school age (Bristow, 2014). This parenting attitude is based on the intention to contribute positively to the child's school success and parents feel responsible when they do not provide this support. When they receive advice that an overly interventionist attitude will have a negative impact on the child's school life, they claim that they are doing this for their child to have a good future. This parenting attitude, which becomes firmly established at school age, continues in the following years. After high school, parents who have an interventionist attitude about which department their children will study, which university they prefer, and even whom they will marry are usually unaware of the negative effects of such a parenting approach on their children (Yoo et al., 2016).

Method

Research Design

This study was conducted in accordance with the phenomenology design, which is one of the qualitative research approaches. Phenomenology design focuses on phenomena that individuals are aware of but need to learn about the details by utilizing their unique perceptions and experiences (Creswell, 2013). In the phenomenology design, which seeks to understand the experiences of individuals regarding a phenomenon and the meanings they attribute to their perceptions, individual experiences are interpreted on a universal plane (Patton, 2014). Since phenomenology follows a descriptive approach, defining phenomena is more important than generalizing (Akturan & Esen, 2008). The phenomenon examined in this study is the helicopter parenting approach of new generation parents who focus too much on their children. In this context, it was tried to obtain in-depth information through parents' experiences related to child education and the subjective meanings they attribute to these experiences.

Participants of the Study

In phenomenological research, data sources are intended to be individuals or groups who have experience on the topic that the research focuses on and who can convey this experience. It is important to gain the trust of the participants in the interviews and to create a comfortable atmosphere where they can answer the questions sincerely (Yıldırım & Şimşek, 2018). In this study, the participants were determined by criterion sampling method, which is one of the purposeful sampling methods. In this context, the criteria determined for the parents whose opinions will be taken were determined as having at least one school-age child attending private school and being closely involved with their children. Criterion sampling is the creation of the sample from people, events, objects or situations that have the qualities determined in relation to the problem. In criterion sampling, it is an important criterion that the situations to be selected are rich in terms of providing information (Marshall, 1996). Demographic information about the participants of the study is shown in the table below.

Table 1. Demographic Information on the Participants in the Study Group

Participants	Gender	Age	Education Level	Occupation	Number of Children
P1	Female	37	University	Accounting	1
P2	Male	42	High School	Businessman	2
P3	Female	46	High School	Homemaker	2
P4	Female	32	High School	Homemaker	1
P5	Male	41	University	Banker	3
P6	Male	44	High School	Businessman	3
P7	Female	33	High School	Homemaker	1
P8	Male	44	University	Engineer	2

The study group consisted of 8 participants, 4 men and 4 women. After the first interviews were completed, the data were analyzed and the interviews were terminated after it was determined that sufficient data were obtained for the purpose of the study. The common aspect of these parents with different professions and education levels is that they have at least one child and are private school parents. Focus group interviews were conducted with five of the participants. Participants who were parents at a private school operating in Istanbul were selected from among parents who were more closely involved with their children and spent more time at the school compared to other parents. In order to identify these parents, the school principal was first informed about the research topic and then asked for name suggestions. The online focus group interview lasted an average of two hours. The parents were first informed about the topic and purpose of the research and then asked the research questions in turn.

Face-to-face individual interviews were conducted with the other three participants out of five. The selection of the three participants, who were also parents at a private school in Istanbul, was determined after a meeting with the school principal. Since two of the proposed names did not agree to be interviewed, interviews were conducted with the remaining three participants. The interviews with the participants lasted an average of half an hour.

Data Collection

In qualitative research, observation and interviewing is one of the most systematic and effective methods to make sense of people's feelings and thoughts. For this reason, the data were collected through face-to-face and online application of the semi-structured interview technique. In semi-structured interviews, questions are prepared and planned in advance, but new questions can be added during the interview depending on the course of the interview. However, in a structured interview, the researcher does not ask any questions other than the previously determined questions. Therefore, the semi-structured interview provides

flexibility to the researcher and allows for a more in-depth exploration of the subject (Leech & Onwuegbuzie, 2007; Yıldırım & Şimşek, 2018). In the data collection tool used in this study, there is a section that includes information on parents' gender, age, occupation and their children's age, grade and school. In the second part, there is a semi-structured interview form created to reveal the parents' parenting styles and new generation parenting approaches. The interview form consists of 5 open-ended questions that were approved by experts to be suitable for the purpose of the study. Expert help was obtained to ensure that the questions were understandable, clear, single purpose and without assumptions. Pilot interviews were conducted with two parents to measure the appropriateness and usability of the questions and some revisions were made to the questions.

Data Analysis

The data obtained from the interviews conducted within the scope of the research were analyzed by content analysis method. The purpose of this method is to bring together similar data by creating certain themes and categories and to organize all data to make them understandable (Yıldırım & Şimşek, 2018). Content analysis is a qualitative method applied to make written and visual data understandable. In order to analyze the data, the voice recordings of the participants were converted into text and the participants were coded as K1, K2. The transcribed interviews were sent to the participants and participant confirmation was obtained. After the interviews were read and analyzed, three themes and sub-themes and categories were created for each theme. In the findings section, these themes, sub-themes and categories are discussed in order and the participants' statements are presented together with the author's evaluations. In content analysis, within the framework of the model developed by Strauss and Corbin (1998), the steps of a) coding the data, b) finding themes, c) organizing the data according to codes and themes, d) interpreting the findings and e) reporting were used. Coding of qualitative data refers to a cyclical process rather than a linear one (Saldana, 2009). In this cyclical process, not only similarities but also differences, frequency, sequence (succession), relationships or reasons can be coded (Hatch, 2000).

Findings

In this section, the data obtained in relation to the question "What are the reasons for the change in parenting roles that take all kinds of responsibilities of children and start to harm their educational processes by focusing on them more than necessary?" and the 4 research problems that were sought to be answered in this context were analyzed. The data obtained as a result of qualitative research were analyzed by content analysis and themes, sub-themes and categories were determined. The themes were identified as "New Generation Parenting Concept," "Academic Achievement" and "Concerns".

The theme "New Generation Parenting Concept" was analyzed in two sub-themes: helicopter parenting and digital parenting. The helicopter parenting sub-theme was categorized as over-intrusive approach, family involvement in education and the effects of modern life; the Digital Parenting sub-theme was categorized as digital dangers, digital divide and cyber concerns.

The theme of "Academic Success" was analyzed in three sub-themes: expectations, being a private school parent and competition. The sub-theme of expectations was categorized as school expectations and parents' expectations; the sub-theme of being a private school parent was categorized as school hours and free time, buying success, and competitive system; and the sub-theme of competition was categorized as competition among students, competition among parents, and neoliberalism and education.

The "Concerns" theme was analyzed in three sub-themes: school pressure, future anxiety and technology use. The sub-theme of school pressure was analyzed under the categories of education system and academic pressure; the sub-theme of future anxiety was analyzed under the categories of living conditions, national exams and responsibility and self-confidence; and the sub-theme of technology use was analyzed

under the categories of cyber bullying and electronic babysitter. In this section, the themes, sub-themes and categories are explained in detail.

Theme 1- The Concept of New Generation Parenting

The first theme was identified as "new generation parenting concept". The definition of parenting has also changed depending on the social changes from past to present. In line with the purpose of the study, the participants were first asked how they perceived the concept of parenting, and since the answers obtained focused on the concepts of helicopter parenting and digital parenting, these two concepts were determined as sub-themes.

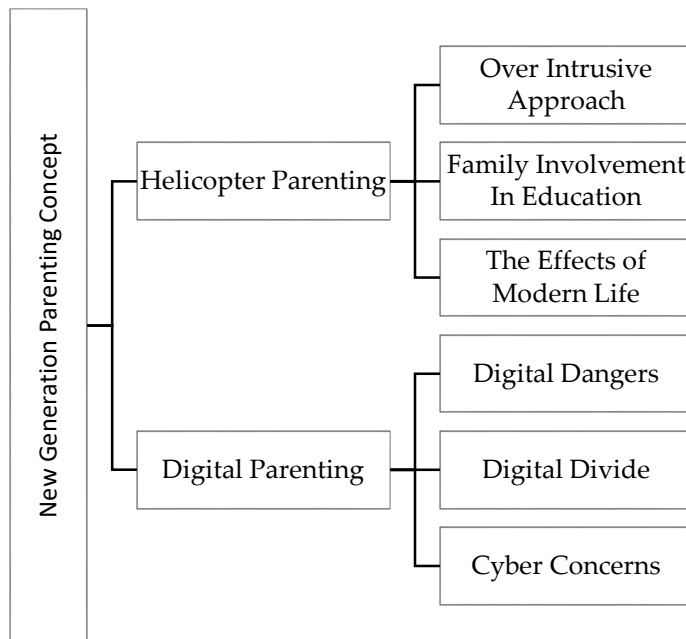


Figure 1: New Generation Parenting Theme, Subthemes and Categories

The Helicopter Parenting sub-theme is related to the behavior model and experiences of parents regarding their children and their children's educational life. This sub-theme is divided into three different categories. The first category is related to parents' methods of intervention with their children, and the participants described in detail how they developed a behavioral approach to their children due to the parental pressure they felt. Due to the intense anxiety they felt due to different factors, parents stated that they intervened a lot in their children's lives and that they were aware of this. One parent stated that their children work on command and described the situation as follows:

K1: While my mother was not particularly engaged in school matters, I personally took responsibility for my homework diligently, never missing an assignment. However, my daughter seems reluctant to initiate homework without a prompt. It seems we might have played a role in shaping this behavior. I find myself constantly instructing them – urging them to wash their hands, come to the table, complete their homework, or read a book. There is a concern about the extent of direction I provide, making me wonder what kind of life my child would lead if I didn't intervene. At times, I contemplate whether it would be better to let them navigate tasks independently, but the fear of potential risks restrains me. It feels like I'm directing a production at home, with a perpetual need for guidance. The dynamics and responsibilities have shifted significantly, reflecting a level of involvement that I did not experience in the past.

Another parent explained that she was forced to engage in the behaviors defined as helicopter parenting because of the current system and private schools.

P3: We are accused of being helicopter parents, yet we did not choose this path voluntarily. The exam system was introduced, and those who do not perform well are marginalized. Then, advice is offered to parents to remain calm. How can we maintain

composure in a system that places such high stakes on exams? Won't our children blame us in the future, questioning why we did not intervene? Enrolling them in a private school seems insufficient. In addition to private schools, parents invest in various study centers. Consequently, the term "private" loses its meaning as the financial burden extends beyond the school fees to include additional educational expenses.

Another participant said that she controls every moment of the children, but if she does not do this, the children cannot do things on their own and expressed this as follows.

P1: Our daughter is in the midst of a full rebellion phase, frequently expressing, "Mom, leave me alone!" It appears she perceives interference, but in reality, she relies heavily on my guidance. Despite occasionally staying with her grandmother, she consistently calls me multiple times in the evening, seeking advice on what to do. When left alone, she turns to me for direction, asking, "Mom, what should I do now?" It's a paradoxical situation where she insists on not being interfered with, yet consistently seeks my input when faced with decisions. This contradictory behavior leaves me feeling overwhelmed. Ideally, if she were more self-sufficient, I would gladly give her space and let her navigate things independently.

The second category of the helicopter parenting sub-theme consists of thoughts on family involvement in education. Parents stated that they had to be closely involved in their children's school success, and some parents said that they learned the subjects better than their children when doing homework with their children. In this section, parents again stated that they did not want to be so involved in education but were forced to do so due to circumstances. One participant explained that the definition of parenting has changed a lot in our time and that they are forced to adopt a very different approach from their own memories;

P4: The concept of parenthood has undergone substantial changes over time. Reflecting on the past, my parents, juggling the responsibilities of raising five siblings, were less involved in our school activities. I rarely saw my father, and my mother, although more attentive to our education than my father, didn't engage as comprehensively as parents do today. During my own exam preparation, my mother would observe without a clear understanding of the subjects I was studying. In contrast, I find myself now possessing a better grasp of my child's curriculum and even learn alongside them during exam periods. The question arises: what would happen if I refrained from assisting and supporting my child? The concern stems from the fact that other students in the class receive substantial support from their families. If I were to withdraw my involvement in an attempt to foster my child's self-confidence and independence, I fear they might lag behind their peers. In the current educational landscape, families engage collectively in even the simplest homework assignments, and parents find themselves inadvertently participating in a race to support their children. Given this scenario, it seems only natural that I, as a parent, hesitate to let my child navigate this journey alone.

Another participant emphasized that the advice given to parents at school contradicts the practices applied and stated that private school teachers and the education system in general cause helicopter parent behaviors as follows;

P3: My high school-aged child has already determined her future profession, and even my younger one, still in primary school, confidently declares his ambition to become an architect. Contrary to my own experiences during primary school, where I had little awareness of professions and future careers, today's children seem much more conscious and decisive. Their level of intelligence surpasses ours, emphasizing the need for attentive parenting. At times, we are labeled as helicopter parents, a term that conveys excessive involvement. Recently, during a school seminar, the guidance counselor advised against pressuring our children. However, with the busy schedules we often impose on them, it becomes challenging to grant them autonomy. The constant competition, including weekly mock exams with publicized results, creates an environment where children falling below certain standards feel embarrassed. Paradoxically, while advising parents not to exert undue pressure, the educational system itself perpetuates a competitive culture. Perhaps, before expecting changes in parental behavior, there should be a reevaluation and reform of the existing educational system.

Another participant explained that their children's grades affect their psychology a lot and that this situation affects the parents as well;

P5: I am personally more invested in my job, whereas my wife becomes greatly distressed when our children face academic challenges. Exam results hold significant importance for her, to the extent that when they receive low grades, she suspends her own work to provide additional support. I am concerned that this approach negatively impacts our children by shifting

the responsibility from their shoulders to ours. In the long run, this might hinder their ability to navigate challenges independently. It's crucial to recognize that success or failure is not confined to academic performance; it extends to various aspects of life, including future professional endeavors. If our children do not experience and overcome failures now, they may struggle to cope when faced with challenges in the workplace.

Another participant stated that she became obsessed with her child's academic achievement and that she had to follow the other children in the class in order to understand her child's academic level;

P1: In the first grade, my primary concern revolved around my child's ability to learn reading and writing. I diligently reviewed her homework on a daily basis, even reaching a point where I became concerned about the quality of her handwriting. To address this worry, I would visit the school and compare her writing to other samples on the bulletin board, questioning whether her writing was exceptionally poor or a common issue. Nowadays, I find myself consoling friends who share similar anxieties, assuring them that every child can learn to read and write with time. However, I empathize with their concerns, as I underwent the same experience. Presently, our focus has shifted to mathematical challenges. Some of the questions in the new-generation curriculum pose difficulties that aren't easily surmountable. Consequently, I inquire with fellow mothers about their approach to these problems – whether they assist their children or let them solve it independently. Instances where mothers affirm their child's self-sufficiency in problem-solving tend to evoke a sense of despondency in me.

The last category under the helicopter parenting sub-theme was identified as the effects of modern life. Emphasizing that the parenting relationship they have with their children is shaped by the conditions of modern life, parents again criticized the system. One participant stated that the purpose of education is to find a good job in the future;

P7: Everyone knows the main goals of national education but the main purpose of education is to find a job right now. Does anyone send their children to school to be good people, to have good morals? I don't think so, because moral education is already given at home. At the moment, we send our children to school so that they can get a good university education and can get a good job. In other words, the money I give for my child today will pay off years later. This is not investing in people, but this is the conditions of modern life.

A participant who emphasized that the modern world makes children asocial and that there are big differences between the life she lived in her childhood and today said the following;

P1: I lost my father during my childhood, and my upbringing was undertaken by my mother, who devoted herself to protecting me. In turn, I find myself committed to safeguarding my own children. Despite the growing complexities of modern life, I exert my utmost effort in fulfilling this responsibility. During my own childhood, I recall playing on the street with friends and rushing home after the call to prayer. Contrarily, my child seems disinterested in outdoor activities. Despite residing in a secure housing complex and having friends, he prefers staying indoors. Although he possesses a social nature, he opts to watch TV or engage with his cell phone at home. It's intriguing to note the difference between my own upbringing, where going inside was undesirable, and my child's inclination to stay indoors. The dynamics are indeed interesting and highlight the evolving nature of parenting across generations.

Another participant stated that she thinks about tomorrow rather than today and that that's why she worries a lot.

P4: I came across a proverb that emphasized the significance of not merely having children but exercising control over them. The process of exerting control over our children differs significantly from managing material possessions. Unlike inanimate objects, children cannot be discarded when they age or face difficulties. The commitment to their well-being extends until the end of our lives; it is not a transient responsibility. Currently, our efforts involve providing financial support. However, potential challenges may arise in their future marriages, perpetuating ongoing concerns. Historically, individuals discontented with their family life would often remain at home. In contrast, contemporary instances witness those in conflict leaving their homes and seeking refuge with their mothers. This shift signifies an added layer of responsibility.

Another participant, who stated that the economic crisis in the society and the general testing system put children and themselves under stress, expressed the reason why they emphasized school success a lot as follows;

P8: *My children are already under stress about the future. They watch the news, they see the unemployment figures, they are aware of the cost of living. Sometimes they ask, "Will you take care of us if we can't find a job in the future?" This is actually a social issue. However, in a country where job opportunities are scarce, and the university entrance examination appears to be the singular gateway for those struggling to meet basic needs, our options become limited. The primary investment we channel into securing a future for our children is education. It is widely recognized that academic failure often translates into unfavorable living conditions in the long term. Consequently, I am compelled to adopt a resilient stance.*

When we look at the parental thoughts under the sub-theme of helicopter parenting, it is seen that parents are aware that they intervene in children's lives more than necessary, but they have some reasons to justify these behaviors. Parents who mention factors such as the current education system or the pressure of private schools feel that they will be left behind if they do not follow their children closely and see this behavior as an ideal parenting approach. It is noticeable that parents who state that they do not want to be helicopter parents criticize the social realities that cause this situation rather than their own behavior. In these interviews, where economic problems and the education system were mentioned as the main reasons for the oppressive attitudes of the participants, it is concluded that parents who focus on school success more than normal do not see a problem in themselves.

The second sub-theme of the New Generation Parenting theme is digital parenting. When the participants talked about their children, they always referred to their relationship with technological devices and stated that the most important part of their parental responsibilities is the digital world. Some parents, who said that they fulfilled their traditional parenting roles fully and completely, emphasized that they did not have enough knowledge and experience to manage their children's close relationship with digital devices and that they had a lot of difficulty because of this. The first category of this sub-theme was identified as dangers. One participant expressed her concerns about her children's close relationship with digital devices in the following sentences;

P3: *As the mother of a daughter, I am deeply concerned about the potential dangers on the internet. I fear that my daughter might be exposed to inappropriate content or activities. Balancing between managing school responsibilities and monitoring internet activities leaves me with little time for anything else. Parenting two girls is a demanding task. In the past, families would often have larger numbers of children, yet they seemed to experience more peace of mind. This difference is attributed to the absence of the current challenges posed by the internet. Earlier generations grew up with less direct parental intervention, allowing children to navigate life more independently. However, in today's world, we feel compelled to be more involved in our children's lives, given the potential risks they may encounter online.*

Another participant stated that bad news in the press increased their anxiety a lot and expressed that they were more worried about the present than the future as follows:

P1: *I experience heightened anxiety when my child is using the tablet, prompting me to check the screen to ensure they aren't engaging with unknown individuals. The constant exposure to negative news in newspapers has contributed to this heightened sense of concern. The daily barrage of distressing information disrupts my emotional equilibrium. Additionally, contemplating what might happen to my child if I were to pass away exacerbates my anxiety, limiting my ability to think about the future extensively. Despite having optimism about my child's potential for success in the long run, my current anxiety levels overshadow this positive outlook.*

The second category of the Digital Parenting sub-theme was identified as the digital divide. While describing their children's relationship with technological devices, parents generally stated that there is a big difference between them and their children in terms of their mastery of technology. One of the participants, who stated that they had difficulty in following up because they did not have the necessary knowledge and equipment to be a digital parent, explained their thoughts as follows;

P1: *In the past, my parents effortlessly kept track of my friends, who were mostly from school and the neighborhood. They were familiar with the people I spent time with. However, the dynamic has shifted, and I find myself in the dark about my child's friendships, especially with those formed online. Despite my attempts to be a vigilant digital parent, I struggle due to my limited understanding of technology compared to my child's proficiency. My daughter dedicates a minimum of two hours daily to her phone, engaging in conversations and activities that remain unknown to me. I consistently inquire about her online contacts, cautioning her against communicating with strangers. Nevertheless, my ability to monitor her is constrained by the significant technological gap between us; my child possesses a level of knowledge that surpasses my understanding.*

Another participant stated that she had difficulty in keeping track of her child's digital life and that she was helpless because of this;

P8: *I want to avoid breaching my child's trust by checking his cell phone, but there are instances when I feel compelled to do so. This happened when I witnessed his friends using offensive language in a WhatsApp group, which deeply disturbed me. However, when my child became aware of my phone checks, he took measures on his own, such as restricting my access to previous internet pages and regularly deleting conversations in the WhatsApp group. Given his greater expertise in this area, I find myself in a position where I have no option but to foster a relationship based on trust, as I acknowledge that I am significantly less knowledgeable than my child in these matters.*

The last category of the digital parenting sub-theme was cyber concerns. In this category, the concerns reflected by the data obtained from the parents and how they developed solutions are presented. One participant explained that the experiences he did not have in his childhood turned into a test with his own children as follows;

P4: *Parenthood requires us to be more careful now. In the past, there was no internet in our world. I mean, my parents didn't have to keep track of who I was talking to or seeing on my cell phone. My child doesn't have a cell phone either but he can't stop using a tablet. He also connects to the internet. But sometimes I get lost. Sometimes he spends hours on the internet and when I ask him what he is doing, I don't get an answer. He says he is just surfing. I ask him to show me the sites he visits. He doesn't like it, but he shows me a few pages. There is nothing harmful on the pages he shows but does he show everything? This question worries me a lot. It is impossible to be with him at all times and to follow him!*

Another participant stated that her children were locked in the house due to technology addiction and that she had difficulty taking them out as follows.

P1: *We wouldn't want to go inside, and my child doesn't want to go out. I guess the phone has a lot of influence on this. There is a fun life on the screen. He talks to his friends from there. He does everything. He doesn't want to go out either. But the screen demoralizes children. When he's on the screen for an hour, I realize he gets depressed. But when he goes outside, he cheers up. I am aware of this but I can't do anything about it.*

Theme 2 - Academic Success

The second theme of the study was Academic Success. The participants explained the reasons for placing academic success at the center of their lives, and in line with the data obtained; expectations, being a private school parent and competition sub-themes were formed.

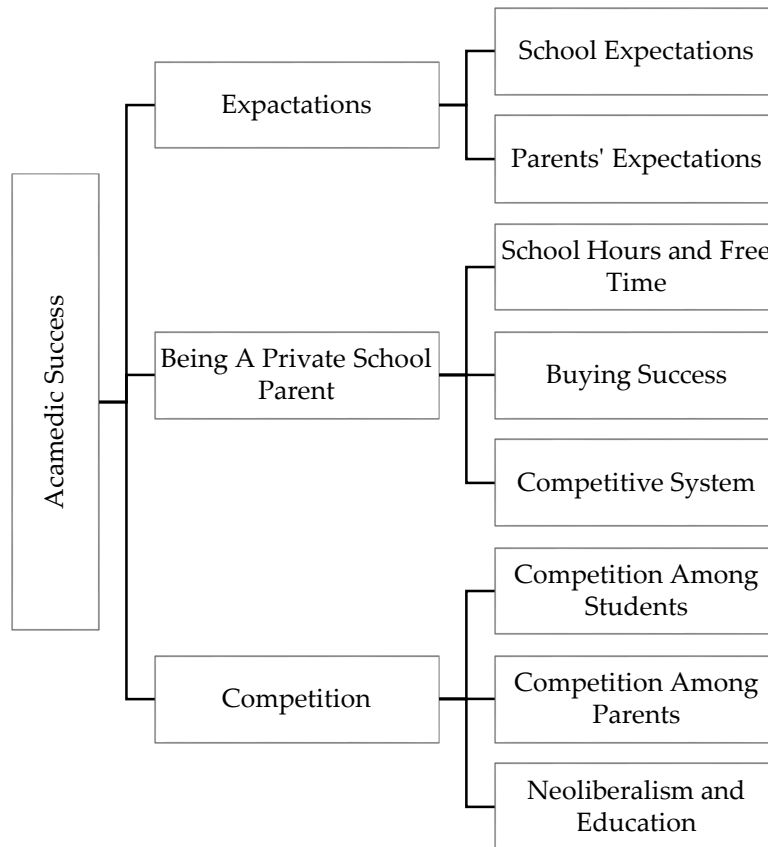


Figure 2. Academic success theme, sub-themes and categories

The sub-theme of expectations was divided into two categories: school expectations and parents' expectations. The participants stated that the expectations for academic achievement worried both themselves and their students and that they had to focus more on their children for this reason. In the first category, the expectations of the school, one participant stated that the school had an approach that focused only on academic achievement;

P8: There is a peculiar atmosphere in our school, as if the expectation is for everyone to become a doctor. There is a lack of recognition for diverse talents, with no distinction between verbal and numerical skills. Few take the initiative to explore their individual interests. For instance, my child is actively engaged in creating digital drawings and animations, and has even established a YouTube channel. Unfortunately, not a single teacher has acknowledged or congratulated him for these accomplishments. However, if there is a struggle in a math-related subject, we are immediately summoned to the school. We are questioned about the reasons behind the difficulties, although neither I nor the teachers have been successful in teaching him math. The school places high expectations on the students, but it feels like these expectations are unfairly imposed on us without acknowledging the diversity of talents and interests among the students.

Another participant stated that her child was stressed due to the behaviors of the private school teachers as follows.

P6: Honestly, I regret choosing a private school for my children. Despite providing full support for all their homework, the teachers never seem satisfied. It might be a matter of the child's capacity, and I believe it's the responsibility of the teacher to recognize and understand this. The assigned homework is exceptionally challenging, and I assure you, the new generation questions are baffling for us parents. As individuals from older generations, we find it challenging to comprehend and solve these modern problems. What's perplexing is that the teacher addresses regular questions during class but assigns homework involving these new generation questions. Is it realistic to expect every student to excel in every field? The school seems to operate under such an assumption, and this constant pressure is causing significant stress for us.

The second category of the expectations sub-theme was the expectations of parents. Participants stated that they had high expectations for their children independently of the school and that they were therefore very interested in their children's school success. One participant stated that he knew his child's report card grades by heart and that this situation was a bit strange when he compared it with his own childhood;

P2: As parents, we have burdened our children with numerous expectations, a situation unheard of in the past. In earlier times, children attended school, and upon graduation, parents would offer congratulations without necessarily delving into the details of their academic journey. Nowadays, we seem to know our children's report card grades almost by heart, closely monitoring every step they take. This level of involvement is challenging for both us and our children. The close scrutiny inevitably puts pressure on them, possibly hindering their success due to the fear of failure. While adults facing similar circumstances are often diagnosed with anxiety, we tend to view children's anxiety as normal. However, stress and anxiety at a young age can pose a threat to their future well-being. I believe our heightened expectations stem from the societal pressure we experience, as success in many aspects is intricately linked to academic achievements.

Another participant, who stated that her biggest fear about her child is that she will be disappointed in the future and that this possibility has become stronger with the increase in expectations, stated the following;

P3: My greatest fear revolves around the possibility of my children experiencing disappointment in the future. We place numerous expectations on them, outlining specific paths to success. We constantly convey the message that they must achieve certain milestones and be successful. The children genuinely believe in these expectations. However, as they enter high school, I am uncertain about what will transpire. If they struggle to meet these extensive expectations, it could potentially shatter their self-confidence. I wish to shield them from this disappointment. Occasionally, I emphasize to them that school is not the sole measure of success, but I am unsure of its effectiveness given their awareness of our expectations.

The second sub-theme of the Academic Success theme was determined as being a private school parent. In this section, the parents stated that being a private school parent affected their parenting approaches a lot and that the expectations of the school were the basis for overburdening their children. In line with the data obtained from the participants, this sub-theme was analyzed in three categories: school hours and free time, buying success, and the competitive system. Regarding the first category, school hours and free time, one participant stated the following;

P6: The parental responsibility is on the rise day by day. We enroll our children in private schools where the first-grader returns home at five, and the other, three days a week, after seven due to tennis practices and a study hall. Upon arriving home, they immediately delve into homework, leaving them with minimal free time. It's an unusual situation. While private schools are expected to consider not only the academic success but also the social development of children, the current programs seem inadequate for this purpose. As a parent investing in private education, I anticipate a comprehensive program from the school. If, for instance, the school were to extend class hours unexpectedly, I would likely be among the first to object because I expect the educational experience to justify the expenses. Consequently, the current system appears flawed. It's perplexing that both a first-grader and a twelfth-grader spend an equal amount of time in school. Is this considered normal? I find it highly abnormal, especially when compared to educational practices in other countries.

Another participant explained that her child could not spend much time at home but she felt obliged to participate in the programs offered by the school;

P2: Fortunately, our children are diligent, and we try not to burden them with excessive warnings. However, I can't help but feel sorry for their situation. In my own upbringing, my parents were quite strict about studying. Interestingly, I now advise my child to ease up on studying because I empathize with them. There seems to be a notable difference. While I am hesitant about allowing my child to join clubs, they express a desire to do so due to their friends' involvement. I'm also against them dedicating too much time to studying, given that they already have nine hours of classes each day. I question the purpose of additional study sessions. Nevertheless, societal expectations compel us to enroll them in such activities to avoid being labeled as disinterested parents. It's worth noting that my children's dissatisfaction lies more with the school system than with us. Particularly, my first-grader shows reluctance towards homework. Occasionally, I overlook it, but the teacher contacts us to express concern about incomplete assignments. It appears that the system has led us to this predicament, and my children seem to grasp this reality. While they don't openly communicate their feelings to us, their

constant complaints indicate their desire to engage in playful activities. After all, they are children. Isn't it only natural for them to want to play? If they don't enjoy these moments now, when will they?

The second category of the sub-theme of being a private school parent was defined as buying success. Participants stated that their expectations of success increased because they paid for private schools, but some of them also said that they realized through experience that success cannot be bought. One participant explained the effort he made to get value for the money he gave to the school as follows;

P4: We send the child to a private school. We pay money and I pay more attention to get value for money. My child doesn't pay attention to the lessons if I don't pay attention. I even remind him of his homework every day, so I can say that the concept of parenting has changed a lot. In a sense, we are trying to make a profit from our investment. You can say that it is wrong to see education as a shopping object but this is the case.

Another participant stated that he worked very hard to pay for the private school and that she burdened the child in order to get a return for this;

P5: I am a father of three children and work tirelessly, allocating a significant portion of my income to their education. This is why I harbor concerns. Investing so much money into education, I expect it to be worthwhile. In contrast to my own childhood where my family wasn't particularly involved in school matters, now I find myself at school almost three days a week. It feels like something is amiss if we skip these engagements. There's a sense that, without exerting pressure on the teachers, we might not receive the education we believe our children deserve. It's a marked departure from the minimal involvement my family had in my schooling years, where they would only come to school if there was a serious issue, usually involving a fight, and even then, it was obligatory due to a call from the principal.

Another participant explained that success is something that cannot be bought as follows;

P7: Merely sending my child to a private school doesn't ensure their success. While it's possible to provide material possessions, a prosperous future cannot be bought. Possessing a house or a car doesn't guarantee a bright future; these don't define one's character. However, a good education is indispensable. Education, often associated with academic achievements, is equally crucial for nurturing one's character and values. Success and morality are not commodities that can be purchased; some aspects of life remain untouched by wealth. Therefore, as parents investing in private education, it's essential for us to be realistic. At times, we get carried away with the idea that financial investment alone guarantees a child's success. However, this notion is flawed; if it were true, the most groundbreaking inventions would have originated from the wealthiest families worldwide.

The third category of this sub-theme is the competing system and the data obtained from the participants show that there is a system that forces students to compete with each other. A participant who said that his child had to take private lessons even though he went to a private school and that the system was built on competing children said the following;

P3: My children are enrolled in a private school, yet neither of them is proficient in English. I am considering enrolling them in an English course in the future, perhaps on Sundays. Isn't it regrettable? It indeed is. However, the regret is not only for them but also for me. I feel like I am wasting both my money and energy. The system, which promotes intense competition, not only compels our children to compete but also places us in a continuous race against time and each other. This constant competition is exhausting. Sometimes, I find myself wishing I had been born a hundred years ago; life might have been more straightforward and comfortable.

Another participant explained that teachers are in a race along with students as follows;

P7: Everyone is exerting pressure on the children. Class teachers seem to be in a constant competition; I've even heard that they engage in arguments after exams, as shared by another parent. It's concerning when teachers behave this way and I'm unsure how to address it. I genuinely hope they find fulfillment in their lives. Additionally, technology poses another challenge. Although they claim to be studying, I'm uncertain about the accuracy of their statements. When I check, I find websites related to the lessons, but it's unclear whether they are genuinely focused on their studies. When I set time limits, they express frustration not just towards the restrictions but also towards me. They also seem to lack clear career aspirations

for the future; they could be nurses or doctors, and it doesn't seem to matter much to them. However, I believe they should strive for something meaningful.

The third sub-theme of the academic achievement theme is competition, and this sub-theme is divided into three categories: competition among students, competition among parents, and neoliberalism and education. Stating that competition is at the center of the education system, the participants stated that in a system that pits students against each other, parents do not have the luxury of leaving children alone. In the category of competition between students, one participant said the following;

P5: My husband hangs the test results of the children on the refrigerator every time. Sometimes the children are at the bottom, I feel sad, but my husband does this to motivate them. I am aware of this. Nevertheless, I doubt the future of a child who is always forced to compete with his peers in childhood. This child will always try to surpass others when he enters business life. Maybe the lists won't be posted but once it's ingrained in the subconscious mind, it's already there. This is the reason for the animosity in work environments. In the environment where I work, everyone is trying to outdo each other. Because they probably came here by competing at school.

Another participant complained that her child was very calm, did not want to compete with anyone and therefore was not ambitious and argued that her child should be more aggressive in such a system;

P8: My child has a calm disposition, indifferent to what others do. At times, I appreciate this quality. However, there are moments when I feel he should exhibit more ambition, as being too laid-back might put him at a disadvantage in the business world. In the past, this might have been acceptable, but nowadays, individuals who are not proactive or self-driven are often deemed as unsuccessful. The emphasis is on constant movement, competition, and staying ahead. If you remain in your own space, everyone else may surpass you. I attempt to convey this perspective to my child, but it seems to be ingrained in his character.

The second category of the competition sub-theme, competition among parents, was treated as a kind of confession by the participants and they stated that although they were uncomfortable with the situation, the system forced them to do so. One participant stated that there was a comparison race at school and that they had to participate in this race with the following sentences;

P2: I don't want my child to lag behind peers due to the constant comparisons prevalent in school. Even during parent-teacher conferences, teachers engage in comparing students, which I find highly inappropriate. There are moments when I yearn for a simpler life in a village, where my children could attend a local school. In such a setting, we wouldn't be compelled to conform to a rigid system. Unfortunately, the current environment robs our children of their childhood, as they are constantly pressured to meet societal expectations.

Another participant emphasized that children's achievements are used to show off to the world and said the following;

P5: What if our children don't pass the university entrance exam? It would be challenging! Primarily, we find ourselves answering to societal expectations, where everyone scrutinizes each other's achievements. People are constantly curious about what accolades someone's child has achieved or what field their daughter is studying. While not everyone admits to it, this is the reality. There's an unspoken desire for every child to excel, and some even use their children's success to boast. It's become a trend to say proudly, "Our child has become a doctor," without much consideration for the significance. Similarly, we harbor the wish for our children to attain a reputable degree in the future. Even though I have two children, one seems to have veered off the academic path. It's evident that he won't pursue university studies, or if he does, it may not be at a prestigious institution. What's the use of pushing him forcefully in this direction? It's futile. We acknowledge this, but he seems to be merely going through the motions. I believe every individual should be encouraged according to their potential. Pushing too hard when they are not capable serves no purpose.

The last category of the competition sub-theme, neoliberalism and education, was formed by parents' statements criticizing social life. Parents stated that they follow their children's every moment in order to prepare them for the future, and that they push them today so that they will not have regrets when they enter

the workforce. One participant said the following about her child who is at the beginning of a race that will continue until death;

P8: *If I refrain from guiding my child, I am certain he will resent me in the future. Graduating from school thrusts him into a highly competitive environment. The world has evolved to a point where pausing for even a moment can result in being surpassed by millions. Hence, it becomes imperative to nurture children who are well-prepared for this intense competition. In my home country, if I had a stable job, I might not feel the need to push my child so intensely. At most, he would compete with a few local shopkeepers. However, the current reality is different. I cannot ignore the fact that, in a highly populated and competitive environment, not taking exams means my child would be up against at least two or three million competitors at the university level. The relentless competition persists even after entering the workforce, extending throughout their entire lives.*

Another participant stated that a diploma is no longer worth money and that much more effort should be made to prepare for life.

P6: *When I browse job listings, I become concerned about my child's future. Employers often seek a minimum of three years of experience and list various qualifications, including proficiency in foreign languages. It's evident that the journey doesn't conclude with a school diploma; its value seems to have diminished. Nowadays, children are gearing up for a lifelong competition, and as parents, we are anxious about their prospects. However, I don't personally face any issues myself.*

Theme 3 - Concerns

The third theme of the study was identified as Concerns and this theme was divided into the sub-themes of school pressure, future anxiety and technology use.

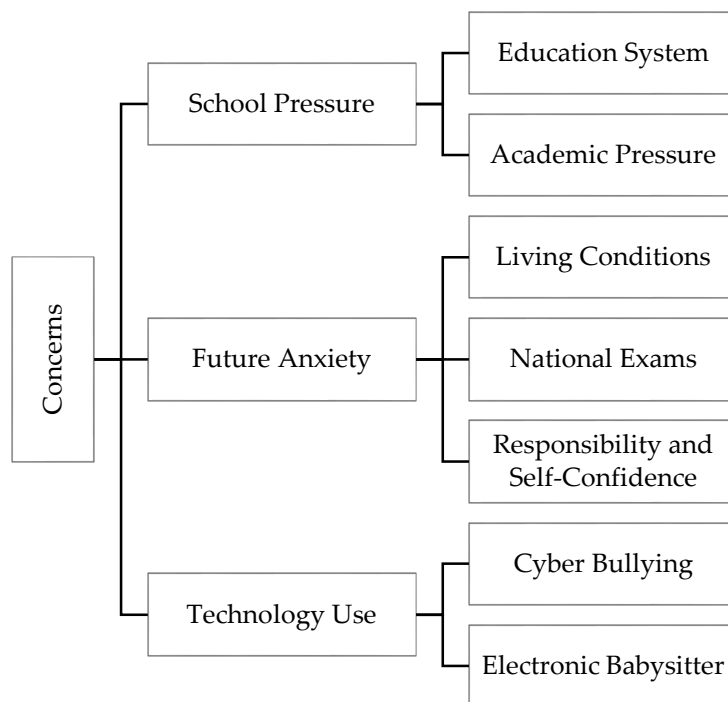


Figure 3. Concerns theme, sub-themes and categories

The first sub-theme, school pressure, was expressed as the most important cause of anxiety by the participants who sent their children to private schools. Participants were critical of the efforts to get value for money given to private schools, the responsibilities and expectations placed on students and parents at school. Although the participants were self-critical from time to time, they generally emphasized that they were forced to adopt helicopter parenting approaches due to social realities. The sub-theme of school pressure was divided into two categories: educational system and academic pressure. In the educational system category, one participant stated the following.

P3: *Mock exams are administered every week, and the school regularly contacts the families of struggling students to arrange meetings. There's a strong emphasis on not being lenient with the students. I believe the system is becoming overwhelming for the children. As parents, our involvement is primarily to stay informed about their progress. Without our guidance, there's a concern that the children might lose focus and motivation.*

Another participant explained that she was warned by her relatives to leave her children alone but she was forced to adopt this parenting approach because of the education system;

P3: *My relatives often advise me not to put pressure on my child. It's easy to give such advice from an external standpoint. I understand my child and I am aware of the consequences if I don't provide guidance. Despite the child's claims that excessive pressure leads to stress and hampers studying, I've noticed that without such stress, there is a lack of motivation to study. The discussions during the school's parent meetings shed light on the existing challenges. With daily homework assignments and the distribution of tracking charts by the class teacher, the pressure on my 11th-grade high schooler is intense, as if preparing for an exam in a month, even though there is still a year and a half before the actual exam. The stress is already taking a toll. In such a situation, one might argue for the abolition of exams, a reinforcement of vocational high schools, or sending the child to learn a trade. However, these alternatives are not readily available in our country. Despite my child's protests, I choose to continue applying pressure.*

The second category of this sub-theme, the academic pressure was formed within the framework of the data provided by the parents regarding the pressure they felt for their children to be academically successful. One participant argued that in an environment where there is such intense exam pressure, the reason for the academic pressure on children is not the parents but the school;

P4: *My child is currently in the third grade. Despite the information that there are no formal exams in this class, it seems like they have assessments every two weeks. I'm unsure whether these are considered assessment tests or exams. Could you clarify the distinction between the two? The teacher shares the results through WhatsApp, and I find myself feeling the need to ensure my child achieves good grades. He aspires to become a doctor but the school doesn't provide guidance on how to pursue that path, making it a challenging journey. While we typically tackle homework together, I believe this approach hinders the development of his sense of responsibility. In my absence, he waits for my guidance and even asks if we should start the homework, creating a dependency that doesn't promote independent learning.*

Another participant stated that the homework assigned by the school was too much and some of them were not easy at all, so she had to support the homework. She also explained that the academic pressure on the students is stronger on themselves as follows;

P1: *We've been accustomed to working on homework together since the first grade. At times, I suffer from severe headaches, including migraines, and on such occasions, I suggest that she completes the homework independently. However, this proposal upsets her and I find myself obliged to sit down at the table with her. We're contemplating the idea of hiring a private tutor but that seems impractical considering the substantial amount we already pay for her school fees. The idea of additional expenses for private lessons raises concerns, especially when our financial resources are already strained. It's a challenging situation, and I'm uncertain about what the future holds.*

The second sub-theme of the anxiety theme was determined as future anxiety and this sub-theme was divided into three categories: living conditions, national exams, and responsibility and self-confidence in line with the data obtained from the participants. In the category of living conditions, a participant stated that the basis of her concerns about her child was the difficulties they would face in the future;

P5: *I am employed at a bank, and my primary goal is to provide a better life for my children. I firmly believe that academic success is key to achieving this goal. Without a strong educational foundation, life can become significantly more challenging for them, possibly leading to a future of residing in rented accommodations with financial difficulties. Although they may find their studies a bit tedious now, I am confident that as they grow older, they will appreciate the efforts we are putting in for their future. We are not only focused on their academic success but also on shaping them into good individuals by setting a positive example.*

A participant explained that she felt fear that she would be unemployed in the future and therefore put pressure on her child about school success as follows;

P4: I am also concerned about the possibility of my children facing unemployment in the future. The current job market is challenging, and salaries often fall short. Considering the uncertain economic outlook, I fear that their employment prospects may not improve anytime soon. My worries persist until they secure stable employment. This concern is heightened because, as a parent, I naturally want the best for my son, encompassing both strong moral values and financial stability. While good morals are paramount, I acknowledge that they alone may not be sufficient, especially when observing the prevalence of immorality in wealthier individuals. I am determined to guide my child towards earning a respectable income through lawful means, even if it means investing in their education and development.

The second category of the future anxiety sub-theme was identified as national exams. Participants stated that their parenting approaches were very much affected by national exams and that the exam system forced them to certain behaviors. One participant explained the role of exams in positioning the school at the center of children's lives as follows;

P2: Everything revolves around school. Conversations are filled with discussions about how the school day went, what the teacher said, and upcoming events at school. While it's positive that my child enjoys school, there are moments of boredom. The thought of potential failure raises concerns. The immediate focus is on getting through high school successfully, with the anticipation of university looming in the near future. Currently covering school expenses, my aspiration is for my child to attend a reputable university. I am willing to invest in a good education, as not all schools are equal, and I aim for a valuable return on this investment. Success in high school is a crucial stepping stone, as their lives seem to hinge on achieving victories at each stage. The ultimate goal is for them to secure a promising career and financial stability in the future. While I wish a world without financial concerns, I acknowledge the reality that success requires effort and dedication. However, the uncertainty surrounding university entrance test results and their future adds an element of unpredictability to the journey ahead.

Another participant explained that she attaches great importance to the moral development of her child, but sometimes this effort is overshadowed by the pressure of national exams;

P4: My immediate concern is fostering a strong connection within our family today. I am actively working to instill love and trust in our relationship, believing that a solid family bond will contribute to our collective well-being in the future. My worry intensifies at the thought of him growing distant from us, potentially seeking companionship elsewhere. Currently in primary school, my son has not yet encountered the challenges of more complex subjects like math and science. While his performance seems satisfactory, I remain skeptical about national exams in the future. It's common for parents, especially from private schools, to receive positive feedback about their children's achievements, but I am wary as I know that challenges often arise while preparing for the national exams. To ensure a solid educational foundation, my husband's cousin will be teaching him math during the upcoming summer. While many parents might resist the idea of their children studying during vacation, I can't shake the belief that every moment invested now will prevent regrets in the future. I am determined to provide my child with the tools and support necessary to face the challenges that lie ahead.

Another participant explained that she was not sure what kind of a situation her child would be in if she did not get into university in the future and that she was worried about this;

P3: What matters most to me is that my child grows up to be a good person and achieves success. While success is important, it doesn't take precedence over qualities like honesty. I don't want my child to lie, even if they were to receive lower grades. This may seem contradictory, but the emphasis is on them being good individuals first. Of course, I do hope for their academic success but moral character holds a higher priority. Admittedly, I find myself deeply upset when they receive low grades and I tend to search for blame within myself. Despite my attempts to conceal these feelings, they often get sensed by my children, adding to my distress. My fear is that if they experience failure once, it may become a recurring pattern over the years. Unfortunately, there are numerous examples around us, including an acquaintance's daughter who was diligent until high school but later fell into the wrong company, started skipping classes, and failed to gain admission to university. This illustrates that a hardworking child is not guaranteed to maintain that work ethic throughout their life.

The last category of the future anxiety sub-theme, responsibility and authenticity, includes parents' concerns about their children's loss of self-confidence. One participant explained that he did not feel responsible for intervening in every moment of his child's life and that he felt guilty for this;

P5: My main concern revolves around the notion of children growing up like nurtured garden plants. During my own primary school years, I used to visit the market independently, purchasing fruits and vegetables in bulk. Contrastingly, my child cannot currently navigate a simple trip to a grocery. When I instruct him to go and buy something, he seeks guidance on what to say. It makes me ponder: what if this child aspires to attend a prestigious university in the future? The best-case scenario might be securing a salaried position under someone with financial means. Consequently, children ought to familiarize themselves with a degree of struggle, yet, regrettably, we seem unable to facilitate that. Our primary concerns revolve around school and homework, while the children engage in disputes with friends and grapple with depression - a seemingly normal part of their lives. The mother intervenes at school and attempts to resolve issues; if unsuccessful, I step in. Hours are dedicated to comforting the child at home.

The last sub-theme of the concerns theme was identified as the use of technology and this sub-theme was divided into the categories of cyberbullying and electronic caregivers. One participant expressed her concerns about cyberbullying in the following sentences;

P2: We cannot simply leave the child in front of a screen. Even a first-grader requests a phone from me, and not just any phone - a smartphone. Naturally, I resist the urge to purchase one. However, we did get one for the older child, and now prying it away from them is a challenge. The uncertainty of the websites they visit and whether they interact with questionable individuals leaves me with numerous concerns. I find myself navigating through a sea of question marks in my mind. Banning it seems impossible, and even if you don't permit it, that doesn't solve the issue. In a nutshell, it's a tough situation. Parenting is currently an arduous task, burdened with responsibilities that feel like a towering mountain.

Another participant expressed her concerns about cyberbullying in the following sentences in line with her experiences;

P7: In our child's class, someone created an online account in a child's name and shared absurd photos. The situation led the child to the brink of leaving school. Although the family reported the incident to the police, no significant action was taken. I am genuinely fearful that a similar occurrence might happen to us, especially considering the occasional conflicts among children. The worry persists that one of his friends might choose such a vengeful path. Consequently, I make a concerted effort to closely monitor my child's technology usage and educate myself by reading books on the subject.

Another participant said that there are great threats even in WhatsApp groups and shared her experiences as follows;

P7: Just as we, parents, have WhatsApp groups, children also have their own groups. Occasionally, they engage in conflicts within these groups, and unfortunately, this has repercussions for my child. Due to these issues, we sought guidance counseling at the school approximately ten times. We spent several days at the school when my child used inappropriate language towards another friend, and a similar incident occurred involving someone else targeting my child. They superimposed my child's face onto the body of an animal and shared it. Although it may seem innocent, my child found it distressing and couldn't put the phone down for days. He constantly checked to see if there were any new posts. There is a need for schools to take action on such matters.

The second category of the sub-theme of technology use was identified as electronic caregivers. One participant stated that she used electronic devices as electronic caregivers and that she was aware of the negative effects of this on child development;

P4: Honestly, my child doesn't express any complaints. The only issue we face is around eating habits. He believes that I'm pressuring him, but the reality is he won't eat unless I apply some pressure. Left to his own choices, he would opt for hamburgers every day. However, the moment spinach is on the table, he claims his stomach hurts. Consequently, I find myself compelling him to eat. Most of the time, I resort to using a tablet in

front of him. Despite the criticism that it's not the right approach, the fact remains that he refuses to eat spinach without some form of entertainment. Thus, I often end up playing random videos on YouTube for him. Admittedly, it's not an ideal solution, but I'm at a loss. What should I do?

Another participant said that they use the tablet as a silencer and explained that they know their behavior is wrong but they are forced to do so due to their living conditions;

P8: At times, we resort to using the tablet as a means of quieting things down, especially when we are exhausted. The tablet or phone becomes a sort of savior in these moments, as the child engrossed in the device vanishes, providing us with a sense of relief. However, the true comfort derived from this situation remains uncertain. Deep down, there is an unsettling feeling within us. The guidance teacher suggested imposing time limits, so we agreed to no more than half an hour a day. Unfortunately, our attempts have been futile. The child consistently finds excuses to use the tablet, claiming homework or the need to review lessons on YouTube. Even before exams, he insists on revisiting lessons through channels like Tonguç. We never succeeded in adhering to the half-hour daily limit.

Conclusion, Discussion and Recommendations

One of the most important results of the interviews conducted with the participants throughout the research was that parents were aware that they were taking too much care of their children but they did not feel guilty about this situation in any way. The reason for this situation is that social changes and developments have changed the structure of the family (Bayer, 2013). An individual who acknowledges the wrongful nature of a behavior may not feel guilt if they rationalize and justify that behavior in their mind. This parallels the situation faced by parents, particularly those who justify an excessively intrusive parenting style, often referred to as helicopter parenting.

It is argued that various factors contribute to the emergence of these concerns, attributing them to issues such as socioeconomic crises, the impacts of neoliberalism, competition within private schools, and the overarching worry of securing a prosperous future for their children. Some parents defend their approach by attributing it to the prevailing circumstances, even if they already possess an overbearing parenting style. Nonetheless, the term "parent" is ascribed to individuals responsible for not only ensuring a child's biological and physical development but also fostering their emotional, social, and moral growth while providing a conducive environment for such development (Yaman et al., 2013). Despite this comprehensive definition of parenthood, it is observed that the perception of parenting often revolves around the realms of academic success and school-related matters.

Participants stated that private schools had a great influence on their focus on children's school success. They said that even if they wanted to leave their children free, they had to closely monitor and control them due to the strict system and expectations of private school teachers and administrators. This situation was found to support the view expressed in a study conducted by Nacak et al. (2011) that "The socio-demographic characteristics of the family, their attitudes and behaviors towards the child greatly affect the behaviors desired to be seen in the child. In addition, it is revealed that the obstacle in front of raising children aware of their own responsibilities and with high self-confidence is the pressure applied by private schools for academic success. However, the point that should be emphasized and overlooked here is that parents prefer private schools because they already aim for academic success. In other words, the reason why parents send their children to private schools instead of public schools is the strict monitoring of their children's academic performance.

At this point, the participants' criticism of the attitudes of private schools can be considered as a kind of paradox. Although it is the parents who pay the money in the education sector, the main customer in school is not the parents but the students. In other words, the needs of the students should be at the center when creating curricula and it should be realized that the demands of parents who see private schools only as a

center for "securing their children's future and gaining a good status" will not be sufficient to create a quality educational environment and will even harm them.

Another noteworthy aspect arising from the findings of this study is the correlation between parental monitoring and control and children's academic achievement. A parent who meticulously oversees every aspect of the child's life, collaborates on homework, stays abreast of the child's school lessons, and memorizes their grades may perceive this involvement as a success, assuming that such behavior positively influences the child's academic performance. However, students subject to strict parental monitoring often experience a diminishing sense of responsibility over time, rendering them incapable of taking initiative without parental pressure. Considering the importance of responsibility and intrinsic motivation factors for sustainable academic success, helicopter parenting approach cannot be considered as a positive contribution to the process. Parents with this attitude expect their children to realize the situations that they cannot achieve themselves (Yamanoğlu, 2009). In this sense, although the oppressive attitude of parents towards children provides temporary success, it does not have a long-term effect and children's psycho-social development is negatively affected.

Oppressive parenting attitude prevents intrinsic motivation and students are motivated only to please their parents or to get high grades in exams. This type of motivation ends with a change in parental attitudes or the end of exams. Students who are persuaded by temporary methods may face different problems when they start their professional life. When there is no family member to support them when they face a problem, they may not be able to solve problems on their own. Considering that one of the most important 21st century skills is the ability to solve problems, it can be said that the helicopter parenting approach will have negative consequences for the future of children.

The modern lifestyle and the impacts of neoliberalism have been assessed as factors contributing to heightened parental anxiety. Amidst this, families, already devalued in terms of wages due to neoliberal policies, find themselves compelled to compete for privatized education, hoping to secure a quality education for their children (Gök, 2004). To some extent, parents arguing that their intervention in their children's lives is geared toward ensuring a successful profession and future financial stability can be considered justified. Neoliberalism, emphasizing the concept of lifelong learning, places a burden on individuals to continue working until retirement, perpetually striving for self-improvement. The early introduction of concepts like entrepreneurship or leadership to students, even at the primary school level, positions them as essential human resources for the business world, shaping educational systems accordingly. Consequently, parents tend to excessively focus on their children's present to safeguard their future. However, there is a disregard for the possibility that a student lacking developed critical thinking skills, solely concentrating on exams, may struggle in the professional realm. Children heavily dependent on parental support for even minor school problems, incapable of completing homework independently, and achieving high grades without learning to stand on their own feet pose a significant challenge for the future of society.

To comprehend the evolution of the private education system, one must grasp the social processes and conditions contributing to its emergence, such as urban densification, the autonomization of institutional practices, and the resultant division of labor, along with the establishment of a market for symbolic products (Bourdieu & Passeron, 2015, p. 87). Armed with this understanding, private school administrators, attuned to social conditions, can adopt more sensitive attitudes towards parents. Mitigating the negative impacts of parental interventions on children, teachers, administrators, and, to a lesser extent, the education system, particularly those paying for private schooling, hinges on private school administrators taking a firm stance on the matter. Education, being a specialized field, requires processes to be meticulously planned and executed by experts in the domain. Parents excessively involved in their children's school lives, either with the aim of cultivating "project children" or by over-interfering, pose significant obstacles to the broader goals of the

education system. It becomes the responsibility of school administrators and teachers to raise awareness among parents who believe they are acting in their children's best interest but inadvertently cause harm with each step.

School principals aspiring to foster a healthy school climate can restructure their approach to parents by examining their expectations from private schools through various lenses. Strengthening communication between school principals and private school parents, along with guiding them as needed, helps prevent any adverse effects on school management processes. This, in turn, facilitates teachers' work and enables field experts to conduct teaching activities more effectively, free from external influences, and focused solely on the students' wishes, demands, and needs.

Based on the research data, the following suggestions are presented for parents.

- While it's natural for parents to aspire to their children's success, those who assume all responsibility and transfer it onto themselves cannot achieve success in parenting. Consequently, the primary task of parents should be instilling a sense of responsibility in their children. This can only be accomplished through a proper and measured parenting approach. To guide parents in adopting appropriate behavior models, private school guidance units should organize seminars and conduct awareness-raising studies, incorporating case studies.

- Parents who employ a helicopter parenting approach often justify it by claiming to secure a bright future for their children. However, the overlooked risk lies in sacrificing children's present for a promising future. Therefore, it's crucial to consider children's developmental characteristics and prevent them from shouldering burdens beyond their capacity. In this context, collaboration between families and schools is imperative, as both parties should share responsibility, and academic studies need to be structured with a keen awareness of children's potential.

- Parents, who are influenced by neoliberal policies and have the perception that success and happiness can be bought, should be given guidance to raise awareness on this issue. Without intrinsic motivation, a child cannot achieve long-term success even if they attend the best school in the world. Therefore, children should not be put under pressure to get value for the money paid to private schools, but should be guided to achieve the best in line with their own capacities.

- According to the results of the research, the approaches of some private school parents have changed from family participation in education to family intervention. In order for children to stand on their own feet at school, the balance of parental involvement should be well balanced. If children get used to seeing their parents in the school lobby after every problem they have at school, they will not develop problem solving skills. Removing all obstacles in front of the child will result in the child becoming a weak and unable to struggle in the future.

- Parents who place their children's academic success at the forefront unintentionally neglect other crucial aspects of life. Inquiring, "How was school today?" instead of asking "How are you?" when a child returns home may inadvertently make the child feel undervalued. While academic success is undoubtedly significant, students with compromised social and psychological development are bound to face challenges in school adjustment. Hence, parents should prioritize their children's overall well-being before emphasizing academic achievements, recognizing that psychological well-being is a prerequisite for academic success.

- Family support for homework is considered very important and parents have a great responsibility in this regard. However, the responsibility of parents is not to do the homework, but to provide support. According to the data obtained from the research, some parents overestimate the importance of helping their children with homework so that they do not fall behind other children, and this is a situation that damages

the child's self-confidence. Therefore, homework should be the child's responsibility and parents should only step in when the child is struggling.

- The more anxious parents are about their children's school success, the more likely it is for their children to experience anxiety. Therefore, parents should initially reassure their children by emphasizing trust in their abilities and conveying that the grades achieved after studying do not determine their worth. When parents have expectations that surpass their children's capacities, it can elevate the child's anxiety levels, becoming a detrimental factor affecting academic success negatively.

- Being a positive role model is one of the significant responsibilities of parents. When children spend time at home with family members they can look up to, they tend to internalize valuable qualities. Attempting to instill specific behaviors solely through words or pressure may yield short-term success but lacks lasting impact. An ideal parenting approach necessitates fostering a democratic climate at home.

- School administrators must stay attuned to societal changes, address parental concerns, and adapt their management approaches accordingly. Imposing excessive responsibilities on parents and pressuring students for absolute success negatively impacts parental roles. School administrators should guide parents in discovering their students' potential and refrain from pushing any child beyond their capabilities.

- Schools need to establish clear guidelines regarding family involvement in education. Parents should be discouraged from interfering in educational processes, and all educational activities within schools should be transparently shared with parents.

- Guidance units in schools should organize educational programs for parents and collaborate with them to alleviate children's academic anxiety. Families with high expectations for their children should receive transparent reports on their academic development, and guidance should be provided to help families strike a balance in their expectations.

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An Action Research on Improving the Web-Based Material Design Skills of Turkish Teacher Candidates*

Research Article

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ABSTRACT

In this research, which was conducted to improve the web-based material design skills of Turkish teacher candidates, action research pattern, one of the qualitative research methods, was used. The study group of the research consisted of 61 teacher candidates studying in the second year of Yıldız Technical University, Faculty of Education, Department of Turkish Language Teaching. The research was carried out within the scope of the instructional technologies course. The material design rubric was used to observe the development of teacher candidates' web-based material design skills. After making their presentations, the teacher candidates were given feedback and this continued until the final presentation. Observations were also made by the researcher from the sixth week when the teacher candidates started their presentation to the last week. Between the sixth and tenth weeks, when teacher candidates started making their presentations, it was observed that they had sufficient knowledge about how to use web 2.0 tools in their materials in teaching Turkish. When the rubric scores were considered, it was seen that there was a development and improvement. In addition, it was observed by the researcher that teacher candidates were willing and motivated while preparing and presenting web-based materials, and that other teacher candidates willingly participated in the activities and had fun while the materials were implemented in the classroom. As a result, the study carried out had a positive impact on the development of Turkish teacher candidates' web-based material design skills.

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Keywords:

Instructional technologies, material design, materials, Turkish education, teacher candidates.

Introduction

The integration of technology into education has brought many changes and diversity. Learning environments have diversified with the effective use of smart technologies and the availability of the internet to almost everyone. One of these learning environments is the web-based learning environment. Web-based

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learning environments provide an effective learning experience for teachers and students by offering access from anywhere at any time, being flexible and user-friendly. Web-based learning environments can be used at different education levels and on various subjects. Examples of these learning environments include online lectures and courses, virtual classrooms, live lessons, e-books, digital materials, learning and course management systems, interactive simulations, games, and online assessment tools. In the web-based learning environment, resources on the web are used to create a meaningful learning environment where learning is encouraged and supported (Bay & Tüzün, 2002; Efe, 2019; Park, 2022; Vekli & Çalik, 2023). Materials created using resources on the web are called web-based materials. Multiple sources can be used to create web-based materials. Because the richer the material, the higher the quality of learning (Isaias, 2012). Web 2.0 tools are frequently used when creating web-based materials. Voki, FaceRig, VoiceTooner, Animoto, Animaker, Pixton, Prezi, Zimmer Twins, Poll Everywhere, Kahoot, Classcraft... can be given as examples of these tools. These tools are used because they appeal to the eyes and ears, are action-based, and allow information to be learned more effectively (Bozpolat & Arslan, 2018). Alev et al. (2007) list the benefits of these materials as follows:

1. It provides multiple learning environments.
2. It meets the different learning needs of students.
3. It attracts attention.
4. It makes remembering easier.
5. It concretizes abstract situations and simplifies the content.
6. It saves time.
7. Provides the opportunity to present content consistently and reuse material.
8. It provides the opportunity to learn while having fun.

Every teacher candidate must graduate by having developed at least one material. In this context, teacher candidates have a course in which they design and develop materials. The name of this course is instructional technologies and material design, now called instructional technologies. YÖK (2018) defines this course as using field-specific teaching technologies; software types and purposes of use; principles of design and development of materials to be used in teaching the field; determination of material needs; designing two and three dimensional teaching materials; worksheets; transparencies; VCD, DVD, MP3 and MP4 files etc. development of teaching materials; it is defined as the evaluation of classroom practices for different teaching materials. Through this course, teacher candidates learn the use of instructional technologies and how to design and develop materials. Teacher candidates are expected to use the knowledge and skills they have gained in this course in the schools where they interned within the scope of the teaching practice course in their senior year and in their own classrooms when they become teachers.

With the continuous development and change of technology, technology integration continues to be one of the most important reforms in education (Çubukçu et al., 2017). For this reason, it is considered important to contribute to lessons with technological equipment, environments and applications that comply with the requirements of the age. Thanks to applications supported by technological tools and equipment, students become more willing to learn and prefer to work with teachers who know how to benefit from technology in school and classroom environments and can use them effectively (Güven, 2006). Therefore, teachers need to know these practices and be able to apply them effectively. However, studies show that teacher candidates graduate with limited knowledge because there are no courses required for technology-supported education, and therefore technology integration is disrupted (Gündüz & Odabaşı, 2004). From this perspective, instructional technologies course is seen as important in terms of technology integration in education. The purpose of giving this course in departments of education faculties is to provide teacher

candidates with an effective and efficient course design by supporting teaching with technology. In this context, it is thought that the instructional technologies course will affect the technopedagogical competencies of teacher candidates (Yaman & Dulkadir Yaman, 2021). An important component of teacher education and teaching profession practice is the ability to prepare quality teaching materials (Utkugün, 2021). Instructional technologies are a course that serves for this purpose. With the studies to be carried out within the scope of the course, the material design skills of teacher candidates are improved.

In this study, it was aimed to develop the material design skills of teacher candidates by supporting the instructional technologies course in the undergraduate curriculum of the Department of Turkish Language Teaching with web-based tools, environments and applications.

Methodology

Method

Action research design, one of the qualitative research methods, was used in the research. Action research is an important research design that requires people directly involved in the situation that needs to be developed to work as researchers. In this research design, the focus is on development and improvement (Büyüköztürk et al., 2018). In this research, it was aimed to develop the web-based material design skills of teacher candidates within the scope of the instructional technologies course in the educational environment considered as a social context. In this context, the research focused on improving the material design skills of teacher candidates by supporting the instructional technologies course in the undergraduate curriculum of the Department of Turkish Language Teaching with web-based tools, environments and applications. The web-based materials designed by the teacher candidates were evaluated week by week and feedback was given. As a result of the feedback given, it was expected that there would be an improvement and development in the web-based material skills of the teacher candidates during the five-week period.

Study Group

The study group comprised 61 teacher candidates enrolled in the second year of the Department of Turkish Language Teaching at Yıldız Technical University's Faculty of Education.

Limitations

This research is limited to 61 second-year teacher candidates enrolled in the second year of the Department of Turkish Language Teaching at Yıldız Technical University's Faculty of Education, and the material design rubric which opinions were taken from three field experts and researcher observation used to observe the development of the teacher candidates' web-based material design skills.

Data Collection Tools

In the study, material design rubric and researcher observation were used as data collection tools. Rubric is a scoring list by which teachers or other evaluators evaluate students' products or processes (Brookhart, 1999). Observation is a method used to describe in detail the behavior occurring in any environment (Yıldırım & Şimşek, 2016). The research aims to observe the development of teacher candidates' web-based material design skills among Yayılcı and Yayılcı's (1999) material preparation principles, six principles suitable for web-based material design (appropriateness to the target, suitability to the student, comprehensibility, selectivity, meaningfulness of the background and innovation) were selected and a rubric was created. Opinions were taken from three field experts regarding the material design rubric created. In addition to the rubric, observations were also made by the researcher and these observations were recorded.

Data Analysis

The scores obtained from the rubric were analyzed using the IBM SPSS Statistics 25 program to determine the level of development of teacher candidates' web-based material design skills. Descriptive analysis technique was used to analyze the observation findings. In descriptive analysis, it is aimed to present the findings to the reader in an organized and interpreted form. For this purpose, the data obtained are first described systematically and clearly, then these descriptions are explained and interpreted, cause-effect relationships are examined and some conclusions are reached. Associating and interpreting the emerging themes and making future predictions may also be among the dimensions of the comments made by the researcher (Yıldırım & Şimşek, 2016). In this context, elaborate was taken to interpret and present the findings regarding the observation records in an orderly manner. The results of the research were reached by considering the findings obtained from the rubric and the findings obtained from observation in the context of cause-effect relationship.

Ethics Committee Approval:

In this article that was used research data before 2020. Ethics committee approval is not required for articles that have used research data before 2020.

Findings

Below, the development of teacher candidates' web-based material design skills by week is shown according to the scores obtained from the rubric.

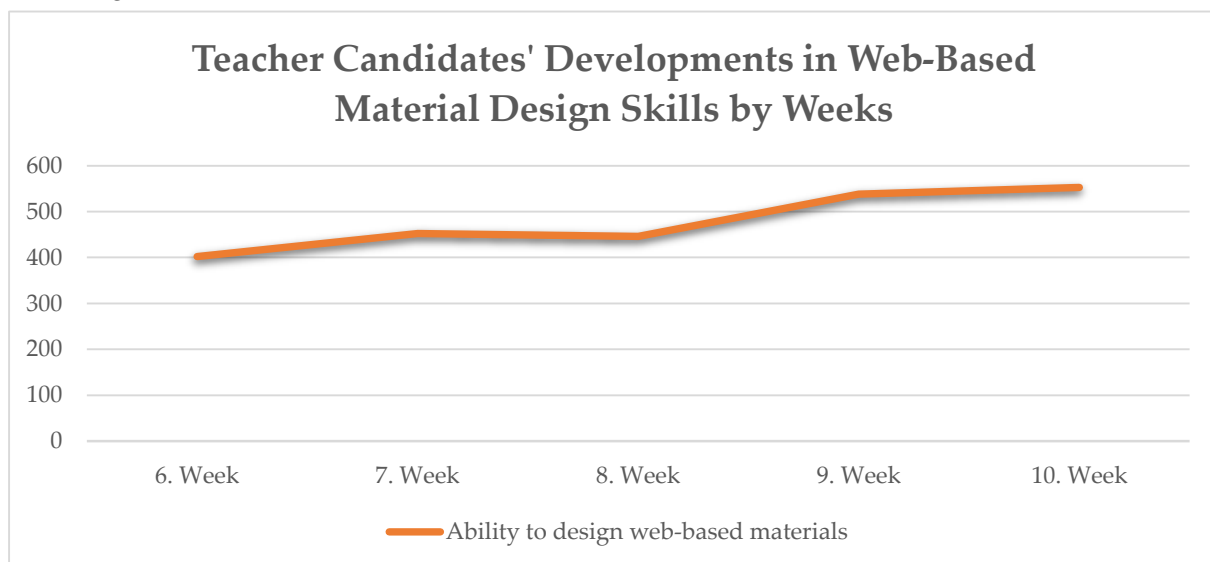


Figure 1. Teacher candidates' developments in web-based material design skills by weeks

Looking at Figure 1, it can be seen that there was a development and improvement between the sixth week when the teacher candidates started their presentations and the tenth week when they finished their presentations. As can be seen from the figure, the development of teacher candidates' web-based material design skills according to weeks showed an increasing acceleration from the sixth to the tenth week. Teacher candidates received a total of 402 points in the first week. In the first week, it was determined that the materials of the teacher candidates were mostly deficient in the principles of comprehensibility, selectivity and meaningfulness of the background. Teacher candidates did not use enough examples to achieve the targeted behavior in the web-based materials they prepared. Additionally, they did not draw as much attention to important elements in the materials as they should have. Since they did not pay due attention to the background in the materials, the texts and images appeared intertwined with the background. These deficiencies in the web-based materials prepared by the teacher candidates were shared with them after they presented their materials, and feedback was given by the researcher on how they could improve their materials. The researcher's feedback continued in the presentations that followed in the following weeks. In

the following week, teacher candidates showed an improvement by receiving a total of 452 points. In the seventh week, it was determined that there were deficiencies in the principles of comprehensibility and selectivity in web-based materials. In fact, there was an improvement in these principles compared to the previous week, but considering the other principles, these two principles caused the materials to receive lower scores. There was a small decrease in the eighth week. The reason for this decrease was determined to be the decrease in teacher candidates' participation in the course. Although the scores of the teacher candidates were higher than the scores of the previous weeks, the total score was also low due to low class participation. However, the scores increased continuously from the eighth week to the last week. The scores of teacher candidates increased to 538 points in the ninth week and 553 points in the tenth week. At the end of the research, teacher candidates' web-based material design skills showed an improvement from 402 points to 553 points.

The findings regarding the researcher's observation records are as follows:

In the sixth week, it was observed that teacher candidates had difficulty preparing and presenting web-based materials. It was observed that teacher candidates were excited and had deficiencies in the principles in the material design rubric. It was observed that in the next week, teacher candidates were more successful than the previous week. They prepared and presented more successful materials based on the experiences they gained from their friends who made their presentations in the previous week. In the following weeks, more effective materials were prepared and presented with fewer errors. The researcher observed that the teacher candidates were willing and motivated during the lesson. Likewise, while the materials were being implemented in the classroom, it was observed that other teacher candidates participated in the activities willingly and had fun. It was observed that teacher candidates had sufficient knowledge about how to use web 2.0 tools in their materials between the sixth and tenth weeks when they started making their presentations. At the end of the course, teacher candidates stated that they had learned a lot from the course and stated that they wanted to use the web-based materials they prepared when they became teachers.

Discussion and Conclusion

In this research, it was aimed to develop the material design skills of teacher candidates by supporting the instructional technologies course in the undergraduate curriculum of the Department of Turkish Language Teaching with web-based tools, environments and applications. In this context, lectures and teacher candidates' presentations were planned week by week, from the beginning of the spring semester classes to the end of the classes. In the first five weeks, a web-based course was conducted, from preparation of an effective presentation to web 2.0 tools. Starting from the sixth week, teacher candidates started presenting web-based materials. The material design rubric was used to observe the development of teacher candidates' web-based material design skills. After making their presentations, the teacher candidates were given feedback and this continued until the final presentation. Observations were also made by the researcher from the sixth week when the teacher candidates started their presentation to the last week. By analyzing both the observation findings and the findings obtained from the rubric, it was tried to determine the level of development of the teacher candidates' web-based material design skills.

Teacher candidates' web-based material design skills improved from 402 points in the first week of presentations to 553 points in the last week. In addition, it was observed that the teacher candidates had sufficient knowledge about how to use web 2.0 tools in their materials in teaching Turkish, between the sixth and tenth weeks when they started making their presentations. In addition, it was observed that teacher candidates were willing and motivated while preparing and presenting web-based materials, and that their friends willingly participated in the activities and had fun while the materials were implemented in the classroom. As a result, the web-based instructional technologies course had a positive impact on the

development of Turkish teacher candidates' web-based material design skills. There has been an improvement in the web-based design skills of teacher candidates.

Sarıkaya and Şakiroğlu (2021) found that Turkish teacher candidates' attitudes towards web-based teaching were undecided. They attributed this to the fact that prospective teachers do not have sufficient knowledge about web-based teaching or the lack of studies on web-based teaching at the university where they study. It is thought that the studies carried out within the scope of this research will contribute to web-based teaching. In the research, it was tried to improve the web-based material design skills of Turkish teacher candidates. In this context, a lecture was given on the basis of instructional technologies and technology integration in education, and then teacher candidates were asked to develop web-based materials. At the end of the five-week material development process, it was determined that the web-based material design skills of the teacher candidates improved increasingly every week. It was concluded that the studies carried out within the scope of the research improved the web-based material design skills of Turkish teacher candidates.

In their study to determine the digital literacy status of Turkish teachers, Erol and Aydın (2021) found that the digital literacy levels of the teachers were high. It has been stated that this situation is related to the level of teachers' use of technology, the time spent on the internet and the use of distance education platforms. Similar results were obtained in the study of Ata and Yıldırım (2019). It has been determined that Turkish teacher candidates' digital literacy perceptions are high and positive. Based on this, the necessity of supporting teachers in utilizing technology and integrating technology into education, starting from undergraduate education, emerges. In order to appeal to digital native students, teachers must use technology in a planned and effective manner and have advanced digital literacy skills. The studies carried out within the scope of this research are aimed to contribute to the development of the mentioned knowledge and skills of Turkish teacher candidates. Utkugün (2021) found that instructional technologies course applications and feedback contribute to the individual and social development of teacher candidates in addition to their professional development, provide them with the competence to prepare and use materials, enable them to learn while having fun and receive instructive feedback by motivating them. As a matter of fact, the results obtained from this study revealed that the applications carried out within the scope of the instructional technologies course had a positive impact on the professional and individual development of the teacher candidates, their web-based material development skills, and motivated the teacher candidates by ensuring learning with fun.

Aytan and Başal (2015) found that Turkish teacher candidates considered web 2.0 tools important for the development of their communication and language skills. Teacher candidates stated that these tools will improve students' critical thinking skills, ICT skills, feedback process with their teachers, creativity power, and information access and sharing. It is thought that this research will be useful in this context. In the research, web-based materials designed by Turkish teacher candidates using web tools will have a significant contribution to students' learning. It is known that these tools increase students' success and motivate students towards the course (Çalışkan et. al., 2019). It seems inevitable that every teacher should benefit from these tools in the educational environment.

Schreglmann and Demir (2022) concluded that enriching the instructional technologies course with augmented reality applications positively affected the attitudes of teacher candidates towards the course, and that they found the course productive, interesting, enjoyable, and entertaining. These results are similar to the results obtained from this research. In this research, the instructional technologies course was taught with the support of web-based tools, and in this context, it was aimed to develop the web-based material design skills of teacher candidates. While the research conducted contributed to the web-based material development skills of teacher candidates, it also positively affected their views on the course and contributed to their learning with fun. Saritaş and Kızıkan (2020) found that, as a result of the opinions and evaluations of the teacher candidates regarding the materials they designed, the materials they designed were relatively compatible with

the acceptances regarding the design and material quality found in the literature, but their awareness of this issue and critical evaluations of their materials were not sufficient. They found that this was not sufficient. Based on this, it is recommended to provide content in relevant undergraduate courses where teacher candidates can integrate their materials with the method. Within the scope of this study, an application was carried out on this subject. The content of the instructional technology course is structured around developing teacher candidates' web-based material preparation skills in line with material design principles, associating and presenting designed materials with activities, and evaluating prepared and presented materials.

Baş (2020) states that instructional technologies and material-oriented courses should be included more in the undergraduate program, and that technology integration into courses should be increased and opportunities should be provided to create environments where students can exhibit their products at the end of the courses. It is thought that this research has taken an important step in this regard. Materials for the instructional technologies course were designed and implemented using web tools in order to ensure the integration of the "technology" mentioned in the name of the course. Presentations were made within the scope of the course so that teacher candidates could apply and exhibit the materials they had designed. In this way, teacher candidates' web-based material design skills were improved. Uzunoz et al. (2017) found that the instructional technologies course provides teacher candidates with gains in many different dimensions such as professional convenience, effectiveness, experience, permanence, concreteness, efficiency, entertainment, mastery, imagination, visuality, material, manual dexterity, approach, benefit, help, and understandability. It has also been observed that, thanks to this course, teacher candidates contributed to their individual and social development, positively changed their perspective on educational environments, and developed their critical and creative thinking skills with the projects they carried out. These results are consistent with the results obtained from this research. In this study, teacher candidates expressed positive opinions about the instructional technologies course. At the end of the course, teacher candidates stated that the course added a lot to them. They stated that they would like to use the web-based materials they have prepared and will prepare when they become teachers. The web-based materials designed by the teacher candidates contributed to their professional and personal development and supported the development of their critical and creative thinking skills.

Yaman (2007) examining the proficiency and perceptions of Turkish teacher candidates regarding the use of technology in the context of instructional technologies course, determined that applications should be included more within the scope of the course, teacher candidates should be enabled to produce materials that they can use in the teaching profession, and evaluations should be made accordingly. As a matter of fact, this research was structured on teacher candidates' practice, production and evaluation of materials, and their ability to use these materials later in their professional lives. Sevim (2014), who investigated the effect of the interdisciplinary material development process on the instructional design success and metacognitive awareness of Turkish teacher candidates, structured the study with a quasi-experimental design, and conducted the course with interdisciplinary material development activities in the experimental group, while in the control group, he taught the course with the activities in the current curriculum. At the end of the research, while no significant difference was found between the control and experimental group students in terms of instructional design, a significant difference was found in terms of metacognitive awareness. However, it was determined that the experimental group, which started the process behind the control group in terms of instructional design success before the application, completed the process ahead of the control group after the application. It has been stated that this situation is more effective in increasing the success of instructional design in the interdisciplinary material development process than the material development process carried out according to the current program. These results also coincide with the results obtained from this study.

Saka and Saka (2014) determined that teacher candidates have deficiencies in computer literacy levels within the scope of the instructional technologies course and state that importance should be given to the development of teaching material development and use skills and that the opportunities for practice in this field should be increased. In this research, in the first week of the lesson, teacher candidates were asked whether they knew about web 2.0 tools, and all but two teacher candidates stated that they were not aware of these tools. Again, more than half of the class stated that they had difficulty preparing a presentation. Therefore, in the first five weeks, a web-based course was carried out, from preparing an effective presentation to web 2.0 tools. After the sixth week, teacher candidates were given the opportunity to prepare and present their materials. In order for teacher candidates to design and implement effective materials, lectures and practice are planned week by week. At the end of the research, it was concluded that the instructional technologies course supported by web-based tools and applications contributed to the web-based material development skills of teacher candidates.

Every teacher should be aware of the principles of material preparation and be able to prepare his or her own materials in line with these principles when necessary. Material selection and appropriate use of materials are among the factors that directly affect success. For this reason, it is necessary to pay attention to material selection and when and which material will be used (Duman, 2013). In this study, the course was taught from the first week to the fifth week of the course, from the principles of material design, web 2.0 tools, preparation of an effective presentation, to the design and use of the material. After the lecture was over, the teacher candidates applied what they learned in the classroom environment.

Recommendations

Based on the results obtained from the research, the following recommendations are developed and suggested:

Instructional technologies course is both a knowledge and a skills course. Therefore, it is important and necessary to provide teacher candidates with the opportunity to practice what they have learned.

Instructional technologies course should be carried out within a plan. Theory and practice can be planned week by week, as in this research, or lesson plans can be made according to the needs of teacher candidates.

In the research, it was determined that teacher candidates were not aware of web tools and did not have sufficient knowledge about preparing presentations. In this context, these issues were taken into consideration when planning the theory part of the course. It is important to introduce and teach the concept of "technology", which is also included in the name of the course, to teacher candidates with its educational uses. Likewise, a teacher candidate's inability to prepare a presentation is a situation that should be questioned in the age of artificial intelligence. For this reason, teacher candidates need to be taught effective presentation preparation skills as well as the necessary technological knowledge.

Today, classical materials are slowly being replaced by web-based, digital materials. These materials appeal more to students who are digital natives and help them maintain their interest in the course. Therefore, it is important to design web-based materials and use them in education.

In this research, the instructional technologies course was supported by web-based tools, and at the end of the training, there was an improvement in the web-based material design skills of the teacher candidates. This study, carried out within the scope of action research, contributed to the improvement and development of teacher candidates' web-based material development skills. Studies can be carried out using different methods, techniques and models in order to look at the subject from different perspectives.

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Listening Strategies in Native Language

Research Article

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ABSTRACT

In this study, it is aimed to examine listening in the native language dimension in terms of both process and strategies. Grounded theory, one of the qualitative research designs, was used. Theoretical sampling was chosen from purposeful sampling types. In the study, seventy-five teacher candidates were studied to determine listening strategies. The pre-service teachers were asked what they did during the listening process. The data obtained were analysed iteratively and comparatively with other classifications. It was tried to provide evidence for the results with the listening strategies classifications and the data obtained from the teacher candidates and to reveal how the classification was obtained. It was revealed that teacher candidates used cognitive and metacognitive strategies in pre-listening strategies. Cognitive strategies consist of inferencing, elaboration and resourcing. Metacognitive strategies consist of the planning category, including directed attention and self-management subcategories. They use cognitive, metacognitive and socioaffective strategies while listening. Cognitive strategies consist of inferencing, elaboration and note-taking. Inferencing and note-taking categories stand out. Metacognitive strategies consist of planning and comprehension monitoring. Especially the planning category is at the forefront. Socioaffective strategies consist of questioning, respect and feedback. After listening, they use cognitive, metacognitive and socioaffective strategies. In cognitive strategies, it is seen that participants summarize, repeat and investigate what they hear. In metacognitive strategies, comprehension monitoring, evaluation and problem identification categories have emerged. It has been revealed that in socioaffective strategies, teacher candidates ask questions, cooperate and give feedback. When the listening processes of pre-service teachers are evaluated as a whole, they use cognitive strategies such as inferencing, elaboration, summarization, repetition, resourcing and note-taking. They use metacognitive strategies such as planning, comprehension monitoring, evaluation and problem identification. Among the socioaffective strategies, they use questioning, cooperation, respect and feedback.

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Keywords:

Listening, strategies, classification, native language

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Introduction

Listening is a vital mental capacity that accompanies us from the womb until the end of our lives. It is the only skill that starts with hearing and ends with making sense. As Rost (1994) points out, listening is a word we use every day without much thought. However, it is one of the main ways in which we understand and participate in the world around us.

According to Wolvin (2018), listening is considered one of the most crucial communication skills in an individual's personal, academic, professional, and civic life. It is the first language skill to be acquired, and it plays a vital role in foetal development, as well as the development of social and intellectual skills.

Lynch and Mendelsohn (2010) state that listening was previously viewed as a passive process, where the listener merely recorded the message. However, they argue that listening is now an active process and good listeners are just as engaged as speakers. Vandergrift (1999) is among those who argue that listening is not a passive activity. It is a complex and active process in which the listener has to discriminate between sounds, understand vocabulary and grammatical structures, interpret stress and intonation, memorise all these and interpret them both in the moment and in the wider sociocultural context. Coordinating all this requires a great deal of mental activity on the part of the listener. Listening is therefore a difficult task and deserves further analysis and support.

Lynch and Mendelsohn (2010) suggest that listening involves comprehending spoken language, often in the presence of other stimuli, by utilizing prior knowledge and contextual cues. They propose that listening is not a singular process, but rather a collection of interconnected processes. Listening is not a passive activity, but rather a complex and active mental process that involves recognizing sounds, perceiving intonation patterns, and interpreting the relevance of information to the current topic.

Listening is not a passive activity, but rather a complex and active mental process that involves recognizing sounds, perceiving intonation patterns, and interpreting the relevance of information to the current topic. It requires objectivity, comprehensibility, logical structure, conventional structure, clear and objective language, proper formatting, formal register, balanced presentation, precise word choice, and grammatical correctness. The literature has long divided the listening process into three stages: pre-listening, during listening, and post-listening.

According to Özbay (2005), pre-listening activities include: The audience should be positioned in a place where they can easily hear the speaker. They should avoid any distracting elements and review any materials related to the speech beforehand to have the necessary preliminary knowledge on the subject. It is also recommended to prepare materials such as paper and pen and add information such as page number, date, and subject to the corner of the paper or notebook for note-taking.

During this stage of the listening process, teachers prepare students for what they will hear and what is expected of them, as stated by Vandergrift (1999). Firstly, students should familiarise themselves with the subject matter. Secondly, they should determine the purpose of their listening. Students can make predictions using all available information. According to Lingzhu (2003), pre-listening activities can assist students in selecting what to listen to and concentrating on meaning while listening. The pre-listening activities mentioned by Lingzhu include word association, questioning, creating a list of possibilities/ideas/suggestions, and examining pictures before listening.

Doğan (2011) suggests that pre-listening activities serve the purpose of preparing students for listening, both physically and mentally. The physical preparation involves ensuring silence in the classroom, arranging the sound source for audibility, maintaining a comfortable temperature, and reducing external noise.

Pre-listening should always precede listening. According to Özbay (2005), the listener's ability to identify key points in the speech is crucial for effective note-taking. Additionally, motivation plays an important role in the mental dimension. Pre-listening should always come before listening. According to Özbay (2005), the listener's ability to identify key points in the speech is crucial for effective note-taking. When taking notes, focus on original information and ideas that may be difficult to find elsewhere, rather than information that is readily available from other sources. Abbreviations for frequently mentioned words, terms, and concepts can aid understanding. When presented with a diagram, sketch, plan or map during a lecture or conference, it is important to take note of the source. If the source is not provided, indicate this on your notes. Additionally, it is recommended to prepare questions about the speaker's content. If the environment allows, direct questions to the speaker during the speech. Otherwise, questions can be directed to the speaker after the speech.

Doğan (2011) suggests that note-taking should be a planned activity and that notes should be tabulated and abbreviated. Note-taking is emphasised during listening as it helps to associate and schematise the elements heard. Post-listening activities should follow the listening process.

Özbay (2005) suggests that after listening, notes should be reviewed, deficiencies completed, sorted and filed in a certain order, and reviewed at certain intervals. Doğan (2011) adds that notes taken during listening can be used to answer questions, summarize the listened text, or evaluate the text.

Vandergrift (1999) highlights the importance of post-listening activities for teachers, particularly in terms of encouraging students to evaluate the decisions they made during the task. To promote self-evaluation and reflection, teachers can ask students to assess the effectiveness of the strategies they used. Additionally, group or class discussions about the approaches adopted by different learners can foster reflection and evaluation. Encouraging students to share their individual pathways to success, such as how they inferred the meaning of a particular word or modified a particular strategy, can be done after listening.

In some studies, the listening process has been analysed in terms of strategies. Paris et al. (1983) state that strategies are deliberate actions and can be used consciously. According to Vandergrift (1999), consistent use of pre-listening, during listening, and post-listening activities can guide students in the mental processes of listening comprehension and encourage the acquisition of metacognitive strategies in three categories: planning, monitoring, and evaluation. Goh (2010) proposed that self-directed listening is also based on three pillars: planning, monitoring, and evaluation. According to the given information, students are able to follow a set of questions that will assist them in completing the listening process.

Various classifications of listening strategies and processes exist in literature. Vandergrift (1997) classified listening strategies, adapted from O'Malley and Chamot (1990), Oxford (1990), and Vandergrift (1996), into five categories: linguistic inferencing, voice and paralinguistic inferencing, kinetic inferencing, extralinguistic inferencing, and between parts inferencing. Elaboration can be categorised into personal, world, academic, questioning, creative, and imagery. When considering metacognitive strategies, planning can be divided into advance organisation, directed organisation, selective attention, and self-management. Monitoring can be categorised into comprehension monitoring, auditory monitoring, and double-check monitoring. Evaluation can be divided into performance evaluation and strategy evaluation. Metacognitive strategies include a problem identification title. Additionally, the classification includes socioaffective strategies such as questioning for clarification, cooperation, lowering anxiety, self-encouragement, and taking emotional temperature.

Goh's (1998) classification covers both cognitive and metacognitive strategies. Cognitive strategies, unlike others, include contextualisation, fixation, and reconstruction. Metacognitive strategies involve real-time assessment of input. Selective attention and directed attention are separate headings and not under the

planning heading. Inferencing and elaboration are not divided into subheadings. Additionally, the author preferred comprehension evaluation over other forms of evaluation. The author included contextualisation, fixation, and reconstruction as cognitive strategies. However, Vandergrift's (1997) cognitive strategies, such as summarization, translation, repetition, resourcing, grouping, note-taking, deduction/induction, and substitution, were not mentioned. Additionally, Vandergrift (1997) did not divide the metacognitive strategies into subheadings for planning, monitoring, and evaluation. Furthermore, there is no title for problem identification. Furthermore, the study solely focused on cognitive and metacognitive strategies, neglecting any socioaffective strategies.

Lynch and Mendelsohn (2010) proposed a classification system for metacognitive strategies based on the work of Goh (2002), Vandergrift (2003), and Kondo and Ying-Ling (2004). The system includes contextualisation, deduction, and fixation, as well as planning, which is divided into advance organization and self-management. Directed attention and selective attention are discussed separately. Vandergrift (1997) coined the term 'socioaffective strategies', while Lynch and Mendelsohn (2010) used 'social/affective strategies'. The questioning and cooperation strategies are similar to those identified by Vandergrift (1997), but the relaxation strategy differs.

Figure 1 [Vandergrift (1997) (adapted from O'Malley and Chamot, 1990; Oxford, 1990; Vandergrift, 1996); Goh, 1998; Lynch & Mendelsohn (2010) (based on Goh 2002; Vandergrift 2003; and Kondo and Ying-Ling 2004)] shows the combined classification of listening strategies.

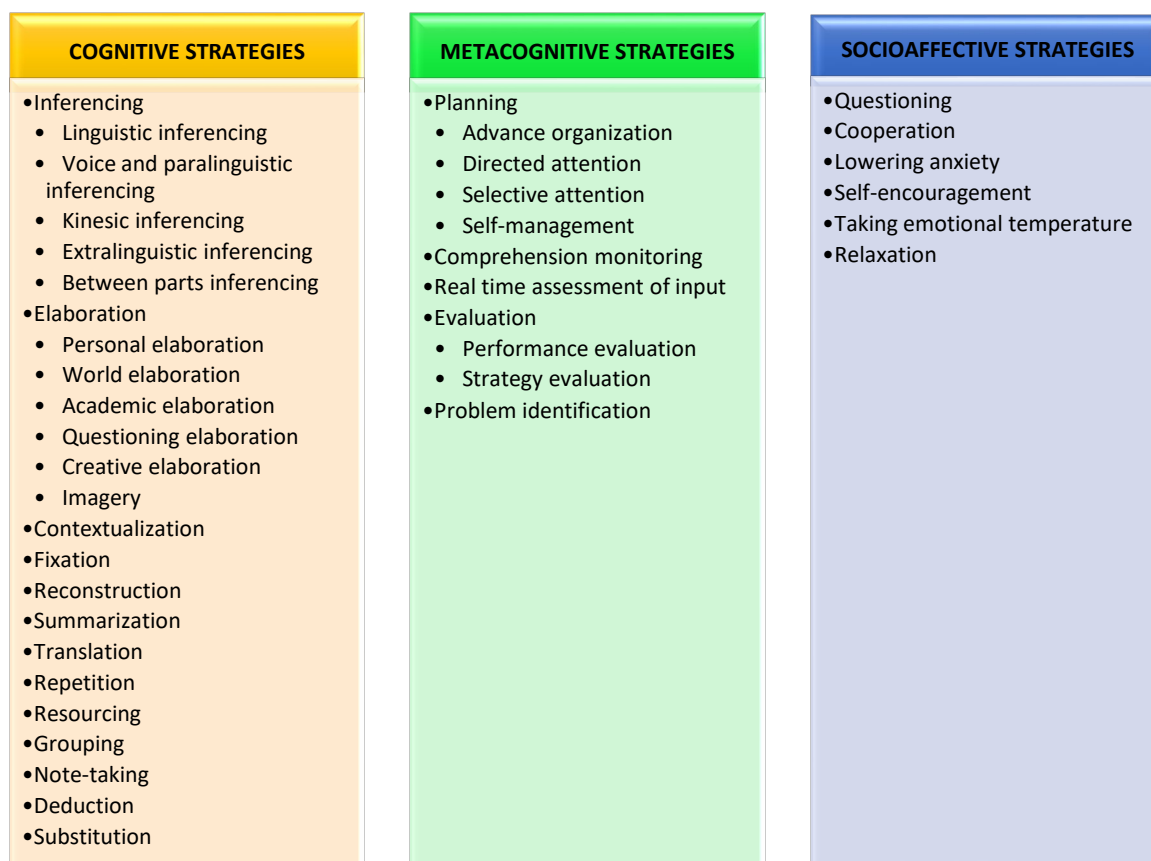


Figure 1. Listening comprehension strategies

When examining the literature on listening strategies, Temur (2010) and Şahin (2012) investigated the impact of pre- and post-listening questions on listening comprehension skills. Berne (1995) explored how diversifying pre-listening activities affects listening comprehension in a second language. Goh (1999) aimed

to identify the factors that influence the listening comprehension of a group of Chinese ESL learners. Goh, Taib (2006) identified metacognitive strategies that facilitate listening in primary school students. Vandergrift (1997) examined the use of listening comprehension strategies by French high school students.

These studies focus on specific aspects of the listening process or second language listening strategies. This study aims to analyse the process and strategies involved in listening in the native language dimension. The study seeks to answer the following questions:

1. Which strategies do pre-service teachers use before, during, and after listening?
2. What is the classification of listening strategies that emerged from the strategies used by pre-service teachers in their native language?

Methodology

In this study, grounded theory, one of the qualitative research designs, was used. Glaser and Strauss (1967) define grounded theory as "the discovery of theory from data". According to Charmaz and Thornberg (2021), grounded theory is a systematic method of conducting research that shapes data collection and provides clear strategies for analysing them. The defining aim of this method is to construct a theory that provides an abstract understanding of one or more basic situations in the world under study. Since the study aimed to reveal listening strategies in the mother tongue, grounded theory design was preferred.

This study was decided by the Aksaray University Human Research Ethics Committee in accordance with the ethical principles with protocol numbers 2023/06-40.

Theoretical sampling, one of the purposive sampling types, was selected in the study. As Cutcliffe (2000) states, theoretical sampling is an integral part of the grounded theory process. Patton (2015) refers to theoretical sampling as a more conceptually orientated version of criterion sampling. According to him, the researcher samples events, sections of life, time periods or people based on the potential manifestation or representation of important theoretical concepts. In the study, seventy-five pre-service teachers were studied in order to determine their listening strategies. The pre-service teachers have taken the listening education course and have been successful in the course and have knowledge on this subject.

In order to describe their listening processes in detail, the pre-service teachers were asked three questions as follows:

- What do you do pre-listening?
- What do you do during listening?
- What do you do post-listening?

The reason why open-ended questions are preferred is to ensure that similarities, differences and reasons in listening processes are explored in every aspect.

Glaser and Strauss (1967) propose that the theory resulting from the researcher's qualitative data collection and analysis is equivalent to their systematic knowledge of the data. The researcher relies on their perceptions and personal experiences, particularly if they have participated in the social life of their subject. They live with their analyses and test them not only through observation and interviews but also through daily life. She has conducted research and examined the processes repeatedly, living with partial analyses for months and testing them at every step until she builds her theory. The researcher has spent seven years considering the listening process and strategies in the listening education courses she has been teaching to pre-service teachers.

Charmaz (2014) outlines grounded theory methods as systematic yet flexible guidelines for collecting and analysing qualitative data to build theories from the data itself. Grounded theory begins with inductive data, employs iterative back-and-forth strategies between data and analysis, uses comparative methods, and keeps the researcher engaged and interested in the data and resulting analysis. Charmaz (2014) highlights the importance of using inductive data to develop abstract analytical categories through an iterative process. In this study, data from seventy-five pre-service teachers was analysed over a period of three years, with each group of twenty-five third-year teachers being analysed separately.

Glaser and Strauss (1967) suggest that researchers should always describe social world data in relation to theory. Presenting data as evidence for conclusions demonstrates how the analyst derived the theory from the data. This study aims to provide evidence for the results and reveal how the theory was obtained through the analysis of listening strategies and data obtained from pre-service teachers.

The listening processes of pre-service teachers were grouped into pre-listening, during listening, and post-listening. The literature was examined in detail to explore the classifications of listening processes and listening strategies. It was found that listening processes were not integrated with listening strategies. The study aimed to determine which listening strategies pre-service teachers use before, during, and after listening. A comparative analysis of listening strategy classifications was conducted, resulting in the emergence of a classification (see Figure 1). However, it can be argued that this classification is based on second language learning research. Therefore, the aim is to present a classification of listening strategies that has been validated for first language listening.

Results

Listening Process (Pre-Listening, During Listening, Post-Listening) Strategies

The use of clear and concise language, along with a logical flow of information, helps to ensure that the reader can easily understand the findings presented in Table 1. The study involved asking pre-service teachers about their pre-listening activities, which were then categorised into cognitive and metacognitive strategies. Cognitive strategies included inferencing, elaboration, and resourcing, while metacognitive strategies involved planning, which was further divided into directed attention and self-management. Regarding cognitive strategies, pre-service teachers reported that their main objective was to gather information about the subject. In the subcategory of planning-directed attention in metacognitive strategies, they primarily prepare by creating a suitable listening environment, ensuring a quiet space, having pen and paper ready for note-taking, eliminating distractions, and finding a comfortable place to listen to the speaker. In the sub-theme of planning and self-management, individuals engage in pre-listening processes. These include clearing their minds to better focus on the speaker and mentally preparing themselves to focus on the subject to be listened to.

Table 1. Pre-listening strategies

COGNITIVE STRATEGIES			
Category	Sub-category	Code	<i>f</i>
<i>Inferencing</i>		Predicting the content to be listened to	1
		Making predictions about the subject to be listened to	3
<i>Elaboration</i>	<i>Personal elaboration</i>	Thinking about whether he/she has knowledge of the subject	5
		Thinking about what they know about the subject	2
<i>Resourcing</i>		Research the speaker	4
		Making research to get information about the subject	27
METACOGNITIVE STRATEGIES			
Category	Sub-category	Code	<i>f</i>
<i>Planning</i>		Trying to stay away from distracting situations (sound, noise)	3

Directed attention	Silencing devices such as phones and tablets	4
	Preparing pen and paper for note-taking	9
	Finding a place where the speaker can listen comfortably	8
	Eliminating distractions	9
	Providing the necessary listening environment	14
	Ensuring that the environment is quiet	13
	Drinking coffee	5
Self management	Trying to clear the mind to better focus on the speaker	8
	Trying to focus on the subject to be listened to	7
	Mental self-preparation	6
	Trying to give all your attention to the narrator	5
	Trying to get motivated	4
	Determining the purpose of listening	4

The statements of some of the pre-service teachers are as follows: "If I am going to listen to a speaker or a teacher live, face-to-face, I sit in a suitable place at a distance where I can hear the person I will listen to comfortably, make eye contact, and not be affected by other people around me. If I am going to listen on social media or platforms, I try to choose a quiet environment where no one is around and I will not be distracted. If I cannot find a suitable environment and I have the opportunity to listen again later, I listen in a quiet environment because I think it will be more effective and understandable." (4)

"Before listening, I try to obtain information about the subject by doing research and reading in order to obtain the necessary information about the subject. I try to be prepared, I enter the environment where the subject will be covered, I check the environment and prepare accordingly to avoid distraction in case of any noise that may interfere with listening. Before listening, I make sure to silence devices such as phones and tablets. I choose a close place to hear the narrator's voice well during the communication. I prepare the necessary equipment and wait." (6)

"I try to do readings and research on the subject to be explained. In the process of doing these readings, I try to take notes of the thoughts that stick in my mind, that I like and that I do not approve of. Afterwards, I do research to have an idea about the speaker; such as examining his/her academic CV and the studies he/she has done before with the subject he/she will explain. If I do not know the place where I will carry out the listening activity beforehand, I get information about the place. Before the event time, I come to the place where the event will take place and sit where I can hear, see and be comfortable with the speaker. I prepare my paper and pen to take notes during listening." (15)

"Coming to the lesson prepared is useful because it motivates people. Having an idea during the conversation and even the feeling of being able to answer the questions makes you feel good, so the lesson is enjoyable and I can listen to the whole lesson carefully. If I have researched the subject to be explained before, I come to the lesson with self-confidence and I can participate effectively." (31)

The pre-service teachers were asked what they did during listening. Their answers were categorised in terms of listening strategies (Table 2). They use cognitive, metacognitive and socioaffective strategies during listening. In cognitive strategies they use inferencing, elaboration and note-taking. Metacognitive strategies include planning and comprehension monitoring. Socioaffective strategies include questioning, respect, feedback themes. During listening, the most common inferencing category is making eye contact with the speaker. In the note-taking category, the codes of taking notes on important parts and taking notes on parts they could not understand come to the fore. In the sub-category of planning-self management, trying to pay attention to the speaker, trying to pay attention to the subject, and trying not to be distracted are among the situations that pre-service teachers pay attention to during listening. Socioaffective strategies include questioning, respect and feedback categories. In the questioning category, asking questions where they do not

understand, in the respect category, not interrupting the speaker, and in the feedback category, showing that they listen to the speaker with body language come to the fore.

Table 2. During listening strategies

COGNITIVE STRATEGIES			
Category	Sub-category	Code	f
<i>Inferencing</i>	<i>Linguistic inferencing</i>	Creating new predictions while listening	2
		Paying attention to the narrator's emphasis and intonation	2
	<i>Kinesic inferencing</i>	Make eye contact with the speaker	34
		Paying attention to the gestures and facial expressions of the speaker	4
		Facing and orientating to the speaker	1
	<i>Elaboration</i>	<i>Personal elaboration</i>	Thinking about similar things that have happened to the other person while they are talking about their experiences
Trying to understand what the speaker tells with previous knowledge and experience			1
Comparison with daily life			1
<i>Academic elaboration</i>		Making connections between information	2
<i>Imagery</i>		Visualising what they listen to	4
<i>Note-taking</i>		Taking notes where he/she cannot understand	10
		Noting important places	27
		Taking notes on what you find interesting	2
		Noting key words and phrases	1
		Taking notes of your questions	7
METACOGNITIVE STRATEGIES			
Category	Sub-category	Code	f
<i>Planning</i>	<i>Directed attention</i>	Not dealing with telephone etc.	4
		Preventing noise in the environment	3
		Cut off communication with the environment	3
	<i>Self management</i>	Trying to pay attention to the speaker	20
		Trying to pay attention to the subject being explained	15
		Try not to be distracted	13
		Displaying an upright sitting position	5
<i>Comprehension monitoring</i>		Identifying words whose meaning is unknown	2
		Trying to understand the speaker's thoughts	1
		Comparing the questions prepared before listening with the questions during listening	1
		Checking whether their ideas before listening are correct or not	2
		Checking the accuracy of pre-listening predictions	3
		Thinking about what has been said	2
	Trying to understand the message	3	
SOCIOAFFECTIVE STRATEGIES			
Category		Code	f
<i>Questioning</i>		Asking questions when you don't understand	9
<i>Respect</i>		Do not interrupt the speaker	15
		Not leaving the environment before the end of the conversation	1

	Asking questions with permission from the speaker	2
	Gently correcting the speaker's mistake	1
	Do not adopt a judgemental attitude towards the speaker	2
	Seriously, don't listen without making fun of me	2
	Paying attention to empathy	4
	Avoiding noises that distract other people	2
	Waiting for the speaker to finish	1
Feedback	Showing that you are listening to the speaker with body language	10
	Making the speaker feel that he/she is listening with verbal feedback	6
	Expressing your own opinions	3

Some pre-service teachers' views during listening are as follows: "I try to focus on the person speaking and pay attention to the subject being explained. The demeanour and attitudes of the person speaking affect my focus on him/her a lot." (1)

"During listening, I try to understand the subject, I concentrate on listening, I emphasise the important points in the narrator's speech, I concentrate on the subject and try to understand it, I try to understand not only the subject but also the thoughts of the speaker, I pay attention to the speaker while listening, I make eye contact with the speaker from time to time and make him/her feel that I am listening by responding with feedback such as yes, no, another, etc. I take notes on the subject I cannot understand and ask questions that are on my mind. While asking these questions, I do it without interrupting the narrator without distracting, when asking for the right to speak, I take the floor by using body language, not by interrupting directly. I provide feedback that what is said is understood and I answer the questions asked in an appropriate way. I make eye contact from time to time. I avoid humiliating, sarcastic gestures and mimics. I try to determine the purpose and the main idea of the narrator's speech. When taking notes, I take them when I find a gap in between, not during the speech, because I am not dealing with anything else while listening to the speech. When I catch a deficit of the speaker, instead of going on him/her, I try to make a correction on the subject with a correct approach without offending or disrespecting him/her. I respect his/her thoughts and explain my own." (7)

"During listening, if the subject attracts my attention, I listen attentively, but if there are external factors that prevent me from listening, I try to eliminate them. These external factors may be the constant interruption of the speaker's speech by some people and interruptions. Such factors can distract both me and the speaker. During listening, I try to be an active listener, if the listener is given the opportunity and given the floor, I try to take the floor because this motivates me. When listening, I try to take notes only on the important parts of what the speaker says, not all of it. It is always good for me to make eye contact with the speaker during listening because when I make eye contact with the speaker, the fact that the speaker makes eye contact with me among all the listeners makes me feel special and motivates me to listen to the speech more carefully." (13)

"During listening activities in the academic field, I observe the environment (the hall, the audience in the hall, the speaker, the speaker's attire, body language) and try to make eye contact with the speaker. I try to take notes about the points that attract my attention, the points I agree or disagree with, and I pay attention to compare them with the questions I took notes before listening. In my family and friend relationships, I listen to the speaker carefully and try to make the speaker feel that I understand him/her with my gestures and facial expressions according to his/her emotional state." (15)

"I start listening without interrupting the other person. I do not interrupt the course of the conversation. I do not interrupt him/her by taking a share from his/her words and saying "I also had such and such". I pay attention to the words of the speaker and do not deal with other things such as phone etc. at that time. I take care to make eye contact with the other person." (41)

The pre-service teachers were asked what they did after listening. Their answers were categorised in terms of listening strategies (table 3). They use cognitive, metacognitive and socioaffective strategies after listening. They use summarization, repetition and resourcing in cognitive strategies. The codes of repeating what they have listened in their minds and repeating the notes they have taken come to the fore. In metacognitive strategies, comprehension monitoring, evaluation and problem identification categories were found. The codes of thinking about what they listened, questioning what they understood, and evaluating what they listened come to the fore. In socioaffective strategies, questioning, cooperation, feedback categories emerged. After listening, pre-service teachers mostly ask questions to the speaker and answer questions/questions.

Table 3. Post-listening strategies

COGNITIVE STRATEGIES				
Category		Code	f	
<i>Summarization</i>		Summarizing what was said	4	
		Summarizing the notes taken	3	
<i>Repetition</i>		Repeating the notes taken	6	
		Clean up your notes	5	
		Repeating what you heard in your mind	7	
<i>Resourcing</i>		Research what's on your mind	2	
		Researching the topics and topics taken into consideration	1	
		Researching information that interests and attracts attention	3	
		Research unfamiliar words	3	
		Conduct research on the topic discussed	2	
		Doing research on places you don't attend	1	
		Re-examine issues that he thinks are important	1	
		Checking whether the information is correct	1	
		Perform additional readings	1	
		Obtaining accurate and useful information on the subject	1	
METACOGNITIVE STRATEGIES				
Category	Sub-category	Code	f	
<i>Comprehension monitoring</i>		Attributing meaning to what you hear	1	
		Trying to answer the questions in your mind	1	
		Designing the general outline of the subject	1	
		Thinking about what they heard	6	
		Questioning what you understand	7	
		Filter what is said in your mind	3	
		Interpret what you hear	5	
		Thinking about whether you got the message or not	1	
		Reviewing and restating your thoughts	1	
		Comparing the notes taken while listening with what they researched before listening	1	
		Compare the notes taken with your own knowledge	1	
		Analyzing what you hear with previous information	2	
	<i>Evaluation</i>		Evaluating whether the speech achieved its purpose	3
		<i>Performance evaluation</i>	Thinking about whether the person knows enough about the subject he is talking about	1
		Pay attention to whether the speaker uses gestures and facial expressions correctly and effectively.	1	
	<i>Strategy evaluation</i>	Self-criticism about your own listening process	2	

Content evaluation	Evaluating what what you hear adds to the person	2
	Evaluate what you hear	7
Problem identification	Point out if there are points you disagree with	2
	Pointing out if the speaker has a mistake	3
	Expressing issues that one is unsure of	1
	Creating solutions if there is a problem	3
SOCIOAFFECTIVE STRATEGIES		
Category	Code	f
Questioning	Ask questions to the speaker	20
	Answering question(s)	13
	Asking curious questions	2
	Asking the speaker to elaborate on the unclear part	2
	Asking him to repeat points he doesn't understand	1
Cooperation	Sharing the knowledge gained with friends	3
	Ask your friends their opinions on the subject	1
	Rating the speaker with friends	1
Feedback	Thanking the speaker	1
	Giving advice to the speaker	2
	Make additions on the subject	1
	Express your thoughts on the subject	4
	Expressing that you understand the speaker well	1
	Make positive or negative criticism	1
	Specify the parts it supports	2

The opinions of a few teacher candidates after listening are as follows: *"If I have any questions, I ask them. If the narrator has a question and it's a question I can answer, I answer. I research things that catch my interest and attention. For example, if a book that interests me is mentioned, I definitely do research on that book after listening. The same goes for new information I learn while listening. I definitely feel the need to research the new information I learn that stays in my mind and attracts my attention. Of course, not every listening may be interesting. When I listen, I don't research topics that don't interest me or topics that don't sound interesting or different."* (8)

"After listening, I make a small-scale summary to see whether I understand it in general. I make inferences from the information I hear. I compare what I understand after listening with the parts I researched before listening and the parts I took notes while listening. I ask questions about parts of the listening that I do not understand. "If the important parts I took notes interest me, I ask the speaker to elaborate a little more." (16)

"If I have questions on my mind, I ask them. I evaluate what I have learned. If I took notes, I clear my notes. "I try to research the information I just learned and do additional reading." (40)

"I try to make sure I understand the speaker correctly. I ask him questions. "I try to answer the topic in my own words." (63)

"After listening, if there are topics that interest me that I have not heard of before or that I am inadequate about, I like to research them. "If I think I've made a mistake while listening and if it's something that would get on my nerves if it's done against me, I'll take action and criticize myself." (68)

"I put myself on a scale. I question what listening brings to me, what I understand and what I don't understand. I usually regret not having a good listening process. "I'll think about how I can focus more during my next listening session." (69)

What the teacher candidates did during the listening process (pre-listening, during listening, post-listening) is summarized in Figure 2 according to their strategies.

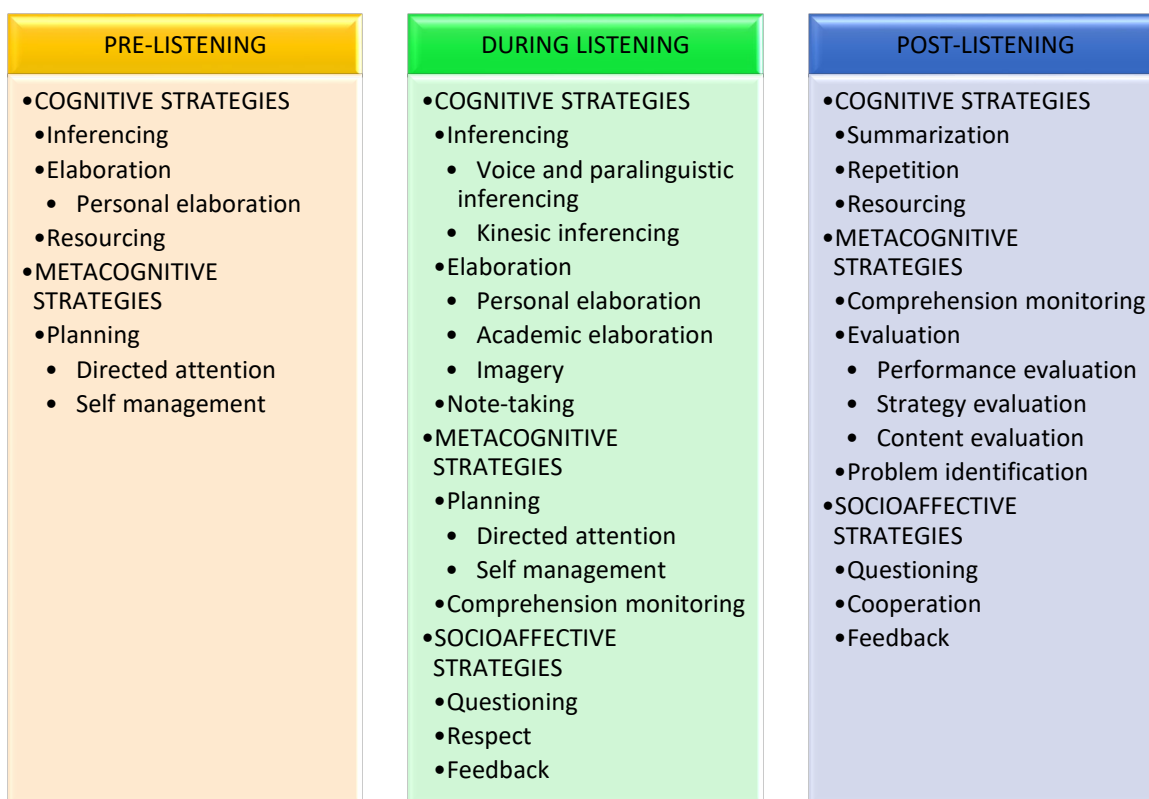


Figure 2. Listening process strategies

Listening Strategies in Native Language

When the listening processes of teacher candidates are evaluated as a whole, a classification of listening strategies in their native language emerges, as in Figure 3. Pre-service teachers use cognitive strategies such as inferencing, elaboration, summarization, repetition, resourcing and note-taking during the listening process. They use metacognitive strategies such as planning, comprehension monitoring, evaluation and problem identification. Among the socioaffective strategies, they use questioning, cooperation, respect and feedback.

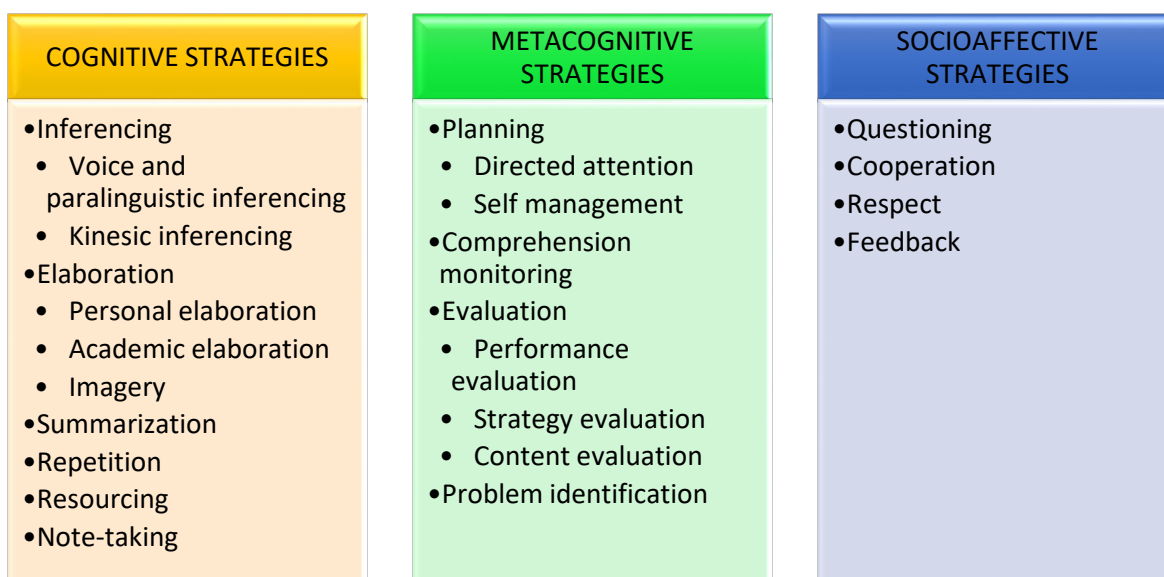


Figure 3. Classification of listening strategies in native language

Discussion

In this study, it was revealed that teacher candidates used cognitive and metacognitive strategies in pre-listening strategies. Cognitive strategies consist of inferencing, elaboration and resourcing. Metacognitive strategies consist of the planning category, including directed attention and self-management subcategories. It was revealed that teacher candidates mostly did research to obtain information about the subject before listening. The codes before listening are mostly in the planning category. They carry out pre-listening preparations such as providing the necessary listening environment, ensuring that the environment is quiet, preparing pen and paper to take notes, eliminating distractions, and finding a place where the speaker can listen comfortably. Apart from the arrangements in the environment, the other thing they attach importance to is mental preparations. They stated that they made preparations such as trying to empty their mind, trying to focus on the subject they were going to listen to, and preparing themselves mentally in order to focus better on the speaker. Goh (1999) lists the factors affecting listening comprehension as interest and purpose, prior knowledge and experience, physical and psychological states, knowledge of context, accuracy of pronunciation, knowledge of grammar, memory, attention and concentration in the listener dimension, and physical conditions in the environment dimension. Among these, interest and purpose, prior knowledge and experience, physical and psychological states, knowledge of context, memory, attention and concentration, physical conditions are similar to the inferencing, elaboration, resourcing and planning strategies used before listening in this study. As stated by Özbay (2005), pre-listening preparations such as being in a position where one can easily hear the speaker, staying away from distracting factors, having the necessary preliminary knowledge about the subject, preparing materials such as paper and pencil, thinking about whether one has knowledge about the subject in this study, and gaining knowledge about the subject. These codes are similar to the codes of doing research to obtain information, preparing pen and paper to take notes, finding a place where the speaker can listen comfortably, eliminating distractions, providing the necessary listening environment, and ensuring that the environment is quiet.

Pre-service teachers use cognitive, metacognitive and socioaffective strategies during listening. Cognitive strategies consist of inferencing, elaboration and note-taking. Inferencing and note-taking categories stand out. The codes of making eye contact in the Inferencing category, taking notes of important points in the note-taking category, and taking notes of things that one cannot understand stand out. Metacognitive strategies consist of planning and comprehension monitoring. Especially the planning category is at the forefront. It is seen that teacher candidates attach importance to mental processes such as trying to pay attention to the speaker, trying to pay attention to the subject being explained, and trying not to distract their attention during listening, as they do before listening. Socioaffective strategies consist of questioning, respect and feedback. In the questioning category, asking questions when someone does not understand, in the respect category, not interrupting the speaker, and in the feedback category, showing the speaker that you are listening with body language, stand out. Goh and Taib (2006), in their study with ten primary school students, determined that the metacognitive strategies that help facilitate listening are planning, directed attention, selective attention, and inferencing strategies. In this study, in addition to planning and inferencing strategies, note-taking, respect and feedback strategies are also at the forefront.

Teacher candidates use cognitive, metacognitive and socioaffective strategies after listening. In cognitive strategies, it is seen that participants summarize, repeat and investigate what they hear. The codes of mentally repeating what you hear and repeating the notes you take stand out. In metacognitive strategies, comprehension monitoring, evaluation and problem identification categories have emerged. Thinking about what you listen to, questioning what you understand, and evaluating what you hear are prominent metacognitive processes. It has been revealed that in socioaffective strategies, teacher candidates ask

questions, cooperate and give feedback. After listening, teacher candidates mostly ask questions to the speaker and answer the question(s).

When we look at the strategies used by pre-service teachers in the listening process, they use inferencing, elaboration, resourcing and planning before listening. During listening, they perform inferencing, elaboration, note-taking, planning, comprehension monitoring, questioning, respect and feedback. After listening, they perform summarization, repetition, resourcing, comprehension monitoring, evaluation, problem identification, questioning, cooperation and feedback.

When the listening processes of pre-service teachers are evaluated as a whole, they use cognitive strategies such as inferencing, elaboration, summarization, repetition, resourcing and note-taking. They use metacognitive strategies such as planning, comprehension monitoring, evaluation and problem identification. Among the socioaffective strategies, they use questioning, cooperation, respect and feedback. The categories that emerged in this study are Vandergrift (1997) (adapted from O'Malley and Chamot, 1990; Oxford, 1990; Vandergrift, 1996); Goh (1998); There are similarities and differences when compared to the categories emerging from Lynch & Mendelsohn (2010) (based on Goh 2002; Vandergrift 2003; and Kondo and Ying-Ling 2004) classifications (figure 1). Pre-service teachers use cognitive strategies such as inferencing, elaboration, summarization, repetition, resourcing and note-taking during the listening process. While these listening strategies are similar to the mentioned classifications, contextualization, fixation, reconstruction, translation, grouping, deduction and substitution strategies were not confirmed in the study. They use metacognitive strategies such as planning, comprehension monitoring, evaluation and problem identification. In metacognitive strategies, only the real time assessment of input strategy has not been validated. Among the socioaffective strategies, they use questioning, cooperation, respect and feedback. While the strategies of lowering anxiety, self-encouragement, taking emotional temperature, and relaxation were not confirmed in this study, respect and feedback strategies emerged with the data of this study. These similarities and differences may be due to the fact that these studies were generally on listening strategies in a foreign language, while this study was conducted on listening strategies in the native language. Friedman (1978) states that listening is an important but difficult process and that it takes place internally, away from the eyes. Even if a classroom is quiet and all faces are toward the teacher, something different may be happening within each individual and this process may vary from moment to moment. The only common element that can be observed is that no one spreads verbal messages. He mentions that a variety of events may be taking place inside, not all of which can exactly be considered eavesdropping. Therefore, the emergence of the feedback category in this study shows that the closed-box listening process is the expression of a statement that is important for both the speaker and the listener.

Berne (1995) examined how diversifying pre-listening activities affects second language listening comprehension. It shows that various listening activities (a question preview activity and a vocabulary preview activity) performed before listening significantly increase listening comprehension performance. Vandergrift (1997) reported that French high school students used metacognitive and cognitive strategies, with an overall increase in the total number of strategies by proficiency level. Results show clear differences in reported strategy use by listening ability and proficiency level. The use of metacognitive strategies such as monitoring comprehension, problem identification, and selective attention has emerged as the important factor that distinguishes successful listeners from less successful listeners. The use of prior knowledge also pointed out differences in inference making, prediction skills, and monitoring. In all these studies, it has been shown how the diversity of listening strategy use affects listening comprehension. At the same time, it is seen that students who are more successful in listening use more listening strategies.

It is necessary to expand the teaching of listening strategies, to diversify listening strategies, and to carry out activities using the think-aloud method so that students can become aware of their listening processes.

Comparative examination of listening strategy classifications and supporting the resulting classifications with applications will contribute to the study of listening strategies.

Ethics Committee Approval

This study was decided by the Aksaray University Human Research Ethics Committee in accordance with the ethical principles with protocol numbers 2023/06-40.

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Contents in Science Textbooks on Circulation and Respiratory Systems That May Cause Misconceptions

Research Article

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ARTICLE INFO	ABSTRACT
<p><i>Article History:</i></p> <p>Received: 01. 0 202</p> <p>Available online: .03.2024</p>	<p>Misconceptions are situations in which the concepts or relationships between concepts that individuals form in their minds do not match scientific facts. In terms of science education, its negative effects on meaningful learning are known. Daily life experiences, textbooks, teachers and the social environment are shown as the sources of misconceptions. In order to eliminate the negative effects of misconceptions, the most logical way is to improve the environment and documents that will allow misconceptions to occur. Perhaps the most functional and low-cost of these is improving textbooks. It is known that students at various levels have misconceptions about the respiratory and circulatory system. Also misconceptions are often acquired at an early age and are resistant. In this context, the research examined how often and how contents that may cause misconceptions about circulatory and respiratory systems were included in 6th grade science textbooks in Turkey. In Turkey, textbooks to be used in formal and non-formal education are determined with the approval of the Ministry of National Education, Board of Education and Discipline. As of 2023, there are 7 science textbooks that will be taught in 6th grades. In the research, three 6th grade science textbooks selected from these books were examined. As a result, a total of 36 contents related to 5 of the 6 misconceptions introduced into the literature by Allen (2019) were identified in the textbooks examined. 19 of these are visual and 17 are verbal. Finally, the research was concluded with suggestions to eliminate these deficiencies and improve the quality of the textbooks.</p> <p style="text-align: right;">© 2024 IOJES. All rights reserved</p> <p>Keywords: Misconceptions, textbooks, respiratory and circulatory system.</p>

Introduction

Misconception is a situation in which the concepts or relations between concepts that individuals create in their minds are incompatible with scientific facts (Taslidere, 2016). In terms of science education, it is known that the misconceptions that students carry from their previous experiences to the classroom environment have negative effects on meaningful learning (Treagust, 1988). Perhaps the most important thing in terms of

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dealing with misconceptions is to improve the environment and documents (textbooks, etc.) that will allow misconceptions to occur. Thus, it is possible to prevent the formation of misconceptions in learners (Ecevit and Özdemir Şimşek, 2017). If misconceptions have occurred, correctly diagnosing and determining them and creating dissatisfaction with this perception in the student are the basic dynamics for conceptual change (Kember, 1991).

Students from various grade levels have been determined to have many misconceptions about photosynthesis (Griffard and Wandersee 2001; Barker and Carr 1989), respiration (Sanders 1993; Yip 1998a), digestive system (Ramadas and Nair 1996; Teixeira 2000), nutrition (Francis and Hill) 1993; Nunez and Banet 1997), excretory and digestive system (Yip 1998b; Soyibo 1995), reproduction (Driver et al. 1994; Perrone 2007), circulatory system (Barrass 1984; Wang 2004) and photosynthesis and respiration (Kose 2008; Köse and Uşak 2006; Treagust and Haslam 1986; Wandersee 1983; Amir and Tamir 1995) the subject. It is said that an important reason for these misconceptions is that they are acquired from previous learning processes and a significant part of them originate from textbooks (Deshmukh, 2015).

It is stated that the main purpose of the latest science curriculum of the Ministry of National Education in Turkey is to "raise all individuals as science literate" (MoNE, 2018). Science literacy consists of many subcomponents. Despite this, a learning process free from misconceptions is the main backbone of this (Laugksch, 2000; Roberts, 2007). In all learning processes, misconceptions are seen as the most important obstacle to meaningful learning (Anam Ilyas, 2018; Muela, & Abril, 2014). Because correcting misconceptions requires a long time and effort. Moreover, most of the time, students' misconceptions are resistant and cannot be corrected (Lassonde, Kendeou, & O'Brien, 2016).

The process of replacing misconceptions in students' minds with scientific truths is called the conceptual change process. Conceptual change requires students to resolve misconceptions and inconsistencies between scientific concepts. It is the student who will carry out this process actively and with mental strain. Therefore, the student's intrinsic motivation and questioning skills are the main factors in this process (Lassonde, Kendeou, & O'Brien, 2016; Novak, 2002). However, the most efficient thing is of course not to acquire misconceptions during the initial learning process (Russell and Martin, 2023).

Daily life experiences, textbooks, teachers and the social environment are shown as the sources of students' misconceptions (Anam Ilyas, 2018; Osman, BouJaoude, & Hamdan, 2017; Özdemir, & Çalışkan, 2018; Soeharto et al., 2019). Additionally, prospective teachers in Turkey have misconceptions about different subjects of science (Adıgüzel & Yılmaz, 2020; Alkan, Akkaya & Köksal, 2016; Atabey & Çiftçi, 2019; Elmas, & Pamuk, 2021; Görkemli Taban, 2017; Karakaya et al. , 2020; Karakaya & Yılmaz, 2021; Sinan, Yıldırım, Kocakulah, & Aydın, 2006; Tamkavas, 2019; Yılmaz, & Bayrakçeken, 2017). This is a worrying situation because these prospective teachers are likely to transmit these misconceptions to students in the future (Anam Ilyas, 2018; Soeharto et al., 2019).

Tippett (2010) argues that textbooks are the dominant source for teaching science in most classrooms. It is also known that misconceptions exist to a large extent even in academic publications and textbooks (Crowther, & Price, 2014). Textbooks are a basic resource for both students and teachers (Sothayapetch, Lavonen, Juuti, 2013). In addition, unqualified textbooks may cause both teachers and students to develop misconceptions (Zajkov, Gegovska-Zajkova & Mitrevski, 2017).

Misconceptions are often acquired at an early age (Yanarateş, 2022a; Yanarateş, 2022b). Therefore, in terms of science education, primary school textbooks are more important than secondary school textbooks. In this study, the presence of verbal and visual contents in primary school science books that may cause six misconceptions determined by Allen (2019) on circulatory and respiratory systems in primary education was investigated. When we look at the primary school science textbooks in Turkey, it is seen that these topics are

discussed for the first time at the 6th grade level in the unit of systems in our body, living things and life. Apart from this, at the 8th grade level, the energy conversions and environmental science unit is covered in the subject area of living things and life (MoNE, 2018). However, at the 8th grade level, only matter cycles and cellular respiration are discussed in this sense. As a result, circulatory and respiratory systems are only included in 6th grade science textbooks in primary education. Therefore, only 6th grade textbooks were examined in this research.

In this context, the main problem statement of this research is as follows:

How often and in what form do 6th grade science textbooks in Turkey contain content that may cause misconceptions about the circulatory and respiratory systems?

Methodology

In this study, the document analysis method was used. Document analysis is one of the qualitative research methods in which printed documents are examined for a purpose (Yıldırım & Şimşek, 2016). This type of research involves analyzing the documents included in the research and comprehensively interpreting the information obtained (Corbin and Strauss, 2008).

Researched Textbooks

Table 1. Imprint Information of Textbooks

<i>Order</i>	<i>Grade Level</i>	<i>Edition</i>	<i>Author/s</i>
1th Book	6th grade	State Books	Dr. Öğr. Üyesi Fatih Serdar YILDIRIM, Ali AYDIN, İhsan SARIKAVAK
2nd Book	6th grade	State Books	Dr. Semra DEMİRÇALI, Birsen ALKAN
3th Book	6th grade	Anadol Publishing	Süheyla Özlem DİNÇER, Erhan YİĞİT

There are seven science textbooks determined to be used in 6th grades as of 2023 by the Ministry of National Education Board of Education and Discipline (MEB, 2023: 41). In the research, three 6th grade science textbooks selected by convenience sampling method among these books were examined. The easy sampling method aims to provide efficiency from the time and effort of the researcher or researchers (Büyüköztürk et al., 2016). Information about the textbooks examined in the study is presented in Table 1.

Analysis of Data

Table 2. Six common misconceptions on the circulatory and respiratory systems

<i>Subject</i>	<i>Misconception</i>
Circulation	1. The heart lies at the left side of the chest.
	2. Our heart beats faster during exercise in order to work our muscles.
	3. The blood in our veins is blue.
Breathing	4. Air is just breathed in and out, serving no physiological function.
	5. Air tubes connect the lungs to the heart.
	6. Exhaled air is mainly carbon dioxide and very low in oxygen.

In this research, 6 common misconceptions about the circulatory and respiratory systems identified by Allen (2019) are focused. It has been examined whether there are visual and written contents that may cause these misconceptions in the mentioned science textbooks. The six misconceptions on circulatory and respiratory systems identified by Allen (2019) are presented in the Table 2.

Reliability and Validity

During the research process, three science textbooks were read in detail by the researcher, taking into account the misconceptions in Table 2. According to Creswell (2013), the most important factor affecting the validity and reliability of data in qualitative research is expert opinions. In this regard, opinions were obtained from two experts. One of them is in the field of biology education and has 25 years of experience, and the other is in the field of educational programs and has 13 years of experience. As a result, data with full consensus by the researchers and experts were used. Miles and Huberman (1994) consider an agreement of 90% or above between two or more different experts to be sufficient to prove the reliability of the study.

Results

The findings obtained as a result of examining the textbooks in the research are presented in tables. Each table focuses on six misconceptions identified by Allen (2019) regarding circulation and respiration, respectively. While the title of the tables includes the expression misconception, the contents that may cause these and the pages in the textbooks are given in the tables. Examples of some of these are presented below the tables.

Table 3. Contents in textbooks that may cause the misconception "the heart is located on the left side of the chest"

<i>Book Order</i>	<i>Unit</i>	<i>Topics</i>	<i>Page/s</i>	<i>Verbal/Visual</i>
2nd Book	The systems in our body	The structure and function of the heart	69	Visual
3th Book	The systems in our body	The structure and function of the heart	53	Visual

Two of the three science textbooks each contain one objectionable content (that may cause misconceptions). There is no evidence of this misconception in the first book. An image showing the heart symmetrically, completely on the left, on page 53 of the third book is shown in Figure 1.

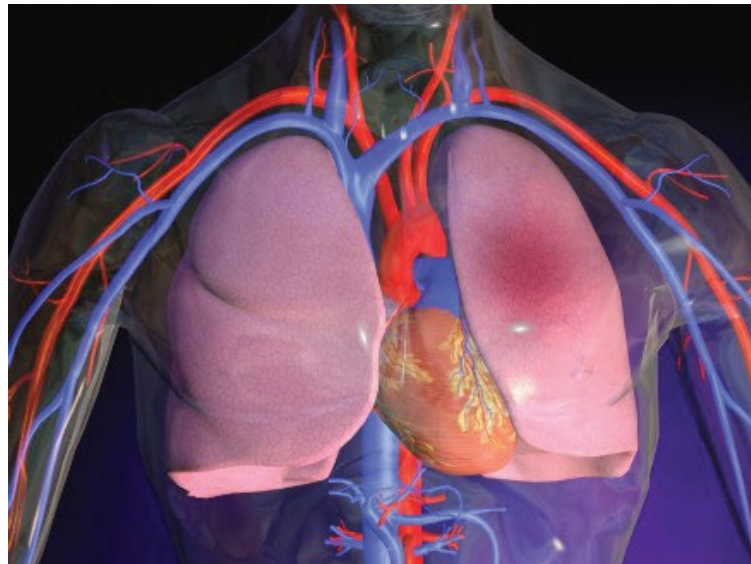


Figure 1. Visual that gives the impression that the heart is on the left according to the body symmetry shown in the background.

The visual in Figure 1 gives the impression that the heart is completely on the left in terms of body symmetry.

In the textbooks examined, no visual or verbal content was found that could cause the misconception "our heart beats faster to exercise the muscles during exercise", which is the second misconception given in Table 2.

Table 4. Contents in textbooks that may cause the misconception "the blood in our veins is blue"

<i>Book Order</i>	<i>Unit</i>	<i>Topic/s</i>	<i>Page/s</i>	<i>Verbal/Visual</i>
1th Book	Systems in our body	Structure and Functions of the Heart, Blood Vessels,	48, 50, 52, 61, 67	Visual
		Structures and Organs That Make Up the Excretory System		
2nd book	Systems in our body	Circulatory system, Skin	67, 68, 69, 70, 189	Visual
3th Book	Systems in our body, Systems in our body and health	Circulatory system, Structure and function of the heart, Sensory organs	53, 54, 55, 56, 204, 208, 244	Visual

Table 3 shows 17 content pages that may cause the misconception that the blood in our veins is blue. All of these are visual content.

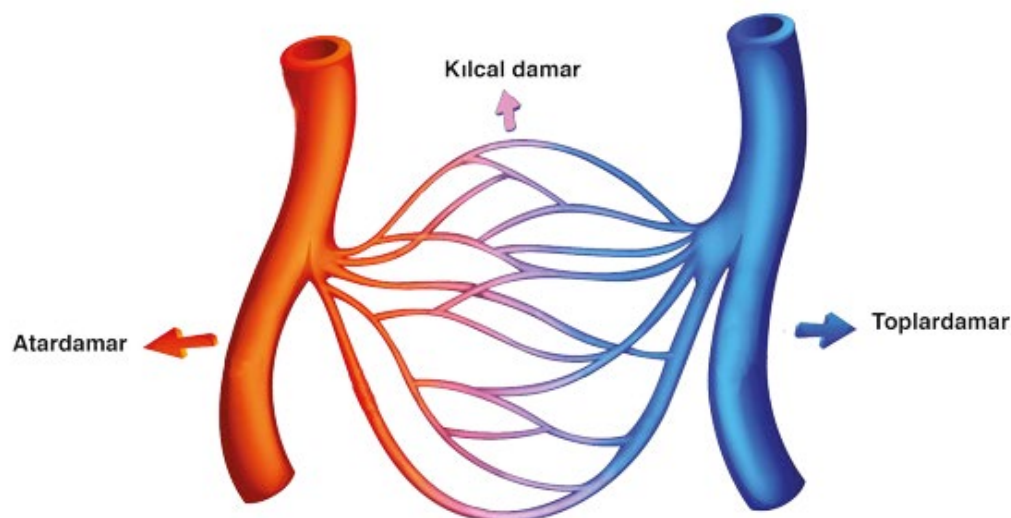


Figure 2. An example of visual content that may cause a misconception that the blood turns blue as it passes into the veins, in the image given to introduce arteries, capillaries and veins on page 50 of the first book.

Figure 2 supports the misconception determined by Allen (2019) that blood is red in the arteries and turns blue towards the veins. In addition, there is no verbal explanation around the figure indicating that this is just a representative colouring.

Table 5. Contents in textbooks that may cause the misconception that "air is only breathed in and exhaled and has no physiological function"

<i>Book Order</i>	<i>Unit</i>	<i>Topic/s</i>	<i>Page/s</i>	<i>Verbal/Visual</i>
1th Book	Systems in our body	Respiratory system	56, 57	Verbal
2nd book	Systems in our body	Respiratory system	79, 80	Verbal
3th Book	Systems in our body	Respiratory system	63, 69, 172,	Verbal

Table 5 shows pages containing 7 contents that may cause misconceptions. In addition, the relevant contents are included almost homogeneously in all three books.

For example, in the third book, on page 63, as mentioned:

“...food alone is not sufficient to produce energy in the human body. Oxygen is required along with food to produce the energy necessary for life. Oxygen is taken into our body through the respiratory system organs. The way our body takes in oxygen from outside and gives out the carbon dioxide formed in the body is called breathing. The system formed by the structures and organs responsible for breathing is called the respiratory system. The main task of the respiratory system is to ensure that the body takes in oxygen from outside and to expel the carbon dioxide formed in the body.”

Here it can be seen that the respiratory system is handled independently. However, the basic components of the circulatory system, namely vessels, blood, heart and respiratory system, function together with strong relationships. Although the expression does not directly cause the misconception mentioned, it remains shallow in explaining the functional function of breathing. It would be useful to emphasize the energy-requiring function of digestion, which reduces macronutrients to cell size, and the energy-gaining function of breaking down food inside the cell with oxygen. Otherwise, the relationships between subjects and concepts, which are necessary for meaningful learning (Kinchin, Möllits, & Reiska, 2019), will not be understood.

Table 6. Contents in textbooks that may cause the misconception "air tubes connect the lungs to the heart"

Book Order	Unit	Topic/s	Page/s	Verbal/Visual
1th Book	Systems in our body	Respiratory system	56, 57	Verbal
3th Book	Systems in our body	Respiratory system	64	Verbal

Table 6 shows that the relevant contents are present in 5 places in only two of the three textbooks. On page 56 of the first book, it is stated that "the system formed by the organs that come together to carry the necessary gases in the air we breathe to the cells and to transmit the waste gases from the cells to the outside of the body is called the respiratory system." This may cause the misconception that "air tubes connect the lungs to the heart". Additionally, on page 57 of the first book, alveolus is defined as follows:

It is defined as "Alveoli: Air sac-shaped structures located at the end of the bronchioles, surrounded by capillaries, where gas exchange takes place. *It is important to emphasize here that gas exchange occurs between the blood in the capillaries and the alveoli. Otherwise, there is a possibility of falling into the misconception that "air tubes connect the lungs to the heart".* To prevent this, the functioning of the respiratory and circulatory systems together and in close relationship should be emphasized when both the respiratory system and the circulatory system are processed.

Table 7. Contents in textbooks that may cause the misconception "the air exhaled when exhaled is mainly carbon dioxide and the oxygen content is very low"

Book Order	Unit	Topic/s	Page/s	Verbal/Visual
1th Book	Systems in our body	Respiratory system, Excretory system	56, 61	Verbal
2nd Book	Systems in our body	Excretory system, Answer Key	79, 80, 229	Verbal
3th Book	Systems in our body	Respiratory system, Excretory system	63, 69	Verbal

Table 7 shows that there are a total of 7 contents in all three textbooks regarding the misconception "the air exhaled is mainly carbon dioxide and its oxygen content is very low." For example, on page 80 of the second book, it is stated that "Lung: It expels carbon dioxide and water vapour through exhalation." Additionally, on page 79, the statement "Lung: It expels carbon dioxide, which is released as a result of the breakdown of nutrients with oxygen in the structures in the body... through exhalation" is stated. Due to the weakness in these explanations, students are likely to fall into the misconception that "the air exhaled is mainly carbon

dioxide and the oxygen content is very low." Allen (2019) states in his study that while there is 0,04 percent of carbon dioxide in the inhaled air, this increases to 4 percent in the exhaled air. He states that oxygen is approximately 21 percent in the inhaled air and approximately 17 percent in the exhaled air, while nitrogen and other gases do not change at all. Attention is drawn to the misconception that exhaled air consists almost entirely of carbon dioxide. Insufficient and superficial definition and expressions in the above content are likely to cause misunderstanding unless the teacher explains them. As a matter of fact, these textbooks are also used in non-formal education processes such as open secondary school.

Conclusion, Discussion and Recommendations

As a result, a total of 36 contents related to 5 of the 6 misconceptions introduced into the literature by Allen (2019) were identified in the three 6th grade science textbooks examined. 19 of these are visual and 17 are verbal content. To consider these one by one, the statement related to (which may lead to) the first misconception appears in two places in two of three different textbooks. In all three science textbooks examined, no content was found that could cause the second misconception (Table 2) that "our heart beats faster to exercise our muscles", which is the misconception. The third-ranked misconception occurs in 17 places in all three textbooks (Table 4). In addition, this misconception is the most common misconception in textbooks. The fourth misconception is mentioned verbally and in 7 places in the textbooks. The fifth misconception is mentioned three times in two of the three textbooks. The sixth misconception was identified in a total of 7 places in all three textbooks. Similarly, Yılmaz, Gündüz, Diken, and Çimen (2017) identified some inaccuracies about respiration in 8th grade science textbooks. Additionally, Gündüz, Yılmaz, Çimen, and Şen (2017) say that there are incorrect statements about cellular respiration in the secondary school biology textbook. According to Yıldız (2022), serious errors occur as a result of the use of wrong concepts, especially when translating foreign sources used in textbooks into Turkish.

In the textbooks examined, the most common misconception is "the blood in our veins is blue". This misconception is supported by the purplish appearance of the veins close to our skin, such as our hands (Allen, 2019). The truth is that this is an optical illusion. Our skin normally reflects light in skin colour tones. However, in cases where the veins are dense and close to the skin, the reflected light is mostly in blue tones, causing this appearance (Bilim ve Teknik, 2023). This can be explained by the fact that there is no bleeding other than red colour in small cuts encountered in daily life. Videos on the internet can also be used. However, the teacher's guidance is important here so that students do not encounter inappropriate videos.

It has been stated that various biological processes are taught independently of each other in textbooks and classes, and this has negative effects on students' understanding of the interrelationships between concepts and sub-concepts (Deshmukh, 2015). Understanding the connections between concepts is an important indicator of meaningful learning (Bransford, Brown & Cocking 2000). In this sense, it would be useful to frequently emphasize the relationships between concepts and topics in science textbooks. Otherwise, it becomes difficult to develop a holistic understanding that is independent of each other and devoid of relationships. This especially damages holistic perception, which is considered the basic understanding of biology education (Brown, & Schwartz, 2009).

According to Dake (2007), the inclusion of real-life examples in textbooks makes them attractive, but most textbooks are quite shallow and unconvincing in their subject content and solution of exercise questions. In this sense, it may be useful to prepare textbooks at every teaching stage with the logic of persuasion (with explanations of the reasons).

Students have difficulty in establishing the relationship between respiration and the excretory system (Yip, 1998). Even teacher candidates have difficulty understanding the relationships between the circulatory system and the respiratory system (Pelaez et al., 2005). In this sense, it would be beneficial to focus more on

the relationships between concepts and subjects in textbooks. In this regard, it may be recommended to include sample expert concept maps at the beginning of the unit. Additionally, students can be encouraged to create their own concept maps with sample activities in textbooks. Additionally, the pathways that oxygen follows, starting from the mouth and nose, which is the purpose of breathing, can be emphasized. Again, the pathways followed in the removal of carbon dioxide (other wastes in higher classes), starting from within the cell, can be explained step by step. This may help provide the desired understanding. Finally, in the future, the existence of misconceptions recorded in the literature on other subjects in primary and secondary school textbooks can be investigated. In this way, textbooks can be made more qualified.

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The Effect of Realistic Mathematics Education on Primary School Students' Mathematical Gain: A Meta-Analysis Study

Research Article

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ABSTRACT

The aim of this study is to investigate the effect of the use of Realistic Mathematics Education (RME) approach in teaching mathematical concepts in early childhood and elementary school students. A meta-analysis method was used to systematically examine the results of experimental studies published in the last twenty-three years. The National Thesis Center, Scopus, Web of Science and DOAJ databases were scanned, and a total of 16 studies identified that met the inclusion criteria. A total of 26 effect size values were calculated from 16 individual studies. The Comprehensive Meta-Analysis (CMA) program was used to calculate the value of the Hedges g coefficient. The analysis results revealed that the overall effect size ($d=0.822$) had a significant positive effect. In the light of this information, it was concluded that RME-based teaching had a positive effect on the student's mathematical learning. It is recommended that mathematics instruction in primary schools should be enriched with the RME approach.

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Keywords:

Realistic Mathematics Education, primary education, early childhood, mathematics

Introduction

Education is the most important factor in the process, from the creation of human beings to the present day, that drives societies forward. Education is a change in the behavior of an individual as a result of life. (Demirel, 1999). People have left behind a time when knowledge has an unchanging structure, that being

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informed means only keeping and memorizing information in mind, and that education should therefore be the same for all individuals (Aydın Ünal and Silk, 2010). Education is a dynamic process because it has a constantly evolving, changing dynamic structure, is influenced by socio-cultural, technological, and economic factors, and guides individuals in society (Çilingir, 2015). In other words, the characteristics and requirements of each era have shaped the education system (Özdemir, 2020).

Changes in the education system have also affected the tasks expected from individuals. This change emphasizes the individual who produces knowledge, uses it functionally in life, produces solutions to problems, creates and thinks critically, has communication and cooperation skills, innovates, and so on. (MEB, 2018; National Research Council, 2012). Appropriate educational curricula should be established to raise individuals with these skills. According to MEB (2018) the curricula to be developed for this purpose need to focus on the use of high-level cognitive skills, enabling sustainable learning and integrated with everyday life.

Mathematics education has been influenced by the innovations and changes (Kaya, 2018; MEB, 2017; Oksas et al., 2022). Today, learning approaches that embody mathematical abstract concepts and processes, activate learning in the learning process, and use concrete examples based on the daily life of learning are increasingly popular (Altunay, 2018; Shafiuddin, 2010). In our country, more emphasis has been placed on learner-centered approaches in view of changes in mathematics curricula (MEB, 2018; Özkürkçüler, 2019). One of the new approaches used in teaching mathematics is Realist Mathematics Education (RME). Founded by the Dutch mathematician and educator Hans Freudenthal, the focus of RME in mathematics teaching is to present mathematical concepts and processes in a clear, comprehensible, and tangible way, using the problems that learners encounter in everyday life (Berkant ve Yaren, 2020). RME, a mathematics teaching theory developed as a reform movement that challenged the traditional approach (De Lange 1996; Van den Heuvel-Panhuizen and Wijers 2005), aims to inform learners by identifying a problem situation in daily life and encourage learners to develop and apply possible solutions to the problem. According to Freudenthal, the founder of the approach, mathematics is a human activity (Zulkardi, 2002), which is why mathematics education needs to be real, close to children, and connected to society. (Freudenthal, 1983).

The basic idea of RME is that "I know mathematics" means "I know how to do math". (Streefland, 1991). RME argues that mathematics should be linked to real life and included into children's lives (Van den Heuvel-Panhuizen and Wijers, 2005). RME emphasizes that in order for mathematics education to provide enjoyable and lasting learning, problems should be presented based on the child's own life (Yağcı and Arseven, 2010). This process, in which children start with their own life problems and explore the knowledge by reaching a mathematical concept, is referred to as mathematization.

Freudenthal (1991) pointed out that mathematization was the basic process of mathematics teaching, and linked it with two fundamental reasons. The first of these reasons is that mathematization is not the only thing that mathematicians do. In other words, all individuals who are intrigued by mathematics at all times need to approach the problems they encounter mathematically. Another reason is that mathematization is the key to math lessons (Altun, 2006). This statement emphasizes that reaching formal information is the last step in teaching mathematics (Uzel, 2007). The success of this process depends only on the teacher's creation of an environment where students can do experiments based on the idea of re-discovery (Fauzan, 2002; Gravemeijer, 1998).

Studies revealed that RME has a positive impact on mathematical success in early childhood and primary school (Aytekin Uskun, 2020; Can, 2012; Farmer, 2022; Chilingir, 2015; Sancu, 2022, Papadiks et al., 2017; Zaranis, 2013). In addition, meta-analysis studies focusing on the effect of RME on students' mathematics achievement are also available (Filiz, 2023; Juandi et al., 2022; Kaplan et al, 2015; Turgut, 2021; Gürsoy, 2023). Meta-analysis studies have concluded that RME has a positive impact on mathematics achievement. According to the results of a meta-analysis study conducted by Kaplan and his colleagues (2015), RME has a

moderate overall impact on mathematics achievement. In another meta-analysis study, Turgut (2021) considered the area of learning, the level of education, the size of the sample, and the duration of intervention as moderator variables. The results of the meta-analysis presented that while the duration of the intervention constituted a statistically significant difference, the other variables did not. When the intervention times were compared in the study, the duration of 6-10 course hours had large effect ($ES=0.910$), the duration of 11-15 course hours had small effect ($ES=0.513$). The study concluded that the influence of RME on the student's math achievement was moderate. Gürsoy (2023) calculated the overall impact of RME in master's thesis and dissertations by using the meta-analysis methodology and treated the year of publication, the type of the thesis, the area of learning, and the level of education as moderator variables. The findings of the study suggest that RME-based teaching has a positive impact on mathematical success, while suggesting the use of RME based teaching at all levels of education. In another meta-analysis study, Juandi, Tamur and Kusumah (2022) determined that the application of RME had a positive effect on students' mathematical abilities. The study identified the relationship between the moderator variables including sample size, duration of intervention, combination of learning, geographical region, and the level of education. The researchers suggested that taken into account these variables in organizing RME-based teaching activities would result in a better academic achievement in mathematics.

This study extends previous studies by examining the overall impact of RME-based teaching on students' achievements in mathematics. Although there are meta-analysis studies in elementary school level, the researchers did not find any meta-analysis study in early childhood level. The study has an important role in filling this gap in literature and contributing to the question, "What is the overall effect of RME-based teaching on mathematics learning in early childhood and elementary school students?"

Method

In this meta-analysis study, which is a part of a project funded by TÜBİTAK (grant #122G148), the main goal was to examine the studies focusing on RME-based teaching in early childhood and elementary school levels. Research articles published between January 2000 and September 2023 were found using the following databases: The Council of Higher Education Thesis Center, Web of Science, DOAJ, and Scopus. These databases were selected because they offer electronic access to all studies and are widely utilized in the field of education. The following keywords were used "Realistic Mathematics Education AND preschool," "Realistic Mathematics Education AND kindergarten," "Realistic Mathematics Education AND early childhood," "Realistic Mathematics Education AND primary school," and "Realistic Mathematics Education AND elementary school." Constant article search was conducted between July 10 2023 and September 30 2023. In total, 66 studies in all were identified based on the keywords.

Criteria for inclusion and exclusion

The inclusion and exclusion criteria are provided below:

- Studies should be published between 2000 and 2023.
- If an article was published based on a dissertation/thesis, only the relevant article was included in the list and dissertations/theses were removed.
- Full texts of articles should be available through the databases.
- Quantitative research models should be used in the studies.
- The studies should be experimentally designed with control and experimental groups in order to calculate the effect size.
- The studies should include descriptive numerical data (i.e., sample size, average, standard deviation, F and t values) for both control and experimental groups.

Procedures

The following path was followed in this particular study (Fig 1). The first search yielded 66 studies in total. After the consideration of the inclusion and exclusion criteria, there were 16 studies in total. The descriptive information about those studies are provided in Table 1.

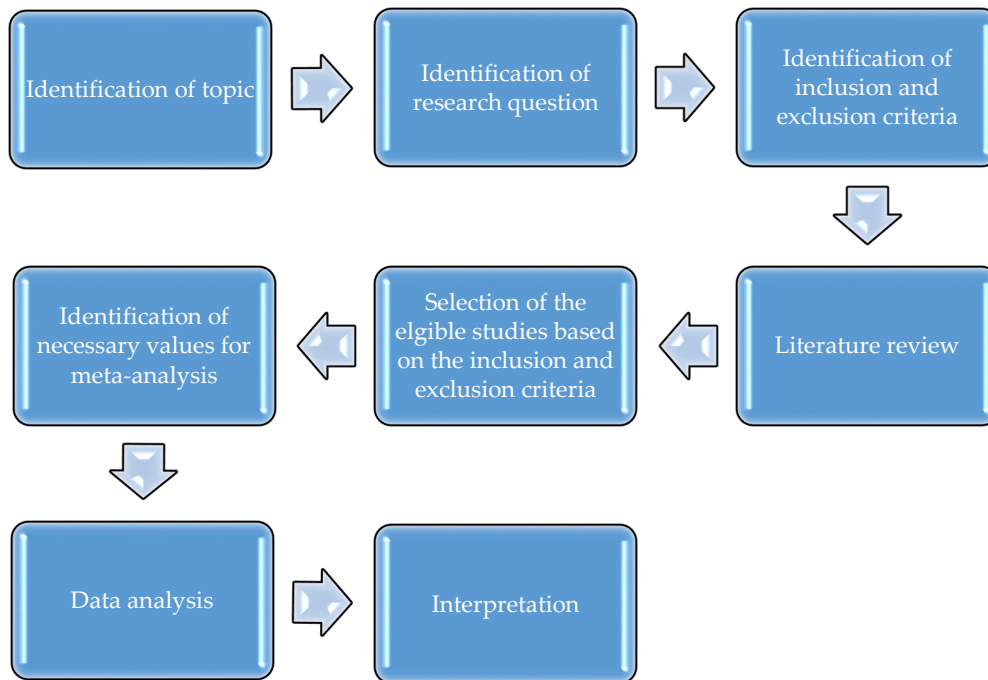


Fig 1. Meta-analysis process (Chambers, 2004; Dinçer, 2014; Hamer & Simpson; 2002)

Table 1. Descriptive information about the studies

<i>Variables</i>		<i>Frequency (f)</i>
Grade level	Early childhood	2
	Grade 1	0
	Grade 2	2
	Grade 3	3
	Grade 4	8
	Grade 4 and 5	1
Publication year	2015 and earlier	4
	2016 and after	12
Publication type	Master’s thesis	9
	Dissertation	2
	Article	5
Subject area	Numbers and arithmetic	8
	Measurement	4
	Data analysis	1
	Geometry	2
	Mix	1
Sample size	1-30	1
	31-60	6
	61-90	3
	91<	6
Duration of implementation	1-5 weeks	8
	6-10 weeks	5
	11 weeks<	3

Out of all those articles, five had several variables. As a result, they were regarded as separate publications, which implies that data from 26 studies were used in the current study. Details regarding those articles can be found below.

- Akış (2022), this study examined the effect of two different independent variables: RME and RME supported higher-order thinking activities. For this reason, the study was incorporated into the analysis as two different studies.
- Çilingir Altner & Artut (2016), this study included data from two different control groups and obtained different data for both groups. For this reason, the study was incorporated into the analysis as two different studies.
- Çopur (2022), this study included data from two different control groups and obtained different data for both groups. For this reason, the study was incorporated into the analysis as two different studies.
- Yazgan & Altun (2010), this study grouped control and experimental groups into three categories including low, medium, and high achievement groups and obtained different data from each category. For this reason, the study was incorporated into the analysis as six different studies.
- Zaranis & Synodi (2017), this study focused on three different geometry subjects and obtained different data for each subject area. For this reason, the study was incorporated into the analysis as three different studies.

For this study, students' mathematical gain was considered as dependent variable while the use of RME-based activities as independent variable (Table 2).

Table 2. Dependent and independent variables in the eligible studies

<i>Dependent variables</i>	
Çakır, 2013	Achievement of mathematical objectives
Erce, 2021	Effect on learning
Sancu, 2022	Problem solving achievement
Yazgan & Altun, 2010	Achievement in fraction
Papadiks et al., 2017	Mathematical proficiency
Zaranis & Synodi, 2017	Development of geometry competence
Akış, 2022; Altunay, 2018; Uskun et al., 2021; Çiftçi, 2022; Çilingir Altner & Artut, 2016; Çopur, 2022; Kan, 2019; Kurt, 2015; Nama Aydın, 2014; Özkürkçüler, 2019	Academic achievement/Math achievement
<i>Independent variables</i>	
Akış, 2022; Altunay, 2018; Uskun ve diğ., 2021; Çilingir Altner & Artut, 2016; Kan, 2019; Kurt, 2015; Nama Aydın, 2014; Özkürkçüler, 2019; Papadiks et al., 2017; Çakır, 2013; Sancu, 2022	RME
Akış, 2022	RME-based higher-order thinking activities
Çiftçi, 2022	RME-based Scratch activities
Çopur, 2022	RME-based digital storytelling
Zaranis & Synodi, 2017	RME-based digital activities
Erce, 2021	RME + computer supported learning
Yazgan & Altun, 2010	RME and socio-constructivism

Data Analysis

The Comprehensive Meta-Analysis (CMA) package application was used to evaluate the data collected for this study. Prior to using the CMA program, the statistical data was initially analyzed in the Microsoft Excel 2010 Office application to include author names, year of publication, title, publication type, dependent variable name, independent variable name, sample sizes for experimental and control groups, arithmetic average, standard deviation, p value, t value, and F value. These data were re-coded separately by the researchers to ensure inter-rater reliability. Using Hedge's g, effect sizes were calculated (Cohen, 1994; Lipsey & Wilson, 2001; Özdemir et al., 2020; Vacha-Haasse & Thompson, 2004). The impact sizes of the following range of Cohen (1988) criteria were used for the interpretation.

- Between 0,20 and 0,50: small effect
- Between 0,50 and 0,80: medium effect
- 0,80 and higher: large effect

Findings

This section presents the findings of a meta-analysis of primary school students learning of mathematics supported through RME. In order to answer "what is the overall effect of RME-based teaching on mathematics learning in early childhood and elementary school students?", meta-analysis was carried out. Effect sizes of the studies were calculated using the Hedges g value, homogeneity tests were performed and a random effects model was used.

Publication Bias Analysis

Publication bias is of particular importance for the reliability of the meta-analysis studies. Publication bias indicates that studies with statistical differences between groups tend to be published more frequently than those with no statistical significance (Rothstein et al., 2005). Publication bias above a certain level causes the impact size to exceed the actual value (Borenstein et al., 2009). A Funnel plot of the studies included in the study is presented in Figure 2. The distribution in the figure revealed that publication bias was not observed (Sad et al., 2016).

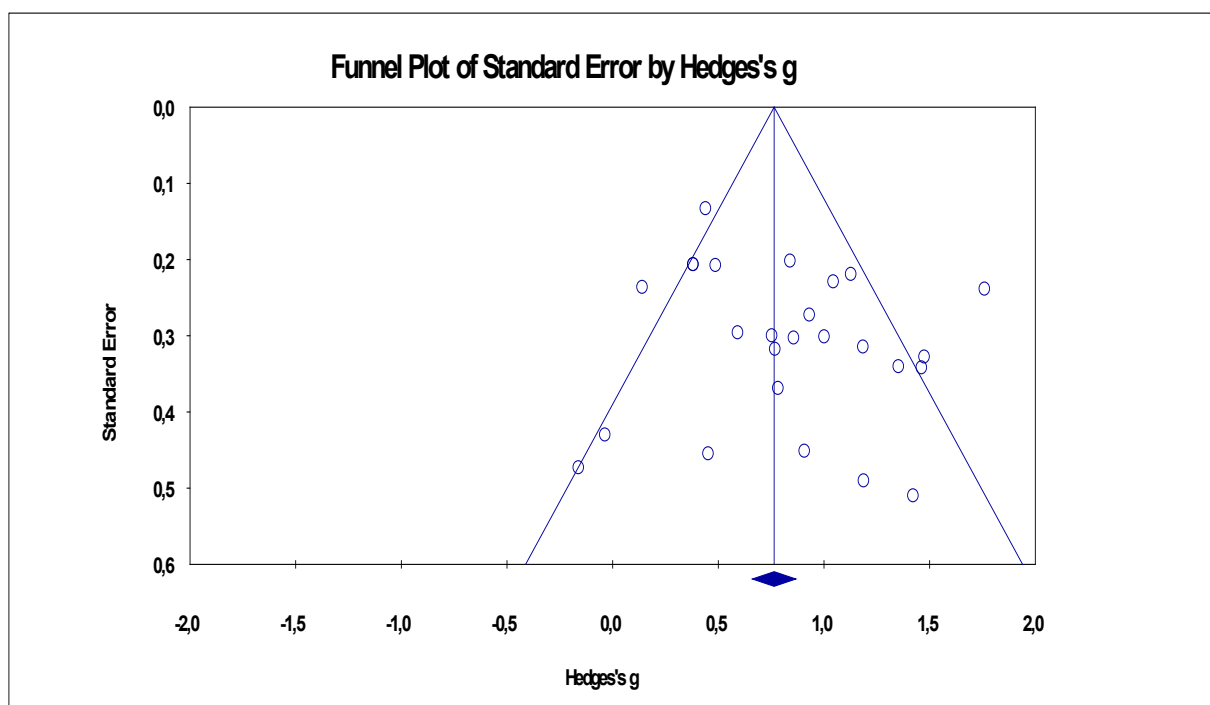


Figure 2. Funnel plot of the 26 studies

Calculation of the Effect Sizes

The effect size of each study must be determined in order to determine the overall effect size in meta-analysis study. The impact sizes and additional information for the eligible studies are shown in Table 3.

Table 3. Descriptive data of the eligible studies

Studies	Statistics in the Studies							
	Std diff in means	Hedges' g	Standard error	Variance	Lower limit	Upper limit	Z value	p
1-Akış- 2022	0,873	0,858	0,303	0,092	0,264	1,453	2,830	0,005
2-Akış-2022	1,208	1,187	0,315	0,099	0,569	1,805	3,766	0,000
Altunay-2018	0,785	0,770	0,318	0,101	0,147	1,393	2,422	0,015
Çakır -2013	0,946	0,933	0,273	0,075	0,398	1,468	3,415	0,001
Uskun et al..-2021	0,143	0,142	0,237	0,056	-0,322	0,606	0,599	0,549
Çiftçi-2022	1,492	1,464	0,342	0,117	0,793	2,135	4,276	0,000
1-Çilingir Altıner & Artut-2016	0,848	0,842	0,202	0,041	0,445	1,238	4,159	0,000
2-Çilingir Altıner & Artut-2016	1,138	1,129	0,220	0,048	0,699	1,560	5,139	0,000
1-Çopur-2022	1,502	1,476	0,328	0,108	0,833	2,120	4,499	0,000
2-Çopur-2022	0,768	0,755	0,300	0,090	0,166	1,344	2,514	0,012
Erce-2021	1,02	1,003	0,302	0,091	0,411	1,594	3,323	0,001
Kan-2019	1,776	1,762	0,239	0,057	1,293	2,230	7,368	0,000
Kurt-2015	0,604	0,594	0,296	0,088	0,013	1,175	2,003	0,045
Nama Aydın-2014	1,056	1,046	0,230	0,053	0,596	1,496	4,557	0,000
Özkürkçüler-2019	0,807	0,785	0,369	0,136	0,061	1,509	2,124	0,034
Sancu-2022	1,381	1,355	0,341	0,116	0,686	2,023	3,973	0,000
1-Yazgan & Altun-2010	1,495	1,424	0,510	0,260	0,424	2,424	2,790	0,005
2-Yazgan & Altun-2010	-0,036	-0,035	0,431	0,185	-0,878	0,809	-0,080	0,936
3-Yazgan & Altun-2010	-0,169	-0,160	0,474	0,224	-1,088	0,768	-0,337	0,736
4-Yazgan & Altun-2010	0,949	0,909	0,452	0,204	0,024	1,795	2,013	0,044
5-Yazgan & Altun-2010	0,477	0,454	0,455	0,207	-0,438	1,347	0,998	0,318
6-Yazgan & Altun-2010	1,249	1,190	0,491	0,241	0,228	2,152	2,424	0,015
Papadakis et al.-2017	0,443	0,442	0,134	0,018	0,180	0,704	3,308	0,001
1-Zaranis & Synodi-2017	0,493	0,489	0,208	0,043	0,081	0,896	2,348	0,019
2-Zaranis & Synodi-2017	0,386	0,383	0,207	0,043	-0,023	0,788	1,850	0,064
3-Zaranis & Synodi-2017	0,385	0,382	0,207	0,043	-0,023	0,788	1,848	0,065
Total	0,837	0,822	0,092	0,008	0,641	1,002	8,941	0,000

As shown in Table 3, 26 studies have impact size values ranging from -0.160 to 1.762. The overall effect size was calculated as 0.822. Among the eligible studies, 20 of them were statistically significant ($p < 0.05$), while six of them showed no statistical significance ($p > 0.05$).

Homogeneity Test Results

This section provided information about whether the eligible studies had a homogeneous distribution. If the calculated distribution is homogeneous, the fixed-effect model is used, and if the distribution isn't homogenous (heterogenic distribution), the random effects model is applied. (Ellis, 2010; Orhan ve Men Durak, 2018).

Table 4. Homogeneity test results

Q value	Df(Q)	p value	I ²
68,484	25	0,000	63,495

The homogeneity test revealed that there was a significant difference between the impact sizes of the studies in which the effect of GME on students' academic/mathematical achievement was examined (Q=68,484; p=0.00). Accordingly, it is concluded that the data is heterogeneous (Table 4).

Random Effects Analysis

Data from the eligible studies included in meta-analysis were analyzed based on the random effect model. As shown in Table 5, for the value of standard errors (0.092) and the 95 % confidence range, the upper and lower limits were calculated as 1.002 and 0.641, respectively. The effect size was found to be 0.822. The Z score was 8,941 and the p value was 0,000, which was statistically significant (p<0.05).

Table 5. Random effects analysis results

Studies	Effect Size	Standard Error	Variance	Lower limit	Upper limit	Z Score	p Value
Random Effects Model	0,822	0,092	0,008	0,641	1,002	8,941	0,000

Discussion and Conclusion

This study examined a total of 16 studies investigating the effect of RME-based mathematics teaching in early childhood and primary school on students' success in mathematics through meta-analysis methods. A homogeneity test was applied to 16 studies included in the meta-analysis to determine the impact model. It was concluded that there was a significant difference between the results and that the distribution had heterogeneous properties (Q=68,484; p=0.00). Therefore, the random effects model used in the study. The data from each study were analyzed separately and the Hedges g impact values were calculated. The overall effect size was found to be 0.822. The effect sizes obtained in meta-analysis studies are interpreted by many researchers using different classifications (Özdemir and Berg, 2022). According to the findings, the Hedges' g effect size was large according to Thalheimer and Cook's (2002) classification, and medium according to Cohen and his colleagues' (2007) classification. This implies that the RME approach has a meaningful and positive impact on students' mathematical learning. This finding is supported by the other studies conducted at both national and international levels (Akash, 2022; Çakır, 2013, Erce, 2021; Filiz, 2023; Gürsoy, 2023, Kurt, 2015; Orksüz et al., 2022; Papadiks et al. 2017; Tamur et al, 2020; Zaranis, 2013; Zranis, 2016). In summary, both this particular study and the other studies in the field suggest that RME-based mathematics instruction should be placed more in the teaching of mathematics in early childhood and primary schools.

According to the findings of this particular study, two important points come to the fore. The first point is that there is a limited number of studies focusing on RME-based mathematics instruction, especially in the preschool/kindergarten and 1st and 2nd grades. The mathematical world of children at this age is based on concrete concepts (Erdoğan and Baran, 2003). Therefore, mathematical activities must be linked to real life and supported by tangible materials in order for meaningful learning to occur (Akman, 2002). These characteristics form the core of RME. Considering the positive impact of RME on students' mathematical success (Aytekin Uskun, 2020; Blood, 2019; Can, 2012; Zilingir, 2015; Juandi et al., 2022), it is important to increase the number of experimental studies in these age groups.

The second point is related to the mathematical concepts covered in the studies. Descriptive analyses results revealed that RME approach was mainly used in teaching numbers and basic arithmetic. Children are expected to gain skills about geometry, number concepts, arithmetic, measurement, pattern, and data analysis,

graphs, and probability in primary schools (MEB, 2013, MEB, 2018; NCTM, 2000). Therefore, future research is needed to examine the effectiveness of the RME approach not only in the teaching of numbers and arithmetic but also in other mathematical areas. The limitation of this study is the use of only one dependent variable (mathematical learning). Some studies have shown that RME is dealt with alongside academic achievement with attitude, motivation, and persistence (Akış, 2022; Çakır, 2013; Çopur, 2022, Nama Aydın, 2014). In this context, it is recommended that future meta-analysis studies take these variables into account.

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