Chapter 4

Mathematical and Spatial Intelligence in Turkish Teaching

Abdulkadir Kırbaş[1]

Abdulkerim Çiftci[2]

Abstract

Individual differences need to be taken into account in today's educational environment to meet curriculum goals effectively. Students who receive instruction in different settings have unique characteristics that necessitate applying various strategies and tactics. The dominating intelligence kinds among students are the most significant of these individual variances. Recent theories—most notably Howard Gardner's "Multiple Intelligence Theory"—have made it clear that intelligence is not best described as a single dimension. Consequently, many forms of intelligence were brought up. Language intelligence, mathematical intelligence, spatial intelligence, musical intelligence, kinesthetic intelligence, social intelligence, intrapersonal intelligence, and natural intelligence are the eight categories of intelligence that Gardner listed in his theory. Among these several levels of intelligence, the study focuses on mathematical and spatial intelligence types. Like with all other intelligence domains, mathematical and spatial intelligence regions benefit greatly from instructional activities as well as the application of various strategies and tactics. First and foremost, this study highlighted the many forms of intelligence and discussed the roles that mathematical and spatial intelligence play in language instruction. Following the completion of the theoretical framework, mathematical and spatial intelligence were considered in the 2019 Turkish Curriculum and the Turkish textbooks utilized in the language teaching process. The test led to a classification of the accomplishments in the Turkish curriculum for 2019 according to their eligibility for the domains of mathematical and spatial intelligence. The

1 Assoc. Prof. Dr., Atatürk University, Kâzım Karabekir Faculty of Education, Turkey, akadirkirbas@atauni.edu.tr, https://orcid.org/0000-0001-9846-0256

2 Arş. Gör., Kafkas University Faculty of Education, Turkey, abdulkerim.ciftci@kafkas.edu.tr, https://orcid.org/0000-0002-1421-6211

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mathematical and spatial intelligence components of the activities in the Turkish textbook were analyzed, and the activities in the textbooks for these intelligence domains were then demonstrated. Following the assessments, several recommendations were put forth concerning the inclusion of mathematical and spatial intelligence domains in the context of teaching language to Turkish learners.

1. INTRODUCTION

The definition of intelligence may vary depending on the field of science studied or the types of research targeted. The "What is intelligence?" question is one of the most controversial and most researched concepts of psychology, and thousands of research articles on intelligence are published every year (Çuhadar, 2017, p.2). Intelligence is an extremely complex trait that can be viewed and interpreted in a variety of ways. Traditional definitions, often linked to academic ability, have expanded over time. Contemporary psychological theories such as Howard Gardner's "Multiple Intelligence Theory" argue that intelligence cannot be collected in a single dimension but consists of various forms (Gardner, 1983). At the core of Gardner's theory of multiple intelligences is the idea that people do not have a single type of intelligence, but rather that each individual has a range of intelligence types, each of which is associated with specific abilities and skills. The concept of Multiple Intelligences, which started with Howard Gardner's work "Frames of Mind" published in 1983 and peaked in 1993, finds a wide range of applications in every field today. Various articles and books are published regarding this theory, conferences are held and tests based on this approach are developed. In addition, projects are carried out in schools, programs are developed by this theory, and teaching activities are continued. This theory of Gardner, which emphasizes different dimensions of intelligence, has significantly impacted education and psychology (Altan, 1999). Intelligence is an individual's ability to understand and use information based on unique abilities and skills. Gardner's "Multiple Intelligence Theory" allows evaluating individuals' abilities and potentials in a broader context by considering the wide diversity of intelligence. This means they can receive more support during the education process and express themselves better.

1.1. Multiple Intelligence Theory

In his groundbreaking work "Frames of the Mind: A Theory of Multiple Intelligences," Gardner rejected the traditional view of intelligence as a single general ability, proposing that human intelligence consists of a variety of modalities, each associated with specific skills or forms of knowledge. (Gürel

& Tat, 2010). Gardner's theory, which suggests that intelligence consists of more than one part, believes that biological and cultural components are the basis of intelligence. This theory explains that different types of learning occur in different parts of the brain. It suggests that intelligence has cultural components in addition to biological factors and that the types of intelligence and behavioral patterns that cultures appreciate are more likely to emerge. Gardner put forward four criteria for a feature to be considered intelligence: the presence of symbols, the value of culture, the capacity to create goods or services, and the capacity to solve problems (Bellenka, 1997). Gardner's model provided a broader framework for the question of what intelligence is. Gardner acknowledged that the traditional understanding of intelligence provides an advantage in terms of the ease of evaluating a student based on a common criterion. However, he stated that it was insufficient to determine the student's strengths and weaknesses. Stating that there are eight different and independent intelligence components, Gardner emphasized that an activity is the result of several intelligence components working together (Başaran, 2004).

Gardner (1993) describes eight different types of intelligence in his Multiple Intelligence Theory. Types of intelligence include verbal-linguistic intelligence, mathematical-logical intelligence, visual-spatial intelligence, musical intelligence, bodily-kinesthetic intelligence, naturalistic intelligence, social-interpersonal intelligence, and intrapersonal intelligence. Each individual has a certain potential in each of these eight types of intelligence (Yalmancı, 2011). Each individual may generally have one or more specific types of intelligence that are more prominent than others. However, if an individual's less developed types of intelligence are allowed to develop, these types may become the person's prominent intelligence type over time. Therefore, every human being is born with various types of intelligence to varying degrees, but these types of intelligence can be developed throughout life with appropriate education, an enriched environment, and strong support. In particular, factors such as culture, genetics, beliefs, social environment, and personal qualities are of great importance in the development of intelligence (Güneş and Gökçek, 2010). For students' intelligence development to occur effectively, approaches appropriate to the characteristics of intelligence should be developed in educational environments.

1.3. Linguistic/Verbal Intelligence

Linguistic/verbal intelligence relates to the ability to use language effectively, whether spoken or written. It requires sensitivity to the sounds, meanings, and rhythms of words (Smith, 2002). People with high linguistic

intelligence often excel in activities such as writing, reading, and public speaking. Individuals with advanced linguistic/verbal intelligence abilities generally have very strong listening, analyzing, and remembering capacities. It is seen that these people have high-level communication skills and are more talented than other individuals, especially in the field of verbal communication. For this reason, the most productive learning environment for these individuals is interactive areas where they can express their thoughts freely. Considering the type of verbal/linguistic intelligence, the frontal and temporal lobes located in the left hemisphere of the brain are considered to be neurologically dominant regions. From a professional perspective, people with high linguistic/verbal intelligence abilities are seen to be successful in politics, literature, law, linguistics, art, and communication sectors. For this reason, political leaders, novelists, poets, lawyers, linguists, theater actors, television presenters, editors, and journalists are among the individuals who achieve success thanks to their advanced linguistic/verbal intelligence skills (Gürel and Tat, 2010).

1.4. Logical-Mathematical Intelligence

This type of intelligence is related to the ability to analyze problems logically, perform mathematical operations, and investigate topics scientifically (Gardner, 1983). People with high logical-mathematical intelligence often excel in mathematics and other numerical disciplines. Typical tasks of logical-mathematical intelligence include predicting, thinking critically, identifying contrasts, constructing logical arguments, classifying, sorting, and categorizing. This type of intelligence plays an important role in several critical aspects of life, such as resolving interpersonal conflicts, overcoming psychological problems, happiness, success at work, making the right decisions, and critical thinking (Yilmaz, 2010).

1.5. Visual/Spatial Intelligence

Visual/spatial intelligence relates to the potential to recognize and manipulate patterns in large areas (such as finding one's way in an unknown city) or in limited areas (this is important for architects, artists, and engineers (Gardner, 2006). Visual/ spatial intelligence is about the ability of an object to It is understood as the ability to visualize its three-dimensional form and image and therefore to comprehend the world accurately and express these perceptions. Individuals with this type of intelligence can see an object from different angles and think in shapes or pictures. Visual thinking, such as coloring and shaping Visual/spatial intelligence, which includes actions, is

associated with the back part of the right hemisphere of the brain (Gürel and Tat, 2010).

1.6. Musical Intelligence

Musical intelligence is about the ability to recognize, create, recreate, and think about music. It is seen in composers, conductors, musicians, and sensitive listeners (Gardner, 1983). Factors that define musical intelligence include the ability to easily distinguish and memorize various elements of music, namely sound, rhythm, tempo, nuance, harmony, and musical forms, high success in playing an instrument or singing, and the ability to compose and think about various events. in a musical language. There is a tendency to interpret and express. These factors are considered qualities that can be determined and measured in similar ways, such as questions or expected performances in exams for music education around the world (Çuhadar, 2017).

1.7. Bodily-Kinesthetic Intelligence

This type of intelligence relates to the potential to use the whole body or parts of the body to solve problems or create products. It is common among athletes, dancers, surgeons, and artisans (Gardner, 2006). Kinesthetic intelligence is about moving in a balanced way and directly understanding the movements of others. Students with this type of intelligence are generally unable to fully meet their needs in traditional education systems where auditory learning is dominant, and this negatively affects their success. Therefore, it is important to include activities that provide students with movement opportunities in lessons. Actors, clowns, and pantomime actors demonstrate the dominance of this type of intelligence by making the best use of the body's ability to understand, comprehend, and communicate (Gürses, 2011).

1.8. Social intelligence

Social intelligence reflects the ability to understand others and interact with them effectively. It includes effective verbal and nonverbal communication, sensitivity to the moods and temperaments of others, and the ability to have multiple perspectives (Smith, 2002). Social intelligence is based on the ability to understand differences between individuals, especially differences in psychological states, temperaments, motivations, and intentions. More advanced levels of this type of intelligence provide an adult with the ability to understand the goals and desires of others, even if this information is confidential (Şen, 2006). Awareness of internal emotional states, intentions,

motivations, potentials, temperaments, and desires allows one to access and symbolize one's own emotional experiences and use these understandings in one's personal life (Arğıç, 2022).

1.9. Inner Intelligence

Intrapersonal intelligence refers to the capacity to understand oneself, and one's own emotions, fears, and motivations. It includes self-awareness, self-regulation, and self-motivation (Gardner, 1983). People who develop their intrapersonal intelligence capacity are more capable of planning and managing their learning processes. This makes it easier for them to understand more deeply the areas in which they aim to achieve success. Painters, therapists, and shamans are among the prominent professionals in this field of intelligence (Babacan and Dilci, 2012).

1.10. Nature Intelligence

Natural intelligence relates to the ability to recognize, classify, and draw on certain features of the environment. He was added to Gardner's initial list in 1995. It is seen among botanists, chefs, and some people who interact closely with nature (Gardner, 2006). Natural intelligence refers to the ability to distinguish living and non-living entities in the natural world. Individuals with strong natural intelligence generally like to communicate with animals and tend to have ecological awareness. Organizing trips to natural environments and using these environments as learning spaces creates effective learning options for such students. These students show a natural interest in events such as clouds, rock formations, and natural processes (Ayhan, 2016).

Recognizing these various forms of intelligence can have a significant impact on our education system. Instead of a one-size-fits-all solution, educators can adapt teaching methods to fit each student's dominant intelligence type (Armstrong, 2009). Additionally, understanding types of intelligence can also inform career choices and personal development strategies. Gardner's "Theory of Multiple Intelligences" offers an inclusive view of intelligence that recognizes diverse human potentials. Although his theory has been criticized for its lack of sufficient empirical evidence, it has a profound impact on our understanding of education and human capacities.

2. Language Teaching And Mathematical Intelligence

Mathematical intelligence is the capacity to think about numbers, calculate, conclude, establish logical connections, produce hypotheses, solve

problems, think critically, recognize the abstract nature of numbers and geometric shapes, and establish relationships between pieces of information (Köksal, 2006). Mathematical intelligence is a fundamental aspect of human intelligence that is fundamentally associated with the ability to perform mathematical operations, recognize patterns, and solve problems logically. In the context of language teaching, it is often overlooked. The ability to use and understand language is a distinctive feature of human intelligence. In this context, mathematical intelligence can play an important role. Mathematical intelligence provides the structure and logic required to understand and use language effectively (Gardner, 1983). Transferring mathematical intelligence to language teaching can offer students new ways to understand and use language, improve their communication skills, and increase their confidence in language use.

Mathematical intelligence is one of the cognitive abilities that best explains intelligence today (Talu, 199, p.166). It includes the capacity to analyze problems logically, perform mathematical operations, and investigate topics scientifically. It can also be associated with a type of mental discipline that encourages precise, logical thinking. In language learning, this can be translated into systematically approaching grammar, syntax, and vocabulary, thus strengthening language proficiency. Additionally, the pattern recognition aspect of mathematical intelligence can help students distinguish language patterns and understand and make predictions about language rules and structures. Mathematical reasoning can improve problem-solving skills, especially when dealing with complex language problems such as language translation or interpretation. Integrating mathematical intelligence into language teaching involves creating a bridge between abstract mathematical concepts and language learning tasks. It may be helpful to use puzzles and problem-solving tasks that include both mathematical and grammatical elements. These tasks encourage mathematical thinking, require the use of language to be completed, and thus encourage a holistic cognitive approach to language learning. Additionally, the use of mathematical metaphors and analogies in language teaching can help students understand complex language concepts. By comparing language structures to mathematical concepts, teachers can make abstract language principles more concrete and understandable to students (Cook, 2001). Individuals who have a command of logical/mathematical intelligence generally turn to scientific thinking, make impartial observations, make inferences based on data, make evaluations, and create hypotheses (Kaleli & Turan, 2021). Additionally, these individuals define concepts and like to work with numbers, geometric forms, and abstract symbols. For example, a game called “My hand is on

you" can be used to repeat and reinforce numbers in a foreign language. This game is suitable for students of all age groups. During the game, each student in the class is given a consecutive number. Student number one first says his or her number and then the number of the student he or she wants to pass the turn to, for example, "one-nine." In this case, the turn passes to student number nine. The game continues in this way. Then, the activity of keeping rhythm with the students' hands is added to the process of saying the numbers. Students who make mistakes are excluded from the game and the winner of the game is determined in this way. In this way, the game turns into a social activity, and a musical atmosphere is created by keeping the rhythm (Aydın, 2014).

Integrating mathematical intelligence into language teaching may present some difficulties. These may include resistance from students who do not immediately see the connection between mathematics and language or from teachers who are unprepared for this type of interdisciplinary approach. Providing professional development to teachers and clearly explaining to students the benefits of such integration can help overcome these challenges. The integration of mathematical intelligence into language teaching provides a potentially powerful tool to enhance language learning. By leveraging the structure, logic, and problem-solving skills inherent in mathematical intelligence, language teachers can offer students new and potentially more effective ways to understand and use language. More research is needed to discover and develop effective strategies for this integration and to overcome the challenges that may arise in this process.

2.1. Language Teaching and Visual/Spatial Intelligence

Visual intelligence is perceiving, understanding, and interpreting visual information around us; It is defined as the capacity to think, perceive, and discuss three-dimensional objects with images, graphics, shapes, and lines (Vural, 2005). Visual intelligence is the ability of an individual to objectively observe, perceive, and evaluate his/her environment and to express the visual and spatial ideas he/she acquires from his/her external environment with graphics based on the data he/she obtains (Saban, 2010). It has gained increasing interest in the field of language learning and teaching. Since humans are mostly visual beings, the use of visual intelligence in language teaching can be an effective strategy to increase language comprehension and acquisition (Arnheim, 1969). Visual intelligence plays an important role in language learning. When students encounter new language structures, visual cues such as pictures, diagrams, videos, or even gestures can help them understand and remember these structures. Visual intelligence helps

students organize and structure information in their minds, so they can better remember and apply what they have learned (Paivio, 1986). Additionally, visual materials such as infographics, visual aids, graphic organizers, and visual-based technology tools such as video and multimedia presentations can support the language learning process. It can simplify complex language structures, provide context to new vocabulary, and help students relate language to real-world situations (Mayer, 2001).

Integrating visual intelligence into language teaching brings with it some challenges. These may include resistance from students whose learning styles are more auditory or kinesthetic, and teachers not receiving adequate training in using visual tools effectively. Continuous teacher professional development and clear communication of the benefits of such integration to students can overcome these barriers (Kress & van Leeuwen, 2001).

A faster and more effective development of the individual in the reading-writing phase, which takes place at the beginning of the language teaching process, can be increased by the use of visual materials. Presenting visual materials to language learners through various tools can make all stages of the reading and writing process easier, from the beginning to the end. At this stage, the learner's visual/spatial intelligence emerges. Activities aimed at visual/spatial intelligence should both ensure effective use of this field of intelligence and develop this field of intelligence. Many different activities and materials for visual/spatial intelligence can be used in the language teaching process. With their spatial intelligence, language learners can go beyond visual elements such as texts, images, and letters and use this information to decipher more complex elements of language. Learning strategies based on visual/spatial intelligence help students process information intellectually and understand the visual aspect of language. Graphic organizers provide students with the opportunity to organize and comprehend complex language structures visually. These organizers can help students understand the relationships between words, expressions, and language structures. Particularly in the writing process, these visual tools can give students the ability to organize and express their thoughts and ideas. Another strategy used in language teaching using visual/spatial intelligence is text-based activities. Such activities can improve students' skills in visually organizing and making sense of information in texts. After reading a story or listening to a story, students may be asked to draw the story's plot or map the relationships between characters and events. Such visual representations provide students with the opportunity to understand and interpret the text in depth (Mayer, 2001).

Individuals with visual intelligence are sensitive to colors and show sensitivity to colors. Therefore, it is recommended to use colorful materials in the teaching process. During teaching, methods such as writing on the board with colored pencils, writing words on colored papers or pieces of cardboard organizing various activities (for example, creating sentences by grammatical rules using these words), and using various picture cards such as flashcards can be effective. Additionally, photographic cards can be used to help students learn the names of different objects and actions. Through stick figure pictures, adjectives such as "tall", and "short" and verbs such as "run" and "swim" can be taught. Pictures of various facial expressions can be used to recognize different expressions and emotional states. Additionally, various pictures can be used in teaching words related to age and gender. Using pictures taken from newspapers and magazines can also be useful in teaching vocabulary. These pictures are hung on the board during the lesson and students are asked various questions about these pictures.

2.3. European Qualifications Framework and Turkey

The European Qualifications Framework (EQF) is a robust and comprehensive system launched by the European Union to promote worker and learner mobility between member countries. This framework, implemented in 2008, serves as a translation tool that facilitates the recognition of qualifications between different national systems. It functions as a reference point that links national qualifications systems, sectors, and organizations to a common European reference framework (Cedefop, 2015). The EQF improves the transparency and portability of citizens' qualifications by increasing understanding of the level and nature of qualifications across countries (Young, 2005). In Europe, the need to create a standard has been emphasized to make the education system more understandable and comparable, as well as to increase mobility and quality levels. For this purpose, the European Qualifications Framework was implemented (Baykal, 2017). Various references are included within this framework.

The EQF is designed around eight reference levels defined in terms of learning outcomes. Levels are defined by parameters of knowledge, skills, and abilities. These parameters are then divided into "autonomy and responsibility", "complexity and unpredictability", "context", "knowledge" and "skills". The framework ranges from basic (Level 1) to advanced (Level 8) qualifications. The EQF does not aim to replace national qualification systems but complements them by serving as a common reference structure. By linking national qualification systems to the EQF, countries can compare

national qualification levels against EQF levels, thus gaining a clearer idea of qualification levels across Europe (Europass, n.d.).

EQF is a transformative tool for European education and training environments. It provides a clear and consistent structure that improves understanding and comparison of qualifications across European countries (Allais, 2014). By doing so, it supports the mobility of learners and workers, creating a more integrated and inclusive European labor market and education area (Markowitsch and Luomi-Messerer, 2008). While there are challenges to consider, the potential benefits of the EQF outweigh its limitations. The EQF offers an innovative approach to the recognition of qualifications, promoting a culture of lifelong learning, mobility, and quality assurance.

Within the framework of the recommendations put forward within the scope of AYÇ, a parallel qualifications framework has been created in Turkey. Turkish Qualifications Framework (TQF) was designed in compliance with the AYF and was officially put into practice by being published by the Council of Ministers on 19 November 2015 (Baykal, 2017). The background report on the Education Monitoring Report prepared in the 2015-2016 period explains the development of the Turkish Qualifications Framework in detail. This framework was first implemented in 2001 at the higher education level, in parallel with the European Union (EU) education policies. The Lisbon Strategy, declared by the EU in 2000, and the objectives of the Bologna Process, in which Turkey was included, undertook the task of developing the national qualification framework until 2010. Countries participating in the Bologna Process have made significant contributions to the evolution of national qualification framework studies with their initiatives to increase transparency, recognition of qualifications, and mobility (Baykal, 2017). Both TQF and EQF contain eight separate levels that include knowledge, skills, and competence elements. These levels are used to determine the adequacy of a particular program. In addition, within the framework of TQF, certain categories have been defined so that qualifications can be evaluated from various perspectives (Özgül, 2011). Along with these categories, certain competencies have been placed in the AYÇ. These competencies are also reflected in the curriculum. The key competencies included in the Turkish curriculum are as follows (MEB, 2019, p.4-5):

* Communication in mother tongue,

* Communication in foreign languages,

* Mathematical competence and basic competencies in science/technology,

* Digital competence,
* Learning to learn,
* Social and civic competencies,
* Taking initiative and entrepreneurship,
* Cultural awareness and expression

2.4. Mathemaıical and Spatial Intelligence in the 2019 Turkish Lesson Curriculum

The Turkish teaching program has certain specific objectives. Among these objectives, "developing the skills of researching, discovering, interpreting and structuring information in the mind" and "enabling them to understand and question what they read from a critical perspective" are mathematical intelligence, "realizing and adopting aesthetic and artistic values through works of Turkish and world culture and art". We can consider the purpose of "providing" among the purposes related to the meaning of spatial intelligence. (MEB, 2019). When we examine the text types that may differ according to the grade levels of the students in the 2019 Turkish curriculum, we can see types that can provide the use and development of mathematical and spatial intelligence. Among these, we can consider ephemera, brochures, postcards, comics, and cartoons as genres that can be presented within the field of spatial intelligence and aim to develop this field of intelligence. In the field of mathematical intelligence, "article" type texts that include a deep analysis and synthesis process come to the fore. We can also evaluate the "essay", "interview" and "joke" types of texts, which are included in the 2019 Turkish curriculum in addition to the article type, within the field of mathematical intelligence, also known as analytical intelligence (MEB, 2019).

2.5. InvestİgatıOn of the Acquısitions in the 2019 Turkish Lesson Curriculum in Terms of Mathematical and Spatial Intelligence

Developed for contemporary teaching methods and techniques, the 2019 Turkish curriculum includes many achievements that may vary according to the grade levels of students in different skills and intelligence areas. In this section, whether the relevant achievements are related to the field of mathematical and spatial intelligence will be examined.

When we look at the achievements in the field of listening skills at the 1st-grade level in the 2019 Turkish curriculum, we see "T.1.1.4. He makes predictions about the text he will listen to/watch based on the visual(s). We can evaluate the achievements within the achievements in the field of

spatial intelligence. 4. When we look at other achievements in the field of listening skills at the grade level, some achievements can be evaluated within the mathematical intelligence stream.

Among the achievements for listening skills at the 4th-grade level, "T.4.1.1. "He guesses the subject of the text he will listen to/watch based on the visual(s)." We can include the achievement of spatial intelligence among the achievements of spatial intelligence (MEB, 2019).

The achievements that can be addressed in the field of mathematical intelligence for listening skills from the 4th-grade level are as follows (MEB, 2019):

"T.4.1.2. Makes predictions about the development and outcome of events when they listen/watch.

T.4.1.3. Explains the text he listened to/watched in outline.

T.4.1.4. Guess the meaning of unfamiliar words when listening/watching.

T.4.1.5. Determines the subject of what you listen to/watch.

T.4.1.6. It determines the main idea/main emotion of what you listen to/watch.

T.4.1.7. Answers questions about what you listen/watch

T.4.1.8. He suggests different titles for what he listens/watches.

T.4.1.9. Expresses his/her opinions about what he/she listens/watches.

T.4.1.11. Evaluate the content of what you listen to/watch.

T.4.1.13. It comprehends the speaker's non-verbal messages."

When we look at the achievements of speaking skills at the 4th grade level, "T4.2.5. Participates in discussions and conversations in the classroom." We can evaluate the achievement within the field of mathematical intelligence (MEB, 2019).

Among the achievements in reading skills at the 4th-grade level, those that can be evaluated within the field of mathematical intelligence are as follows (MEB, 2019):

"T.4.3.10. Identifies literal, figurative, and literal words in the text he reads.

T.4.3.11. Understands the contribution of idioms and proverbs to the meaning of the text.

T.4.3.12. Guess the meaning of unfamiliar words and word groups by using the context.

T.4.3.16. Determines the subject of the text read.

T.4.3.17. It determines the main idea/main feeling of the text.

T.4.3.18. Answers questions about the text read.

T.4.3.19. Asks questions about the text.

T.4.3.20. Identifies the story elements in the texts he reads.

T.4.3.21. Determines a title appropriate to the content of the text read.

T.4.3.23. Distinguish text types.

T.4.3.24. Recognizes the elements that make up narrative and informative texts.

T.4.3.25. Understands the instructions.

T.4.3.26. Distinguishes real and imaginary elements in the text.

T.4.3.28. Makes inferences about what he reads.

T.4.3.33. Evaluates media texts.

T.4.3.35. Uses information sources effectively.

T.4.3.36. Questions about the reliability of information sources.

T.4.3.37. "He expresses his thoughts about the events in the text he reads."

Among the achievements prepared for reading skills at the 4th-grade level, the following can be evaluated within the fields of both mathematical intelligence and spatial intelligence (MEB, 2019).

"T.4.3.22. Understands the meanings of shapes, symbols, and signs.

T.4.3.29. Associates visuals with the content of the text he reads.

T.4.3.34. Answers questions about graphs, tables, and charts."

When the achievements for writing skills at the 4th grade level are examined, "T.4.4.2. Writes instructions regarding the process steps of a job.", "T.4.4.3. Writes narrative text.", "T.4.4.4. Writes informative text." and "T.4.4.7. He determines the title appropriate to the content of what he writes." We can see that their achievements are suitable for the field of mathematical intelligence. "T.4.4.6. It tells an event by associating images." It

is an achievement that can be evaluated within the field of spatial intelligence at this level and skill (MEB, 2019).

Among the achievements in listening skills at the 5th-grade level, the achievements that can be evaluated within the field of mathematical intelligence are as follows (MEB, 2019):

"T.5.1.1. Makes predictions about the development and outcome of events when they listen/watch.

T.5.1.2. Guess the meaning of unfamiliar words when listening/watching.

T.5.1.3. Determines the subject of what you listen to/watch.

T.5.1.4. Identifies the main idea/main emotion of what you listen to/watch.

T.5.1.5. Summarizes what they listened to/watched.

T.5.1.6. Answers questions about what they listen/watch.

T.5.1.7. He suggests different titles for what he listens/watches.

T.5.1.9. Understand the speaker's non-verbal messages.

T.5.1.10. Evaluate the content of what you listen to/watch.

T.5.1.11. He expresses his opinions about what he listens/watches."

When we look at the achievements of speaking skills at the 5th grade level, "T.5.2.3. "He applies conversational strategies." We can evaluate the achievement within the field of mathematical intelligence (MEB, 2019).

Among the achievements prepared for reading skills at the 5th-grade level, the following items can be evaluated within the field of mathematical intelligence (MEB, 2019).

"T.5.3.5. Guess the meaning of unfamiliar words and word groups by using the context.

T.5.3.12. Distinguish text types.

T.5.3.13. Summarizes what he read.

T.5.3.14. It determines the main idea/main feeling of the text.

T.5.3.15. It produces different solutions to the problems discussed in the text.

T.5.3.16. Determines the story elements in the text.

T.5.3.17. Interprets the text.

T.5.3.18. Asks questions about the text.

T.5.3.19. Answers questions about the text.

T.5.3.20. Determines the subject of the text.

T.5.3.24. Determines the title(s) appropriate to the content of the text read.

T.5.3.25. Evaluates media texts.

T.5.3.27. Makes comparisons between texts.

T.5.3.28. Uses information sources effectively.

T.5.3.29. Questions about the reliability of information sources.

T.5.3.31. "He makes inferences about what he reads."

Among the achievements in reading skills at the 5th-grade level, the achievements that are suitable for spatial intelligence and also include mathematical intelligence are as follows (MEB, 2019):

"T.5.3.21. Guess the subject of the text he will read based on the images and the title.

T.5.3.22. Answers questions about images.

T.5.3.34. "Answers questions regarding information presented through graphs, tables, and charts."

When the achievements created for writing skills at the 5th-grade level are examined, the achievements that can be evaluated within the field of mathematical intelligence are as follows (MEB, 2019):

"T.5.4.1.Writes poetry.

T.5.4.2. Writes informative text.

T.5.4.3. Writes narrative text.

T.5.4.6. Writes the steps of a job.

T.5.4.13. Fill out the forms according to the instructions.

T.5.4.14. Writes short texts.

T.5.4.15. He determines the title appropriate to the content of what he writes."

Among the achievements in listening skills at the 6th-grade level, the achievements that can be evaluated in the field of mathematical intelligence are as follows (MEB, 2019):

"T.6.1.1. Makes predictions about the development and outcome of events when they listen/watch.

T.6.1.2. Guess the meaning of unfamiliar words when listening/watching.

T.6.1.3. Summarizes what they listened to/watched.

T.6.1.4. Answers questions about what they listen to/watch.

T.6.1.5. Determines the subject of what you listen to/watch.

T.6.1.6. Identifies the main idea/main emotion of what you listen to/watch.

T.6.1.7. He suggests different titles for what he listens/watches.

T.6.1.9. Understand the speaker's non-verbal messages.

T.6.1.10. Evaluate the content of what you listen to/watch.

T.6.1.11. He expresses his opinions about what he listens/watches."

When we look at the achievements of speaking skills at the 6th grade level, "T.6.2.3. "He applies conversational strategies." We can evaluate the achievement within the field of mathematical intelligence (MEB, 2019).

Among the achievements in reading skills at the 6th-grade level, the achievements that are suitable for spatial intelligence and also include mathematical intelligence are as follows (MEB, 2019):

"T.6.3.15. Guess the subject of the text he will read based on the visual and title.

T.6.3.30. Answers questions about images.

T.6.3.35. It interprets the information presented through graphs, tables, and charts."

Among the achievements prepared for reading skills at the 6th-grade level, the following items can be evaluated within the field of mathematical intelligence (MEB, 2019).

"T.6.3.16. Summarizes what he read.

T.6.3.17. Answers questions about the text.

T.6.3.18. Asks questions about the text.

T.6.3.19. Determines the subject of the text.

T.6.3.20. It determines the main idea/main feeling of the text.

T.6.3.21. Determines the title appropriate to the content of the text.

T.6.3.22. Determines the story elements in the text.

T.6.3.23. It produces different solutions to the problems discussed in the text.

T.6.3.24. Interprets the content of the text.

T.6.3.25. Makes comparisons between texts.

T.6.3.26. Distinguish text types.

T.6.3.28. Distinguishes real and fictional elements in the text.

T.6.3.29. Makes inferences about what he reads.

T.6.3.32. Evaluates media texts.

T.6.3.33. Uses information sources effectively.

T.6.3.34. It questions the reliability of information sources."

When the achievements created for writing skills at the 6th-grade level are examined, the achievements that can be evaluated within the field of mathematical intelligence are as follows (MEB, 2019):

"T.6.4.1. He writes poetry.

T.6.4.2. Writes informative text.

T.6.4.3. Writes narrative text.

T.6.4.4. Applies writing strategies.

T.6.4.6. Write a job according to the process steps.

T.6.4.11. He shares what he wrote.

T.6.4.13. Fill out the forms by the instructions."

"T.6.4.5", which is among the achievements for writing skills at the 6th grade level. He uses graphs and tables when necessary to support his writings." We can also evaluate the acquisition within the field of spatial intelligence (MEB, 2019).

Among the achievements in listening skills at the 7th-grade level, the achievements that can be evaluated in the field of mathematical intelligence are as follows (MEB, 2019):

"T.7.1.1. Makes predictions about the development and outcome of events when they listen/watch.

T.7.1.2. Guess the meaning of unfamiliar words when listening/watching.

T.7.1.3. Summarizes what they listened to/watched.

T.7.1.4. Answers questions about what they listen to/watch.

T.7.1.5. Determines the subject of what you listen to/watch.

T.7.1.6. Identifies the main idea/main emotion of what you listen to/watch.

T.7.1.7. He suggests different titles for what he listens/watches.

T.7.1.9. Identify ways to improve thinking when listening/watching

T.7.1.10. Questions consistency when listening/watching.

T.7.1.11. Evaluate the content of what you listen to/watch.

T.7.1.12. He expresses his opinions about what he listens/watches."

When we look at the achievements of speaking skills at the 7th grade level, "T.7.2.3. "He applies conversational strategies." We can evaluate the achievement within the field of mathematical intelligence (MEB, 2019).

Among the achievements prepared for reading skills at the 7th-grade level, the following items can be evaluated within the field of mathematical intelligence (MEB, 2019).

"T.7.3.5. Guess the meaning of unfamiliar words and word groups based on context.

T.7.3.6. Determines the contribution of idioms and proverbs to the text.

T.7.3.15. Summarizes what he read.

T.7.3.16. Determines the subject of the text.

T.7.3.17. It determines the main idea/main feeling of the text.

T.7.3.18. Identifies supporting ideas in the text.

T.7.3.19. Answers questions about the text.

T.7.3.20. Asks questions about the text.

T.7.3.21. Determines the story elements in the text.

T.7.3.22. Interprets the content of the text.

T.7.3.23. Determines the title(s) appropriate to the content of the text.

T.7.3.24. It produces different solutions to the problems discussed in the text.

T.7.3.25. Makes comparisons between texts.

T.7.3.26. Distinguishes real and fictional elements in the text.

T.7.3.27. Understands how important points are emphasized in the text.

T.7.3.28. Makes inferences about what he reads.

T.7.3.29. Distinguish text types.

T.7.3.23. Determines the title(s) appropriate to the content of the text.

T.7.3.24. It produces different solutions to the problems discussed in the text.

T.7.3.25. Makes comparisons between texts.

T.7.3.26. Distinguishes real and fictional elements in the text.

T.7.3.27. Understands how important points are emphasized in the text.

T.7.3.28. Makes inferences about what he reads.

T.7.3.29. Distinguish text types.

T.7.3.35. Compares written versions of texts with media presentations.

T.7.3.36. Determines the forms of expression in the text.

T.7.3.37. Determines the ways of developing the thought used in the text.

T.7.3.38. Understands the work and process steps in the text."

"T.7.3.30", which was created for reading skills at the 7th grade level. Answers questions about images.", "T.7.3.34. It interprets the information presented through graphs, tables, and charts." and "T.7.3.14. "He guesses the subject of the text he will read based on the images and the title." achievements can be evaluated within the scope of spatial intelligence and mathematical intelligence (MEB, 2019).

When the achievements created for writing skills at the 7th-grade level are examined, the achievements that can be evaluated within the field of mathematical intelligence are as follows (MEB, 2019):

"T.7.4.2. Writes informative text.

T.7.4.3. Writes narrative text.

T.7.4.4. Applies writing strategies.

T.7.4.6. Write a job according to the process steps.

T.7.4.10. Fill out the forms according to the instructions.

T.7.4.11. Writes short texts.

T.7.4.12. Determines a title appropriate to the content of what you write.

T.7.4.14. He presents the results of his research in writing."

3. Mathematical and Spatial Intelligence In Turkish Course Books

There are many achievements regarding mathematical and spatial intelligence in the 2019 Turkish curriculum. To achieve these gains, there must be qualified activities that must be offered to students. Another type of activity that combines mathematical and spatial intelligence aims to develop reasoning skills. Students are expected to analyze various situations and events in the texts sequentially and to understand the relationships between events and the cause-effect relationship. Turkish textbooks contain qualified activities to obtain the relevant gains for the use and development of these intelligence areas. Turkish curriculum and textbooks offer a wide range of opportunities for students to develop their mathematical and spatial intelligence. These activities not only provide students with the opportunity to improve their language skills but also develop a range of important skills such as problem-solving, analysis, and understanding concepts. When Turkish textbooks are examined, it can be seen that there are many activities designed for both mathematical intelligence and spatial intelligence. Below are examples of these activities.

When we look at the 3rd activity in the text titled "I Want a Homeland" in the 5th Grade Turkish Coursebook, it can be seen that it is aimed at mathematical intelligence. In the event, students read Cahit Sıtkı Tarancı's poem "I Want a Homeland" and were asked to answer analytical questions about the text (Çapraz Baran & Diren, 2019). In this respect, we can evaluate the activity as prepared for the field of mathematical intelligence.

In the 7th activity in the text titled "I Want a Homeland" in the 5th Grade Turkish Coursebook, Cahit Sıtkı Tarancı's poem "I Want a Homeland" was read to the students, and the students were asked to find images related to the text (Çapraz Baran & Diren, 2019). This activity can be considered as an activity related to spatial intelligence.

"T.7.4.5," which is among the achievements for writing skills at the 7th grade level. It uses graphs and tables to support the narrative." We can also evaluate the acquisition within the field of spatial intelligence (MEB, 2019).

Among the achievements for listening skills at the 8th-grade level, the achievements that can be considered for the field of mathematical intelligence are as follows (MEB, 2019):

"T.8.1.1. Makes predictions about the development and outcome of events when they listen/watch.

T.8.1.3. Summarizes what they listened to/watched.

T.8.1.4. Answers questions about what they listen to/watch.

T.8.1.5. Identifies the subject of what they listen to/watch.

T.8.1.6. Identifies the main idea/main emotion of what you listen/watch.

T.8.1.7. He suggests different titles for what he listens/watches.

T.8.1.9. Questions consistency when listening/watching.

T.8.1.10. Expresses his/her opinions about what he/she listens/watches.

T.8.1.11. Evaluate the media texts they listen to/watch.

T.8.1.12. Identifies ways to improve thinking when listening/watching.

T.8.1.13. Understand the speaker's non-verbal messages.

T.8.1.14. Applies listening strategies."

When we look at the achievements of speaking skills at the 8th grade level, "T.8.2.3. "He applies conversational strategies." We can evaluate the achievement within the field of mathematical intelligence (MEB, 2019).

Among the achievements prepared for reading skills at the 8th-grade level, the following items can be evaluated within the field of mathematical intelligence (MEB, 2019).

"T.8.3.5. Guess the meaning of unfamiliar words and word groups by using the context.

T.8.3.6. Determines the contribution of idioms, proverbs, and sayings to the text.

T.8.3.13. Summarizes what he read.

T.8.3.14. Answers questions about the text.

T.8.3.15. Asks questions about the text.

T.8.3.16. Determines the subject of the text.

T.8.3.17. It determines the main idea/main feeling of the text.

T.8.3.18. Identifies supporting ideas in the text.

T.8.3.19. Determines the title(s) appropriate to the content of the text.

T.8.3.20.Identifies the story elements in the texts he reads.

T.8.3.21. Interprets the content of the text.

T.8.3.22. It produces different solutions to the problems discussed in the text.

T.8.3.23. Makes comparisons between texts.

T.8.3.24. Distinguishes real and fictional elements in the text.

T.8.3.25. Makes inferences about what he reads.

T.8.3.29. Analyzes media texts.

T.8.3.30. Uses information sources effectively.

T.8.3.31. Questions about the reliability of information sources.

T.8.3.33. Compares the written text of the literary work with its media presentation.

T.8.3.34. Determines the ways of developing thinking used in reading.

T.8.3.35. Understands the work and process steps in the text."

The following achievements created for reading skills at the 8th-grade level are related to the field of spatial intelligence (MEB, 2019).

"T.8.3.12. Guess the subject of the text he will read based on the visual and title.

T.8.3.27. Answers questions about images.

T.8.3.32. It interprets the information presented through graphs, tables, and charts."

When the achievements created for writing skills at the 8th-grade level are examined, the achievements that can be evaluated within the field of mathematical intelligence are as follows (MEB, 2019):

"T.7.4.2. Writes informative text.

T.7.4.3. Writes narrative text.

T.7.4.4. Applies writing strategies.

T.7.4.6. Write a job according to the process steps.

T.7.4.11. Fill out the forms according to the instructions.

T.7.4.12. Writes short texts.

T.7.4.13. Determines a title appropriate to the content of what you write.

T.7.4.14. He presents the results of his research in writing."

"T.8.4.5", which is among the achievements for writing skills at the 8th grade level. It uses graphs and tables to support the narrative." We can also evaluate the acquisition within the field of spatial intelligence (MEB, 2019).

When we look at this list of achievements arranged according to grade levels in the 2019 Turkish Course Curriculum, we see that some achievements remain the same even as the grade level increases, but they change in content. In addition to such achievements, as the class love increases, different achievements are also added to improve the skills of the students. Traces of mathematics, also known as analytical intelligence, can be seen in many of these achievements. The most frequently used intelligence field in the process of obtaining the above-mentioned achievements is mathematical intelligence. While the student is evaluating a text, distinguishing different meanings in the text, trying to find a title for the text, etc. will need to use the field of mathematical intelligence in many activity processes. Another part of this process is the field of spatial intelligence, also known as visual intelligence. In the list of achievements divided by grade levels, many achievements require the use of spatial intelligence and will affect the development of this intelligence field. Another feature of these achievements is that they are not only limited to the field of spatial intelligence but also include the field of mathematical intelligence. In general, the 2019 Turkish curriculum includes many achievements in the fields of mathematical and spatial intelligence. In our age, where the use of these intelligence areas is of great importance, the fact that the gains are in this direction can be considered a positive aspect.

When the 6th activity in the 5th Grade Turkish Coursebook "Goodbye, Goodbye" is examined, it can be seen that there are analytical questions regarding the user guide (Çapraz Baran & Diren, 2019). In this case, the activity requires the use of mathematical intelligence.

6th Grade Turkish Textbook text called "From Finland" – In the 5th activity, students were asked to analyze and classify the sentences in the text (Sarıboyacı, 2021). This activity can also be considered among the activities that appeal to the field of mathematical intelligence.

8th Grade Turkish Textbook "On Optimism and Pessimism" - In the 5th activity, students were asked to analyze the subject, main idea, and supporting ideas of the text they read (Eselioğlu et al., 2019). This activity, which includes the analysis and interpretation process, can be considered an activity that appeals to mathematical intelligence.

6th Grade Turkish Coursebook "Text from Finland" - In the 8th activity, two visuals were given to the students and they were asked to analyze these

visuals and answer the questions (Sarıboyacı, 2021). When examined internally, it can be seen that the activity contains qualities related to both mathematical intelligence and spatial intelligence. Students will use their spatial intelligence when examining visuals and use their mathematical intelligence when analyzing and interpreting what they observe.

CONCLUSION AND RECOMMENDATIONS

It is of great importance to organize educational programs in educational environments by taking the "Multiple Intelligence Theory" into consideration. When we look at the key competencies in the 2019 Turkish curriculum, it can be seen that there are titles for different intelligence areas. In addition, the common achievements and activities of mathematical and spatial intelligence are frequently seen in Turkish textbooks and the 2019 Turkish curriculum.

The achievements in the 2019 Turkish Curriculum and the activities in the Turkish textbooks include content related to mathematical and spatial intelligence areas. However, activities offered for different intelligence areas during the education process should not be limited to textbooks only. Various tools developed to increase the effectiveness of teaching and address different intelligence areas should be used.

There are many Web 2.0 tools created to make educational environments richer and for different intelligence areas. These Web 2.0 tools can be used to diversify activities and applications for both mathematical intelligence and spatial intelligence.

Teachers' competence is needed in the effective use of Web 2.0 tools. In this sense, training can be organized for teachers. The introduction and use of various applications developed in the field of language teaching can be expanded.

To diversify activities in the field of mathematical intelligence, project studies in which students face certain problem situations can be carried out. Various applications developed for language teaching should be used in this project work.

During the language teaching process, different studies can be conducted to reveal the relationship between students' intelligence types and language learning processes. These studies may be useful in revealing the relationship between mathematical and spatial intelligence fields and language teaching/learning.

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