

## The Role of Mind and Intelligence Games in Supporting Student Development: A Focus on Cognitive, Affective, and Psychomotor Domains

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### Abstract

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#### Key Words

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This qualitative case study investigates the contributions of mind and intelligence games (chess, mancala, kulami, reversi, globe, pentago) to the cognitive, affective, and psychomotor development of secondary school students (5th–7th grades), based on the perspectives of teachers, parents, and students. The study was conducted during the 2022–2023 academic year with a purposive sample of 30 students, 10 teachers, and 10 parents from a secondary school. Data were collected through interviews and analyzed using descriptive and thematic analysis methods. Findings indicate that these games positively impact the cognitive domain by enhancing thinking skills, academic success, decision-making, and social learning. In the affective domain, they promote values education, motivation, attitudes, and social skills. Psychomotor benefits were observed in coordination, fine motor skills, and reflex development. Based on these results, it is recommended that schools receive adequate support in terms of game materials and that teachers be trained to effectively integrate these games into educational settings.

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## INTRODUCTION

Mind and intelligence games are considered important tools in supporting students' multiple development and may increasingly be integrated into educational programs. The main reasons for this are the versatile benefits these games provide to children's development by focusing on their interests and abilities, offering them a variety of opportunities and making learning more fun. Including intelligence games as an elective, a subject chosen by students as part of the MEB curriculum, aims to boost cognitive skills, improve decision-making, foster problem-solving, and encourage social interaction through play (Şen, 2020). According to the Ministry of National Education (MoNE, 2013), the goal of the intelligence games course is to help students develop their intellectual potential, solve problems creatively, make quick and accurate decisions, improve teamwork, think critically, enhance reasoning and logic, build self-confidence, and foster a positive approach to problem-solving.

Educational environments should be designed to enhance students' cognitive and emotional qualities while simultaneously improving their achievements (Savaş, 2019). Games have proven to be effective tools for fostering these skills (Lim et al., 2020). The significance of educational games has long been acknowledged (Kafai, 2006). As games are a primary means of engaging students, they play an essential role in their learning processes (Budak & İflazoğlu Saban, 2023). Through their engaging and enjoyable nature, games facilitate the development of skills such as problem-solving, mathematical reasoning, and strategic thinking (Pilten, 2008). Additionally, games contribute to the enhancement of students' intellectual abilities (Yöndemli & Taş, 2018). The primary aim of educational games is to transform specific skills into behaviors, in alignment with clear learning objectives (Aksoy, 2014). Furthermore, games encourage active participation and, when properly aligned with educational goals, significantly improve the learning process (Dempsey et al., 2002). They play a crucial role in the development of students' physical, mental, social, emotional, and linguistic abilities, thereby fostering enduring and effective learning outcomes (Kukul, 2013). Mind and intelligence games, a particular category of educational games, require skills such as observation, information gathering, experimentation, and problem-solving (Alessi & Trollip, 2001). These games are instrumental in supporting the development of 21st-century skills among students (Durulan & Angın, 2023). They enhance cognitive abilities, address real-world problems, and present these challenges in a gamified format (MoNE, 2013). Consequently, they are both educational and enjoyable, contributing to the development of students' cognitive, emotional, and psychomotor skills (Çağır, 2020).

Bottino et al. (2013) describe mind and intelligence games as instruments that promote the enhancement of higher-order thinking and reasoning abilities. Devecioğlu and Karadağ (2014) characterize these games as activities that assist students in recognizing their potential, making swift decisions, finding innovative solutions, and engaging in continuous improvement. These games stimulate creative thinking and problem-solving (Demirel, 2015) and are independent of rote learning methods (Bottino et al., 2013). The increasing emphasis on skill development in international assessments, as opposed to rote memorization, has profound implications for educational policies (Baysura, 2017; Çelebi et al., 2014; Mullis et al., 2021).

In addition to cognitive benefits, games also support the affective and social development of students. By fostering a fun and engaging environment, games enable students to express themselves, contribute to the development of emotional intelligence, and enhance their social skills (Kukul, 2013). This engagement makes the learning process more compelling, thereby increasing student motivation and emotional involvement, which, in turn, strengthens their commitment to the learning process. Moreover, games provide students with opportunities to handle challenging situations, thereby fostering emotional resilience (Güneş, 2023). Mind and

intelligence games also support affective development by encouraging students to utilize emotional intelligence in decision-making processes and helping them cultivate empathy. The enhancement of emotional and social skills ensures that students are successful both in individual endeavors and in collaborative settings.

In Turkey, mind and intelligence games were formally introduced in 2013 as an elective course titled "Intelligence Games Course for Secondary Schools and Imam Hatip Secondary Schools" (MoNE, 2016). The curriculum is structured into three levels: D1 (beginner), D2 (intermediate), and D3 (advanced), with a focus on skills such as rule comprehension, logical inference, strategy development, and creative thinking. The games are categorized into six types: reasoning, verbal, geometric-mechanical, memory, strategy, and intelligence questions (MoNE, 2013). These categories aim to foster both cognitive and emotional development simultaneously.

### **The importance of the study**

Mind and intelligence games not only improve higher-order thinking, but also help students develop essential values such as sharing, patience, and respect, and crucial skills like planning, problem-solving, decision-making, reasoning, and strategic thinking (Bottino & Ott, 2006; Fleeer, 2013; Kirriemuir & McFarlane, 2004; Riggs & Young, 2016). Furthermore, they contribute to students' independent decision-making, responsibility, and proactive thinking (Güneş, 2023; Marangoz & Demirtaş, 2017), as well as boosting socialization and communication skills (Nakao, 2019). The games minimize chance, requiring psychomotor skills, attention, memory, spatial reasoning, and mathematical skills (Erdoğan et al., 2017). As a result, students' psychological well-being improves, and feelings of loneliness decrease (Yavuz & Yavuz, 2018).

Despite these benefits, there is a lack of qualitative research that explores how these games impact students' development across multiple domains—cognitive, emotional, and psychomotor—particularly within secondary school contexts. Most of the existing research has focused predominantly on the cognitive benefits, such as enhancing strategic thinking and problem-solving (Bottino & Ott, 2006; Fleeer, 2013; Kirriemuir & McFarlane, 2004), and there is limited exploration of their broader affective and psychomotor contributions. Furthermore, while many studies have acknowledged the importance of mind and intelligence games, there is a gap in understanding how these games influence students' growth in real-world school settings, especially from the perspectives of various stakeholders—teachers, students, and parents. Moreover, most existing studies have taken a quantitative approach, and there is a need for qualitative research that can provide deeper insights into how these games impact students' development in a more personal and contextual way (Çelik, 2024; Özdevecioğlu and Hark-Söylemez, 2021).

Additionally, this study is timely and relevant in light of the educational goals outlined in the Ministry of National Education's 2023 Education Vision, which emphasizes the importance of fostering cognitive, affective, and physical development in students (MoNE, 2018). Secondary school education plays a critical role in shaping students' cognitive abilities, emotional intelligence, and physical skills. However, research shows that many schools still struggle to develop higher-order skills such as strategic thinking, problem-solving, and creativity (Ayar, 2022). This study, by exploring the benefits of mind and intelligence games, offers valuable insights into how these activities can be incorporated into the curriculum to support students' development in all these areas. Furthermore, the inclusion of mind and intelligence games in school curricula can address issues related to student disengagement, lack of motivation, and underperformance, as it provides an engaging and enjoyable way to support students'

development (Gülle & Vatansever Bayraktar, 2023). The involvement of teachers, parents, and students is key to making these games an integral part of the learning process. Through this study, we aim to highlight the potential of mind and intelligence games in fostering a more dynamic, holistic, and engaging educational environment.

In light of these, this study gains significance by including the perspectives of students, teachers, and parents, employing qualitative research methods, and addressing not only cognitive and affective development but also psychomotor development. It is therefore expected that this study will make a meaningful contribution to the existing body of literature. The purpose of this study is to examine the roles of mind and intelligence games (chess, mancala, kulami, reversi, globe, pentago) to the cognitive, affective, and psychomotor development of secondary school students (5th, 6th, and 7th grades) according to the views of teachers, parents, and students. In line with this purpose, the sub-problems of the study are as follows:

1. What is the role of mind and intelligence games in the cognitive development of students, according to teachers, students, and parents?
2. What is the role of mind and intelligence games in the affective development of students, according to teachers, students, and parents?
3. What is the role of mind and intelligence games in the psychomotor development of students, according to teachers, students, and parents?

## METHODOLOGY

### Research Design

This study uses a single-case design within qualitative research methods. A case study examines "how" and "why" questions in natural contexts, where the researcher has minimal control over events (Yin, 2014). It involves an in-depth investigation of phenomena in real-life settings, reflecting participants' perspectives (Gall et al., 2003). This qualitative case study, utilizing interviews as the primary data collection method, aims to explore the impact of mind and intelligence games (chess, mancala, kulami, reversi, globe, pentago) on students' cognitive, emotional, and physical development. Interviews were conducted with students, teachers, and parents to gather diverse perspectives. By examining these perspectives within the context of a single case, the study provides a comprehensive understanding of how these games influence students' development (Creswell, 2018; Yıldırım & Şimşek, 2021).

### Participants

The study involved 10 teachers, 30 students, and 10 parents from a secondary school in the Aegean region during the 2022-2023 academic year. Participant details are shown in Tables 1, 2, and 3.

**Table 1**

#### *Characteristics of Teachers*

Branche	Gender	Age	Experience
Turkish Language	Female	37	14 years (Expert Teacher)
Turkish Language	Male	33	9 years
Mathematics	Female	38	15 years (Expert Teacher)
Mathematics	Male	30	8 years
English Language	Female	47	23 years (Expert Teacher)
English Language	Male	39	15 years (Expert Teacher)
Science	Female	37	14 years (Expert Teacher)
Science	Male	39	15 years (Expert Teacher)
Social Sciences	Female	45	20 years (Expert Teacher)

Religious	Culture	and	Moral	Male	30	9 years
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**Table 2***Characteristics of Students*

Grade	Gender	Age
5. Grade	5F-5M	10-11
6. Grade	5F-5M	11-12
7. Grade	5F-5M	12-13

**Table 3***Characteristics of Parents*

Occupation	Gender	Age
Employed	3M-3F	27-45
Unemployed	4F	30-40

The participants were selected using criterion sampling, a purposive sampling technique. Purposive sampling involves choosing information-rich cases for in-depth study based on the research objectives, while criterion sampling focuses on selecting individuals with specific characteristics relevant to the study (Büyüköztürk et al., 2014). This method allows for a detailed exploration of cases believed to provide valuable insights (Patton, 2014) and follows predetermined criteria (Yıldırım & Şimşek, 2021). The study's criteria included students who actively participate in the mind and intelligence games class, their teachers, and their parents or guardians.

**Data Collection Tools**

This study used interviews as a qualitative data collection method. According to Rubin and Rubin (2005), in-depth interviews are useful when simple answers are insufficient and when individual experiences and responses are needed. Student interviews were conducted using focus group techniques at each grade level. A focus group interview involves planned discussions to gather participants' thoughts on a specific topic (Yıldırım & Şimşek, 2021). Researchers often prefer focus groups of 8-10 people over one-on-one interviews, as they allow for a broader range of opinions in less time and help identify common views (Lasch et al., 2000). Participants' basic demographic information, such as age and gender, was considered when forming the groups. Semi-structured interview forms were used, with questions based on the research objectives tailored for each participant. The forms included three main questions to assess the contributions of mind and intelligence games for students, teachers, and parents. The content was reviewed by two PhD faculty members from a Department of Curriculum and Instruction and two doctoral-level language teachers for clarity and language. A pilot interview with a teacher, parent, and student confirmed the form's suitability for the main interviews.

**Data Collection Process**

The first researcher informed school administrators about the study's purpose and content, then arranged interviews with participants at their convenience. Participants provided consent for voice recording, and interviews were conducted face-to-face, with questions asked in the same order for each. Explanations were given when necessary but without biasing the discussion. If any communication issues arose during the interviews, the session was paused, and the recording was turned off until resolved. The interviews took place between February 20th and March 20th, 2023, lasting 20-25 minutes, with focus group interviews lasting 35-45 minutes. Participants were assigned code names for confidentiality (e.g., MT1, S1, P1). Interviews were held in quiet rooms, and the researcher also took notes on non-verbal communication.

### **Data Analysis**

After the interviews, the data were transcribed using Microsoft Word and analyzed through descriptive analysis and thematic coding. Descriptive analysis interprets data according to predefined themes (Corbin & Strauss, 2008). Thematic coding identified categories and main themes based on these patterns (Miles & Huberman, 1994). Data were coded with words or phrases, and the organization of themes was guided by the research questions and literature. The findings were analyzed to uncover relationships among the data, and direct quotes were included to explain causal links and underlying reasons.

### **Credibility and Repeatability**

Qualitative research must have credibility, transferability, dependability, and confirmability to ensure quality (Lincoln & Guba, 1985). Triangulation, using different data sources and methods, helps improve reliability by providing a better understanding of events and reducing method limitations, thus enhancing validity (Bogdan & Biklen, 2006; Yıldırım & Şimşek, 2021). In this study, triangulation was achieved by interviewing students from various grade levels (5th, 6th, and 7th grades), parents, and teachers from different subjects. The data collection methods used in this study were semi-structured interviews with students, teachers, and parents. Focus group interviews were conducted with students, while individual interviews were used for teachers and parents. To ensure transferability, detailed descriptions of the study's design, target group, data collection process, and analysis were provided, along with direct quotations, to offer a clearer understanding of the research (Patton, 2014; Yıldırım & Şimşek, 2021).

To enhance credibility, the data collection and analysis processes were clearly explained, and participants' statements were presented with direct quotes. To ensure confirmability and objectivity, the data were accompanied by explanations. For reliability, the theme and code analyses were verified by two faculty experts to confirm the research's validity. To meet confirmability standards, the researcher clearly defined the participants and processes, offering detailed descriptions. Raw data, including audio recordings and transcriptions, are preserved for future examination by other researchers.

### **Researcher's Role and Ethics**

The first author, with ten years of teaching experience across various levels, had a strong understanding of the school environment, which helped build rapport with participants. All necessary permissions and ethical approval were obtained, and participants were informed about the study's content before the interviews, with assurances that the data would only be used for research purposes. Consent forms were signed, including parental consent for students, and participants were guaranteed confidentiality and the option to withdraw at any time. The researcher ensured the process remained natural without interference.

## **FINDINGS**

This section presents the findings and discussions regarding the contributions of intelligence games (chess, mangala, kulami, reversi, globe, pentago) to the cognitive, affective, and psychomotor development of students, based on the perspectives of teachers, students, and parents.

### **Findings and Comments on the Contributions of Intelligence Games to Students' Cognitive Development**

Based on the interviews regarding the contributions of intelligence games to student development, the theme of "cognitive domain" was utilized. According to the data from

teachers, the cognitive domain theme encompasses the categories of “thinking skills”, “decision-making skills”, “academic success”, and “social learning”. Under the most frequently recurring response category of thinking skills, codes such as “strategic thinking”, “logical thinking”, “problem-solving skills”, “creative thinking”, “analytical thinking”, “critical thinking”, and “reflective thinking” were identified. Under the code for strategic thinking, sub-codes of “career goals”, “goal setting”, “planning skills”, and “foresight” were derived. The logical thinking code consists of sub-codes such as “attention”, “focus”, “memory capacity”, “active brain and intelligence”, and “mental flexibility”. The creative thinking code includes sub-codes like “perspective-taking”, “new schemata”, and “originality” (Shown in Table 4).

**Table 4***Teachers' View on Cognitive Domain Contributions of Intelligence Games*

Theme	Category	Code	Sub-codes
Cognitive Domain	Thinking Skills	Strategic Thinking	Career goals, Goal setting, Planning skills, Foresight
		Logical Thinking	Attention, Focus, Memory capacity, Active brain, Mental flexibility
		Problem-solving Skills	-
		Creative Thinking	Perspective-taking, New schemata, Originality
...			
Cognitive Domain	Academic Success	Analytical Thinking	-
		Critical Thinking	-
		Reflective Thinking	-
		Class Participation	-
Cognitive Domain	Social Learning	Knowledge Transfer	-
		Intelligence	-
Cognitive Domain	Decision-Making Skills	-	-

Regarding the development of students' strategic thinking under the cognitive domain, the Religious Culture and Moral Knowledge teacher responsible for organizing mind and intelligence games at the school, coded as RCT1, stated,

*“Students often must develop strategies without realizing it during the game. Especially in turn-based games, they plan their own moves and then try to anticipate the opponent's moves. They need to quickly evaluate many different scenarios. To achieve the best outcome, they must develop a good strategy.”*

The logical thinking development of students in this area was highlighted by the Turkish language teacher coded as TLT2, *“After the games, I see that LGS (Highschool Entrance Exam) students understand what they read faster and reason better in new-generation questions.”*. The mathematics teacher coded MT1 stated,

*“It is clearly observed that students who start playing games are more attentive and focused in their relationships with their classes. Their thoughts during and outside of lessons are more logical than before. A student who makes more logical decisions does not waste time on violent behaviours because they have channelled their energy into positive activities.”*

Similarly, the science teacher coded ST2 expressed,

*“The topics students discuss and the activities they engage in during breaks have started to revolve around these games. Because students' minds and time are occupied with these games, I can say that chaos among students during breaks have notably decreased. All their thoughts are on the games.”.*

The science teacher coded ST1 shared their thoughts on cognitive domain development, stating,

*“Through these games, students develop their thinking skills by engaging in processes such as moving thoughtfully, calculating the next step, analysing their opponent, considering the opponent's next move, and putting themselves in their opponent's shoes to think through their steps. As students spend time in these thinking processes, they aspire to elevate their gameplay to a career level and want to demonstrate their skills in high-level competitions.”.*

According to these findings, it is evident that mind and intelligence games contribute to various aspects of students' cognitive development, and due to the changes in students' behaviour resulting from this cognitive development, they may also help reduce violence and chaos within the school. Consequently, this could alleviate stress and anxiety among both teachers and students, enabling teachers to experience less fatigue and students to enjoy their learning experience more.

When students were asked to describe how intelligence games contributed to their development, two main categories emerged under the theme of "cognitive domain": "academic success" and "thinking skills". The category of academic success was further divided into the codes of "class participation", "knowledge transfer", and "intelligence". The category of thinking skills included the codes of "logical thinking", "creative thinking", "critical thinking", "strategic thinking", and "analytical thinking". Under the logical thinking code, the subcodes "attention", "focus", and "quick thinking" were identified; under the creative thinking code, the subcode "three-dimensional thinking" was identified; under the strategic thinking code, the subcodes "multidimensional thinking" and "foresight" were identified; and under the analytical thinking code, the subcode "attention to detail" was obtained (Shown in Table 5).

**Table 5**

*Students' View on Cognitive Domain Contributions of Intelligence Games*

Theme	Category	Code	Sub-codes
Cognitive Domain	Thinking Skills	Logical Thinking	Attention, Focus, Quick thinking
		Creative Thinking	Three-dimensional thinking
		Strategic Thinking	Multidimensional thinking, Foresight
		Analytical Thinking	Attention to detail
Cognitive Domain	Academic Success	Class Participation	-
		Knowledge Transfer	-
		Intelligence	-

The student coded S6 expressed the development of academic success through the knowledge transfer code and analytical thinking through the attention to detail code, stating,

*“When a disagreement arises in the classroom, I sometimes think to myself as if I am playing a game, and I start to consider how I can get through this situation. I think through everything one by one to resolve the disagreement at that moment.”.*

S15 student described their analytical thinking skills, saying, *“Especially with long texts, I learned to progress step by step, just like in games. I view the text from the beginning to the end as the start and finish of the game. I follow this sequence step by step.”.* S21 student articulated the contributions of games to their academic success by stating,



*“When I see shapes in games, shapes I’ve learned, and the names of moves, I understand them more easily when I hear them in class. For instance, in math class, I already know what the teacher is saying before they even draw it on the board.”.*

Similarly, S13 student noted,

*“When I see the words, games, and moves from the games in the textbook, I immediately raise my hand to answer. Sometimes, these words can also be in the worksheets by the teachers. Then I either already know the answers to the questions or I can find the answers more quickly.”.*

Based on these data, it can be said that the knowledge and experiences gained by students through games facilitate their learning in the classroom. It can also be stated that through their thinking skills, they produce logical and strategic solutions to both mental and social problems.

When examining parents' views on the contributions of intelligence games to students' development, several categories emerged under the theme of "cognitive domain": "21st-century skills", "thinking skills", "social learning", "decision-making skills", and "academic success". The thinking skills category included the codes of "computational thinking", "creative thinking", "logical thinking", "analytical thinking", "critical thinking", "mathematical thinking", "problem-solving skills", and "strategic thinking". The computational thinking code contained the subcode of "coding", while the logical thinking code encompassed the subcodes of "reasoning", "attention", "focus", and "memory". The strategic thinking code included the subcodes of "planning" and "foresight". The academic success category consisted of the codes of "class participation" and "intelligence".

**Table 6**

*Parents' View on Cognitive Domain Contributions of Intelligence Games*

Theme	Category	Code	Sub-codes
Cognitive Domain	21st Century Skills	-	-
		Thinking Skills	Computational Thinking
	Thinking Skills	Creative Thinking	Coding
		Logical Thinking	-
		Analytical Thinking	Reasoning, Attention, Focus, Memory
		Critical Thinking	-
		Mathematical Thinking	-
		Problem-solving Skills	-
		Strategic Thinking	Planning, Foresight
	Social Learning	-	-
Cognitive Domain	Decision-Making Skills	-	-
		-	-
Cognitive Domain	Academic Success	Class Participation	-
		Intelligence	-

P4 parent stated, *“I observe that my child can gather attention more easily while doing homework. Additionally, he can study for longer periods than before. He thinks before doing something and acts by considering the whole thing.”* expressing the development of cognitive areas such as attention, focus, logical thinking, and strategic thinking. Another parent, coded

P7, commented on the development of logical thinking skills, saying,

*“Especially chess has helped my son gather his attention while doing his homework and studying. He often thinks before doing something, fully recognizing the positive and negative aspects. He corrects his mistakes and can better observe and express the causes and consequences.”.*

P1 parent, who expressed contributions to problem-solving skills, stated, *“I see a positive change in his thinking skills after the games. He seeks solutions to his problems by looking at them from different perspectives.”.* P2 parent observed developments in strategic and logical thinking skills, stating,

*“In intelligence games, developing strategies, planning the next two or three moves, reasoning, and predicting the opponent’s moves manifest themselves at home as long-term planning and daily planning for his studies. His study routine has changed positively. Additionally, he comes to us having already mentally rehearsed the conversations he plans to have with us, predicting what our responses will be.”.*

As a result, it can be concluded that these games contribute to students' behaviours such as planning their day, organizing their studies, facilitating learning, acting proactively, using their minds actively and quickly, establishing cause-and-effect relationships, and being attentive in both their daily and school lives.

In conclusion, based on the data from the views of teachers, students, and parents, it can be said that mind and intelligence games promote the cognitive development of students. There were indications of development in the cognitive domain, particularly in areas such as thinking skills, academic success, decision-making skills, and social learning. It can be stated that there is a consensus among teachers, students, and parents regarding the enhancement of cognitive development, particularly in thinking skills, which include strategic thinking, logical thinking, creative thinking, and problem-solving skills.

### **Findings and Comments on the Contributions of Intelligence Games to Students' Affective Domain Development**

Based on the interviews regarding the contributions of intelligence games to student development, the theme of "affective domain" was also utilized. According to the data from teachers, the affective domain theme revealed the following categories: "values", "motivation", "attitudes", and "social skills". The most frequently identified value category included the following codes: "solidarity/helpfulness", "friendship", "self-confidence", "empathy", "patience", "determination", "self-control", "accepting defeat", "respect", and "competition". Additionally, the respect code encompasses the subcode of "respect for diversity and differences". For the social skills category, the following codes were identified: "communication skills", "group work/collaboration", "active listening skills", "sharing opinions", "negotiation", "valuing others", "acceptance", "spending time with friends", and "learning community rules". In the motivation category, the codes identified were "motivation", "coping with stress", and "openness/willingness to learn". Lastly, in the attitudes category, the code "loving/connecting with school" was detected (Shown in Table 7).

**Table 7***Teachers' Views on the Affective Domain Contributions of Intelligence Games*

Theme	Category	Code	Sub-codes
Affective Domain	Values	Solidarity/Helpfulness	-
		Friendship	-
		Self-confidence	-
		Empathy	-
		Patience	-
		Determination	-
		Self-control	-
		Accepting Defeat	-
		Solidarity/Helpfulness	-
		Friendship	-
	Social Skills	Respect	Respect for diversity and differences
		Competition	-
		Communication Skills	-
		Group Work/Collaboration	-
		Active Listening Skills	-
		Sharing Opinions	-
		Negotiation	-
		Valuing Others	-
		Acceptance	-
		Spending Time with Friends	-
	Motivation	Learning Community Rules	-
		Motivation	-
		Coping with Stress	-
		Openness/Willingness to Learn	-
	Attitudes	Loving/Connecting with School	-

The development of the affective domain in the areas of motivation and social skills is expressed by the mathematics teacher with the MT2 code:

*"While on duty on the floor, where the mind and intelligence games class, is located, the students caught my attention. Because I noticed a significant number of students in the morning during the first lesson. I followed them to see where they were going, and they all were in the classroom at that hour. When I asked a few of them, they said they had returned for a game they had started the day before. They all looked excited and happy."*

The RCT1 code in the field of Religious Culture and Moral Knowledge articulated the development of social skills, motivation, and values:

*"In many games, students had to play in teams. Sometimes, I paired them with people they had never met before. Other times, I mixed lower and upper grade students. My aim was to promote integration and increase sharing. Students from different ages or classes communicated to work together and share ideas, even if they didn't know each other. In other words, they set a common goal. I observed that students who were not getting along in class began to work well together."*

The TLT1 code teacher noted the development of values and communication skills:

*"Seeing the patience, tolerance, and respect they displayed while waiting for their opponent during games was very gratifying when I noticed them listening to each other in class. One person does not interrupt the other until their speech is complete, and then they express their thoughts."*

Another teacher, ST1, who observed gains in social skills and values, stated, *"Through games, students who gained self-confidence started to communicate more comfortably with their friends. This especially helped shy students to make friends."* The SST1 coded social sciences teacher described the affective domain development in terms of motivation: *"After the games,*

students learned a lot from each other, which motivated them both in their lessons and towards their peers.". The same SST1 social sciences teacher also mentioned attitude: *"The mind and intelligence games positively influence students' attitudes towards school. Engaging in enjoyable activities with their peers, where they can showcase themselves, results in them liking school more."* The ST1 coded science teacher expressed the acquisition of values related to society as follows:

*"Thanks to games, students learn to act collectively at a societal level, see themselves as part of the community, and adopt the rules of the society or environment they are in. This is because students who understand that they need to play by the rules in games also grasp the necessity of rules in real life and begin to apply them."*

The MT1 coded mathematics teacher described the affective domain developments observed in students: *"Games that motivate students to be responsible and successful individuals towards school and their peers also encourage them to engage with school, lessons, and friends."* This same teacher further noted,

*"In games that require two or more players, students acquire values such as patience, respect, acceptance, and self-confidence. As a result, students learn to wait their turn, congratulate others, and understand that losing is not a negative experience, transferring these behaviours into real life."*

Consequently, it can be stated that mind and intelligence games assist students in developing a love for school, their lessons, and their friends, as well as adapting to school, adhering to rules, accepting those rules, making friends, fostering teamwork, acting collaboratively, gaining values, and ultimately contributing to the formation of a school culture. Students who come to school with enthusiasm may experience a reduction in behavioural problems and absenteeism.

When students were asked to describe the contributions of mind and intelligence games to their development, the theme of the "affective domain" emerged, yielding categories of "motivation", "social skills", "attitude", and "values". The social skills category includes codes such as "making/choosing new friends", "self-expression", and "breaking prejudice". The motivation category consists of the codes "desire to work" and "pleasure of winning". In the attitude category, the codes identified were "lesson", "school", and "friends". The most frequently encountered codes in the values category included "tolerance", "honesty", "equality", "friendship", "helpfulness", "responsibility", "self-confidence", "kindness", "patience", "respect", "understanding", "justice", "love", "self-care", "empathy", and "environmental awareness" (Shown in Table 8).

**Table 8***Students' Views on the Affective Domain Contributions of Intelligence Games*

Theme	Category	Code	Sub-codes
Affective Domain	Values	Tolerance	-
		Honesty	-
		Equality	-
		Friendship	-
		Helpfulness	-
		Responsibility	-
		Self-confidence	-
		Kindness	-
		Patience	-
		Respect	-
		Understanding	-
		Justice	-
		Love	-
		Self-care	-
		Empathy	-
		Environmental Awareness	-
	Social Skills	Making/Choosing New Friends	-
		Self-expression	-
		Breaking Prejudice	-
	Motivation	Desire to Work	-
		Pleasure of Winning	-
	Attitudes	Lesson	-
		School	-
		Friends	-

The affective domain development from mind and intelligence games in terms of values and social skills was articulated by S8 student:

*"I come to this class every recess. I have played matches with many people. I met a lot of people. Even if I feel sad when I lose, I congratulate my opponent if they win. Sometimes, if I notice that my opponent is upset, I intentionally lose. Sometimes, I just say that friendship should win."*

S27 student expressed similar gains: *"I was actually paired with someone I didn't really like for the match. I didn't like them. But while playing the game, I started to like them. So, they weren't the person I thought they were."* S14 student shared their thoughts on motivation and attitude: *"I now enjoy spending time at school much more. I always tell my family about the games and what I will play at home. I always want to be at school playing games with my friends."* Similarly, S22 student stated, *"I get excited when things I know from games come up in class. I want to participate in that lesson."* As an example of gains related to friendship and social skills, S19 student noted, *"During recess, we teach each other the games. I explain the rules that should be in the game to my friends who don't know."* S23 student added, *"Even if there are times when I can't show myself in lessons, when I focus on the game, I can act comfortably."* S28 student completed this thought by saying, *"When I express the things I learned from the game in class, I feel more comfortable showing myself."* As a result, it can be said that mind and intelligence games provide an opportunity for students to express and demonstrate themselves. These games help students not only to acquire fundamental values but also to gain moral behaviours, facilitating their adaptation to and enjoyment of school, participation in lessons, and ultimately fostering a sense of belonging to the school.

When examining parents' views on the contributions of mind and intelligence games to their children's development, the theme of the "affective domain" revealed categories of "attitude",

"motivation", "social skills", and "values". The attitude category includes codes such as "liking school" and "interest in lessons". The motivation category contains the code "pleasure of achievement". In the social skills category, the identified codes were "communication skills", "friendship relations", and "adherence to school rules". The values category included codes such as "determination", "patience", "kindness", "respect", "love", "empathy", "responsibility", "self-confidence", and "environmental awareness" (Shown in Table 9).

**Table 9***Parents' Views on the Affective Domain Contributions of Intelligence Games*

Theme	Category	Code	Sub-codes
Affective Domain	Values	Determination	-
		Patience	-
		Kindness	-
		Respect	-
		Love	-
		Empathy	-
		Responsibility	-
		Self-confidence	-
		Environmental Awareness	-
	Social Skills	Communication Skills	-
		Friendship Relations	-
		Adherence to School Rules	-
	Motivation	Pleasure of Achievement	-
	Attitudes	Liking School	-
		Interest in Lessons	-

A parent coded P1 described the development of social skills in the affective domain by stating, *"After the games, the names of the friends we hear at home started to change. He talks about his matches with friends, many of whom are from different classes."* P10 parent expressed the changes they observed in motivation, attitude, and social skills: *"These games helped my son show more positive behaviours toward his friends, lessons, and school. It was beneficial in terms of his care to follow school rules, his more active participation in lessons, and his socialization with friends."* P9 parent shared their observations regarding motivation and attitude, stating, *"My child's attitude and thoughts about school and lessons changed positively. I see that he is more willing to go to school than before, and I hear about the games he wants to play at school."* This parent also noted the development in the affective domain through social skills: *"I feel that the time he spends with his friends is more productive because he generally talks about having a good time with them at school while playing these games."* P6 parent highlighted the gains in terms of values: *"Previously, when he faced failure, he would experience emotional distress, but now he sees and accepts losing in these games, finding it normal."* Regarding communication skills, the parent stated, *"I see that it led to positive developments in my child's relationships with his peers and us. He started to talk more and communicate better. He speaks in a more constructive manner without being hurtful."* Another parent, coded P3, evaluated the development of the affective domain in terms of communication and values: *"By communicating during games, they contributed to the process of socialization. Thanks to these games, they learned to wait their turn and to be patient. They engage in face-to-face communication, distancing themselves from virtual environments and dependency on digital games."* As a result, it can be said that these games help students distance themselves from technology addiction and digital games, fostering a positive state of mind, creating social networks at school, developing a love for school and friends, enjoying their time, being constructive, and coping with challenging situations.

Based on the data from interviews with teachers, students, and parents, it can be concluded that mind and intelligence games contribute to the development of students' affective domain. In

this development, values stand out. It can be said that mind and intelligence games are effective in instilling fundamental values. Additionally, these games positively impact students' attitudes toward lessons and school, as well as their motivation in terms of effort and achievement. Furthermore, they enhance social skills related to making friends, building friendships, communication skills, adapting to the community, and adopting rules.

### ***Findings and Comments on the Contributions of Mind and Intelligence Games to Students' Psychomotor Development***

In accordance with the findings from interviews regarding the contributions of mind and intelligence games to students' development, the theme of the "psychomotor domain" was also utilized. Based on data from teachers, the categories under the psychomotor domain include "coordination", "reflexes", and "fine motor skills". Within the coordination category, the code "hand-eye coordination" was identified (Shown in Table 10).

The RCT1 coded teacher of Religious Culture and Moral Knowledge described the development in terms of reflexes and fine motor skills: *"In games where they need to make quick decisions, their reflexes also improve. For example, I can say that the games end more quickly. Alternatively, I notice that the number of falling or breaking pieces decreases over time."* Regarding coordination, the TLT1 coded Turkish language teacher indicated psychomotor development by stating, *"When I ask them to find a word during reading, they can quickly scan and say it."* The MT2 coded mathematics teacher remarked on the contributions to fine motor skills, saying, *"The games have changed the students' perceptions of shapes in lessons. Additionally, I see that they are more comfortable drawing familiar shapes."* In this context, it can be said that especially in lessons that involve shapes and drawing, dense text, and time-sensitive activities that require mental and physical processes, students benefit from the assistance of mind and intelligence games.

The theme of the "psychomotor domain" yielded the categories of "coordination" and "fine motor skills". The coordination category includes the code "hand-eye coordination" (Shown in Table 10). At this point, it was observed that students mostly discussed gains related to their hand and eye coordination skills. S17 student expressed their psychomotor development related to hand and eye coordination by stating, *"I used to collect stones with both hands, but now I can pick them up with one hand."* Similarly, S23 student remarked on their psychomotor development by saying, *"I think it is improving my hand skills. For example, I write better now."* S4 student indicated their fine motor skill development by stating,

*"I find easier to draw the shapes I need to in science class. In math class, I can now transfer things to the board without looking back. By examining the shapes for a long time, I can draw them more accurately and quickly because I saw them in the game class."*

As a result, it can be said that spending time with mind and intelligence games has particularly helped students gain proficiency in drawing and develop their hand skills.

**Table 10**  
*Psychomotor Domain Contributions of Intelligence Games*

Participants	Theme	Category	Code	Sub-codes
Teachers	Psychomotor Domain	Coordination	Hand-eye coordination	-
		Reflexes	-	-
		Fine Motor Skills	-	-
Students	Psychomotor Domain	Coordination	Hand-eye coordination	-
		Fine Motor Skills	-	-
Parents	-	-	-	-

When examining parents' views on the contributions of mind and intelligence games to students' development, it was not found that the theme of the "psychomotor domain" (Shown in Table 10). The findings from the parent interviews indicated that they pertained only to the cognitive and affective domains (Shown in Table 11). While teachers' observations and students' experiences and expressions indicated the development of psychomotor behaviours within the school, the lack of noticeable changes in students' behaviours and skills at home stands out as an interesting finding of the study.

**Table 11**

*Participants' Contributions Themes*

Participants	Cognitive Domain	Affective Domain	Psychomotor Domain
Teachers	✓	✓	✓
Students	✓	✓	✓
Parents	✓	✓	X

## CONCLUSION AND DISCUSSION

This study explored how mind and intelligence games (chess, mancala, kulami, reversi, globe, pentago) impact the cognitive, affective, and psychomotor development of secondary school students (grades 5-7), based on feedback from teachers, parents, and students. The findings suggest that, based on participants' perspectives, mind and intelligence games contribute to students' cognitive development in areas such as thinking skills, academic achievement, decision-making, and social learning.

Teachers, students, and parents indicated that these games support the development of competencies aligned with 21st-century skills. Participants specifically identified enhancements in various dimensions of thinking, including strategic, logical, critical, problem-solving, creative, analytical, mathematical, procedural, and reflective thinking. They also noted increased classroom engagement, improved knowledge transfer, and perceived gains in intelligence and academic performance. In relation to strategic thinking, participants described improvements in career goal setting, planning abilities, multifaceted thinking, and foresight. Regarding logical thinking, reported benefits included enhanced attention, reasoning, concentration, quick thinking, memory capacity, mental flexibility, cognitive engagement, and overall intellectual performance. For creative thinking, participants highlighted improvements in perspective-taking, schema development, three-dimensional thinking, and originality. Enhancements in analytical thinking were associated with increased attention to detail, while procedural thinking was linked to improved coding abilities.

Accordingly, it can be stated that mind and intelligence games not only contribute to students' cognitive development but also may help reduce issues of violence and conflict within schools due to changes in student behaviour resulting from this cognitive development. By reducing stress and anxiety among teachers and students, these games can assist teachers in feeling less fatigued and students in having more fun. The knowledge and experiences by students during the games facilitate their learning in the classroom. It can be said that they generate logical and



strategic solutions to both mental and social problems through their thinking skills. Furthermore, mind and intelligence games positively impact students' daily lives and school lives in terms of behaviours such as planning their day, organizing their lessons, facilitating study, moving forward with foresight, being active and quick in mental tasks, establishing cause-and-effect relationships, and maintaining attentiveness.

Studies show that mind and intelligence games positively impact students' cognitive development. Hacısalıhoğlu Karadeniz and Hodancı (2023) found these games improved mental processing, strategy development, and reinforcement. Adalıyılmaz (2022) highlighted their role in enhancing thinking, strategy, and attention. Yöndemli and Taş (2018) found significant contributions to mathematical reasoning in eighth graders. Ayar (2022) noted improvements in creative thinking, metacognitive awareness, and strategic thinking. Durulan (2022) observed high levels of attention and visual perception in children playing these games. Kul and Kel (2021) found positive effects on higher-order thinking, achievement, and mathematical skills. Research by Adalar and Yüksel (2017) confirmed these games improve thinking skills. Çağır and Oruç (2020) linked their use in social studies to higher academic success. Demirkaya and Masal (2017) found significant attention improvements after these games training. Altun et al. (2016) and Altun (2017) both reported significant improvements in attention and visual perception. Yağlı (2019) similarly found better attention levels in students receiving games training.

Jemutai and Webb's (2019) research found that the Six Brick Duplo Block Game improved visual perception and spatial skills in the experimental group compared to the control group. Bottino et al. (2013) showed that mind and intelligence games boost reasoning, problem-solving, and attention, leading to better academic performance. Mackey et al. (2011) found that regular participation in these games increased students' IQ scores by an average of 10 points. Russ (2003) concluded that such games enhance creativity, divergent thinking, problem-solving, and mental skills. In the study conducted by Bakker (2008), the Tridio game was employed with the aim of enhancing students' spatial abilities. The findings of this study align with and support the results of the present research. Similarly, the study by Casey et al. (2002) indicated that games and logic puzzles help students develop skills such as critical thinking, reasoning, drawing conclusions, and formulating strategies. Moreover, several studies have concluded that logic games serve as effective tools for improving problem-solving abilities (Mestre, 2007; Reiter et al., 2013). In a study conducted by Bottino and Ott (2006) involving children in general, the data obtained from logic games revealed that such games have a positive impact on academic achievement. Furthermore, in their article examining how creativity can be supported through technology-enhanced learning experiences, Ott and Pozzi (2012) reported that digital logic games significantly improve students' reasoning skills. Yang and Chen's (2010) study demonstrates that students' spatial abilities were significantly improved after they took the digital pentominoes game. In another study investigating the KenKen (a new form of Sudoku) game, it was found that the game promotes logical reasoning, number sense, independent thinking, learning, perseverance and resilience, problem-solving, and communication (Reiter et al., 2013). In their study utilizing various board games, Bartolucci et al. (2019) concluded that both adults and children experienced positive changes in their cognitive skills.

These studies align with this research on the cognitive contributions of mind and intelligence games. A review of both national and international literature reveals that previous studies support the cognitive outcomes of the present research. This may be attributed to the fact that games typically involve mental processes, promote active engagement with knowledge and learning, support experiential learning, and are student-centered in nature—all of which tend to

yield positive effects on students. Furthermore, it can be inferred that logic and intelligence games were used appropriately in accordance with their intended purposes, and that these objectives were effectively achieved.

The study revealed that mind and intelligence games contribute to students' development in the affective domain, particularly regarding values, social skills, motivation, and attitudes. The values identified include solidarity, cooperation, friendship, self-confidence, empathy, patience, perseverance, self-control, acceptance of defeat, tolerance, honesty, equality, altruism, responsibility, kindness, understanding, justice, love, self-care, environmental awareness, respect, and competitiveness. In terms of respect, the development of respect for diversity and differences was observed. Social skills included communication skills, friendships, the ability to make/select new friends, self-expression, breaking down prejudices, teamwork/collaboration, active listening, sharing ideas, negotiation, valuing others, acceptance, spending time with friends, adherence to school rules, and learning community rules. Regarding motivation, achievements in motivation, coping with stress, openness/willingness to learn, desire to work, pleasure in achievement, and joy in winning were identified. In terms of attitudes, positive attitudes toward lessons, school, and friends, along with a sense of attachment to and love for school, were observed.

Based on this, it can be said that mind and intelligence games help students to love their school, classes, and friends, adapt to school, comply with rules, accept regulations, make friends, develop team spirit, act collaboratively, and ultimately contribute to the formation of school culture. Students who enjoy school may exhibit fewer behavioural problems and absenteeism. It can be stated that mind and intelligence games provide an opportunity for students to express themselves and that these games assist in acquiring core values as well as numerous other values and behaviours. Furthermore, they help students adapt to and enjoy school, participate in classes, and ultimately feel a sense of belonging to the school. It can also be said that these games aid students in distancing themselves from technology addiction and digital games, achieving a positive state of mind, building social networks at school, loving their school and friends, having enjoyable experiences, being constructive, and coping with challenging situations.

The literature reveals that Ayar (2022) found that mind and intelligence games help develop social skills like teamwork, sharing, and listening, as well as affective skills such as motivation, self-confidence, and empathy. Sadıkoğlu (2017) concluded that these games improve interpersonal relationships and promote national and universal values. Kula (2020) showed that these games enhance students' self-confidence, communication, empathy, and teamwork, increasing classroom participation and motivation. Özdevcioğlu and Hark-Söylemez (2021) observed that students enjoy playing these games. Çağır and Oruç (2020) noted positive outcomes in students' attitudes toward Social Studies classes when these games were used. Köroğlu and Yeşildere (2002) found that a majority of students enjoyed playing games, especially with friends, and that math games sparked greater interest in the subject. Akbaş and Baki (2015) and Alkan and Mertol (2017) highlighted the role of these games in fostering socialization and communication skills. While these studies support the positive impact of these games on students' affective development, Devocioğlu and Karadağ (2014) reported that some students experienced fear of losing and mental fatigue during gameplay. As a result of their study, Siew and Abdullah (2012) reported that students who engaged in tangram activities—a type of puzzle game—expressed increased interest in geometry as well as enhanced confidence and creativity in learning the subject. Similarly, in their article exploring how creativity can be supported through technology-enhanced learning experiences, Ott and Pozzi (2012) found that digital logic games significantly improved students' creative abilities, attitudes, and reasoning

skills. In their study utilizing various board games, Bartolucci et al. (2019) concluded that both adults and children experienced positive changes in their cognitive and creative skills.

The literature, supporting the findings of this study, indicates that logic and intelligence games enhance students' motivation and strengthen their interest in learning. However, some studies in the opposite direction suggest that the overly competitive elements of these games may lead to decreased motivation and reduced self-confidence, particularly among low-performing students. For instance, a systematic mapping study examining the negative effects of game design elements such as leaderboards and rewards demonstrated that these components can cause stress, lower achievement, and ethical issues among students (Almeida, et al., 2023). Additionally, Kaçak (2024) concluded that while logic and intelligence games improve attention and cognitive skills in students attending multigrade classrooms, they do not contribute to the development of students' social skills. These differences are believed to stem from affective and psychological factors, such as fear of failure or the adverse effects of excessive competition, as well as from reduced opportunities for a supportive environment, collaboration, or communication. Additionally, individual differences, including varying levels of student proficiency, are also considered contributing factors.

Finally, the research found that mind and intelligence games contribute to the development of students' psychomotor skills in terms of coordination, fine motor development, and reflexes. It was observed that the acquisition of "hand-eye coordination" was achieved in coordination. The literature shows that Ayar (2022) highlighted that these games improve psychomotor skills like impulse control, reflexes, and turn-taking. Güneş (2021) found that these games also enhance balance, fine motor skills, and quick movement. These studies support the contribution of mind and intelligence games to psychomotor development in this research. Accordingly, it can be said that students benefit from mind and intelligence games during lessons that involve shapes and drawings, dense texts, and time-sensitive activities requiring both mental and physical processes. As students spend more time engaging with these games, they particularly gain proficiency in drawing and develop their manual skills.

In conclusion, mind and intelligence games (chess, mancala, kulami, reversi, globe, pentago) were found to support students' development in the cognitive, affective, and psychomotor domains. These games improve cognitive skills like thinking, academic achievement, decision-making, and social learning, as well as affective skills like values, social skills, motivation, and attitudes. They also enhance psychomotor skills, including coordination, fine motor skills, and reflexes. According to Ayar (2022), students develop skills such as creative thinking, metacognitive awareness, strategic thinking, quick thinking, and self-improvement, along with social skills like teamwork, empathy, and collaboration. Psychomotor skills such as impulse control and reflex development are also improved. Additionally, positive impacts on class participation, focus, academic success, quick responses, and longer study times were noted. Güneş (2021) emphasized that these games particularly enhance attention skills. The effects on affective skills were observed from individual and societal angles, with improvements in self-confidence and responsibility, and societal benefits such as increased collaboration and sharing. Teachers also highlighted improvements in balance, fine motor skills, and agility. In light of these findings, it can be stated that the involvement of students mentally in the game, the use of their bodies, and participation in paired or group play contribute to logic and intelligence games actively engaging students in the learning process. These games facilitate the processing of knowledge and learning, are student-centered, provide multiple benefits, increase motivation, support social interaction by fostering skills such as cooperation, communication, and teamwork, impart diverse values, and promote physical development through fine motor skills and reflexes, thereby ensuring holistic development.

### **Implications**

Future research could explore the impact of mind and intelligence games on specific sub-dimensions of cognitive or affective skills. Given the limited data on psychomotor skill development, further focused studies are needed in this area. Experimental studies could integrate mind and intelligence games with lessons involving shapes and drawings. Replicating research with different games or exploring the effects across various socio-cultural backgrounds and age groups could provide additional insights. Research could also assess the long-term effects of these games on skill retention and application in lessons.

The use of these games in values education is recommended, and they could be integrated into orientation activities for new students or those facing adjustment issues. Action research or curriculum programs using these games could address behavioral issues like bullying or school absenteeism. These games could be made mandatory or elective across all education levels. To ensure widespread access, materials for these games should be durable, accessible, and available in sufficient quantities. Teachers could also receive training on how to incorporate these games into their classrooms, and interdisciplinary curricula for mind and intelligence game courses could be developed.

### **Support and Agreement**

"As an author, I have no support or appreciation for the process of conducting the research."

### **Conflict Statement**

We declare that we, as authors of the study, have no interests/conflicts.

### **Publication Ethical Statement**

All the rules stated in the framework of "Scientific Research in Universities and Publication Ethic Codes were followed throughout the process (planning, implementation, data collection and analysis). The study adhered to scientific ethics and citation rules, with no data falsification, and was not submitted to any other publication for review.

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