



Teachers' Views on the Effects of Verbal Intelligence Games on Children's Scientific Reasoning Skills, Problem-Solving Skills, Motivation, and Academic Achievement

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Abstract

This study aimed to explore teachers' views on the perceived contributions of verbal intelligence games (VIG) to children's scientific reasoning, problem-solving skills, motivation to learn, and academic achievement. Grounded in a phenomenological qualitative paradigm, this study sought to capture participants' perceptions and experiences regarding the phenomenon of interest. Participants were recruited through convenience sampling, which is a non-probability sampling strategy. Data were gathered via semi-structured interviews and analyzed following the principles of inductive content analysis. The findings revealed that teachers believed VIG could support the development of children's scientific reasoning, problem-solving skills, learning motivation, and academic achievement. Furthermore, teachers emphasized that VIG supported learning, promoted cognitive development, increased students' interest in lessons, facilitated personalized learning, provided an enjoyable learning environment, helped sustain students' attention, and encouraged active classroom participation. However, teachers also reported encountering several challenges during the implementation of VIG, including inadequate technological infrastructure, a lack of age-appropriate content, overcrowded classrooms, and the risk of technology-related addiction. Based on the findings, several recommendations for future research and educational practice were proposed.

Key Words

Verbal intelligence games
Scientific reasoning skills
Problem-solving skills
Motivation
Achievement

About Article

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Introduction

Developments in technology have affected many areas of life, ranging from healthcare to the economy. Education is also one of the fields that has been substantially influenced by technological advancements (Wang et al., 2024). At the same time, games have always occupied an important place in human life. Games are among the fundamental domains of human experience across all stages of life, influenced by both biological processes and cultural transmission (Yıldız & Küçük, 2026). In addition to serving as a fundamental tool in children's learning, games contribute to the development of imagination, creativity, critical thinking, and problem-solving skills (Sinan-Köşker et al., 2025). Considering their contributions to children's development, the use of intelligence games in educational processes has become increasingly widespread. These benefits of intelligence games for individuals have facilitated the integration of such games into educational curricula. For example, in Türkiye, intelligence games have been incorporated into the curriculum as an elective course. Within the scope of this elective course, intelligence games are classified into six categories: (1) reasoning and calculation games, (2) verbal games, (3) geometric and mechanical games, (4) memory games, (5) strategy games, and (6) intelligence puzzles (Ministry of National Education [MoNE], 2013). A review of the literature indicates that verbal intelligence games are among the most frequently preferred types of intelligence games because of their potential to support the development of scientific reasoning and verbal-linguistic skills (e.g., Coşanay & Kasa Ayten, 2023). Verbal intelligence games are designed to enhance individuals' vocabulary and support the development of their verbal skills. Over the past decade, games have gained considerable importance, particularly with the growing use of VIG. Therefore, VIG can be regarded as a potentially valuable approach to teaching and learning. Borçin Gökçe et al. (2023) conceptualized mind and intelligence games as educational activities that promote the recognition of individual potential while cultivating rapid decision-making, accurate judgment, and effective problem-solving skills. Furthermore, VIG are also regarded as tools that help individuals achieve learning goals (Dempsey et al., 2002).

VIG facilitate the development of individuals' cognitive, affective, and psychomotor skills in an enjoyable and educational way (Çağır & Oruç, 2020). Furthermore, mind and intelligence games have been reported to enhance students' motivation, interest in lessons, and academic achievement while also supporting the development of problem-solving and scientific reasoning skills (Ayar et al., 2023; Kacmaz & Dubé, 2025; Terzi & Altun, 2026). Owing to these educational benefits, mind and intelligence games have been incorporated into school curricula as a separate course. In Türkiye, mind and intelligence games were introduced as an elective course at the middle school level in 2013 (MoNE, 2013). Specifically, the curriculum includes verbal games, reasoning games, strategy games, intelligence games, memory games, and geometric-mechanical games (MoNE, 2013).

Research Gap

A review of the existing literature indicates that studies on mind and intelligence games have primarily focused on intervention-based research aimed at developing various skills, such as problem-solving, scientific reasoning, and critical thinking (e.g., Sulaiman & Amin, 2026). To date, investigations into teachers' and pre-service teachers' perspectives on mind and intelligence games have predominantly addressed primary and middle school educational contexts, leaving other educational levels relatively underrepresented (e.g., Çetin & Özbuğutu, 2020; Ekiçi et al., 2017; Güneş, 2024). In contrast, only a limited number of studies have investigated mind and intelligence games in early childhood education (e.g., Karadavut & Batmaz, 2025). Furthermore, limited research has specifically examined the role of VIG in supporting children's learning and development during the preschool period.

Existing studies also indicate that qualitative research simultaneously examining teachers' general perspectives on VIG and their perceptions of the potential contributions of these games to children's scientific reasoning, problem-solving, motivation, and academic achievement remains very limited. Nevertheless, several studies have reported positive associations between verbal intelligence games and the development of problem-solving, scientific reasoning, and reasoning skills (Bayaga, 2025; Baki, 2022; Çetin & Özbuğutu, 2020; Karataş et al., 2022; Nkereuwem et al., 2023). Moreover, the literature appears to provide limited evidence regarding teachers' perspectives on the challenges they encounter when integrating verbal intelligence games into classroom settings and the solutions they

propose to address these challenges. Accordingly, the present study aims to address these gaps by examining teachers' perspectives on the use of verbal intelligence games in preschool education. The current shortcomings in the literature collectively warrant further investigation into how verbal intelligence games may support the development of higher-order thinking skills. By addressing this research gap, the present study extends the existing literature by providing qualitative evidence from the preschool education context. Furthermore, the findings may provide a useful reference point for researchers conducting future studies on VIG. Moreover, given the widespread use of verbal intelligence games among different types of intelligence games, examining their effects on scientific reasoning and problem-solving skills is particularly important. Investigating these effects may contribute to the existing literature by providing further evidence on the potential role of verbal intelligence games in supporting higher-order cognitive skills.

Purpose of the Study

Within this context, the study aimed to explore teachers' views on the impact of VIG on children's scientific reasoning, problem-solving skills, motivation to learn, and academic achievement. Accordingly, the main research question was formulated as follows: "What are preschool teachers' views on verbal intelligence games?" To address the purpose of the study, the following research questions were formulated:

1. How do teachers perceive the role of verbal intelligence games in promoting children's scientific reasoning and reasoning skills?
2. How do teachers perceive the role of verbal intelligence games in enhancing children's problem-solving skills?
3. How do teachers perceive the role of verbal intelligence games in improving children's motivation and academic achievement?
4. What are teachers' perceptions of integrating verbal intelligence games into educational practice?

Method

Research Design

The study was designed using a phenomenological research design, one of the qualitative research methods. Within this framework, a phenomenological design was employed to provide a comprehensive (Cilesiz, 2011), in-depth understanding of teachers' views on VIG. Accordingly, the study was grounded in ontological and epistemological perspectives. The research was approached from a post-positivist perspective by establishing a connection between experimental and interpretive paradigms (Twining et al., 2017). Phenomenology focuses on exploring individuals' experiences of a particular phenomenon or event and how they make sense of those experiences (Tekindal, 2021). The participants included in the study group were selected from among teachers who had experience with intelligence games and used them in their classrooms. This selection was based on the nature of phenomenology, a qualitative research design that seeks to understand a phenomenon through the perspectives and experiences of individuals who have directly experienced it (Ceylan Çapar & Ceylan, 2022). Therefore, it was important for the teachers participating in this study to have prior experience with intelligence games to ensure that the study was conducted in accordance with the principles of phenomenological research.

Participants

The study group was selected using convenience sampling, a purposive sampling method. The participants consisted of 12 preschool teachers (9 females and 3 males). The teachers' professional experience ranged from 1 to 19 years. When forming the study group, participants were selected in accordance with the nature of the phenomenological research design. The participants consisted of individuals who had knowledge of and experience with intelligence games. To ensure the confidentiality

of participants' identities, pseudonyms were assigned to all teachers and used throughout the data analysis process.

Qualitative Data Collection Instruments

Interview Form

Preschool teachers' experiences and perceptions regarding VIG were investigated using a semi-structured interview approach. During the development of the semi-structured interview form, the relevant literature was first reviewed, and an initial pool of interview questions was generated. Following the preparation of the question pool, the interview form was submitted to an expert holding a doctoral degree in early childhood education for review. The interview questions were reviewed in accordance with the expert's feedback. For example, to improve the clarity and readability of the interview instrument, the wording of one question was refined while preserving its original meaning: "How do you think VIG contribute to children's scientific reasoning skills? Please explain." In addition, one of two questions with similar content was removed to improve the scope and clarity of the interview form. After all necessary revisions had been completed based on the expert's feedback, the interview form was finalized. The final version of the interview form consisted of 7 questions.

Data Analysis

Analysis of Qualitative Data

Before conducting the interviews, the teachers were informed about the purpose of the study and the research process. Following this briefing, they were asked to provide informed consent to participate in the interviews. Only the responses of the teachers who provided informed consent were included in the study. Subsequently, the collected data were analyzed. The qualitative data were analyzed in four stages following the procedures proposed by Yıldırım and Şimşek (2016). In the first stage, interview transcripts were prepared from the interview recordings obtained from the teachers. In the second stage, the transcripts were examined and analyzed in detail. In the third stage, themes and codes were generated based on the analysis results. In the fourth stage, the themes and codes were organized into tables and interpreted. The resulting themes and codes were then submitted to an expert for review, and the necessary revisions were made in accordance with the expert's feedback before finalization.

Validity and Reliability

Several procedures were followed to ensure the validity and reliability of the study. First, expert opinions were sought during the development of the semi-structured interview form used in the study. The interview form was finalized based on the experts' feedback and recommendations. Second, during the analysis of the qualitative data, two experts independently developed the codes and themes. The resulting codes and themes were subsequently compared, discussed, and refined through consensus. Finally, the identified codes and themes were interpreted and presented in tables. Having two experts independently analyze the qualitative data and reach consensus on the coding and thematic structure enhanced the credibility and reliability of the qualitative analysis.

Findings

Findings Related to Teachers' Views

The study examined participants' views regarding verbal intelligence games. The findings obtained from the participants' responses are presented in tabular form to facilitate readers' understanding.

Results for Research Question 1

The analysis explored participants' perspectives on the extent to which VIG enhance children's scientific reasoning skills. The results obtained in relation to the first research question are reported in Table 1.

Table 1. Participants' views on the contribution of VIG to children's scientific reasoning skills

Theme	Code (n)	Teacher Quotations
Scientific Reasoning Skills	Development of scientific reasoning skills (n = 8)	T8: It helps children use and develop their reasoning and logical thinking skills. T11: It positively influences children's reasoning skills.
	Development of problem-solving skills (n = 6)	T12: It can support children's problem-solving and reasoning skills.
	Development of scientific process skills (n = 5)	T4: Children observe, think, and experiment, which form the foundation of the scientific process. T6: They experience generating hypotheses, making observations, collecting data, and drawing conclusions.
	Establishing cause-and-effect relationships (n = 3)	T2: It supports children's ability to analyze, compare, and establish cause-and-effect relationships. T5: I believe it helps children understand cause-and-effect relationships.
	Promoting logical thinking (n = 2)	T5: It contributes to children's logical thinking. T1: It supports the mental flexibility required for scientific thinking.
	Development of analytical skills (n = 1)	T2: It supports children's analytical and comparative thinking skills.
	Supporting cognitive development (n = 1)	T10: These games positively contribute to children's cognitive development.
	<i>Causing distraction (n = 1)</i>	T9: I think that playing these games too frequently distracts children's attention and reduces their reasoning ability.
	<i>Reducing scientific reasoning skills (n = 1)</i>	

*Participants provided more than one answer.

As shown in Table 1, participants believed that VIG positively contributed to the development of children's scientific reasoning and reasoning skills. They further stated that, in addition to enhancing reasoning and scientific reasoning skills, VIG could also promote a range of higher-order skills, including establishing cause-and-effect relationships and developing scientific process skills.

Results for Research Question 2

The analysis explored participants' perspectives on the extent to which verbal intelligence games enhance children's problem-solving skills. The results obtained in relation to the second research question are reported in Table 2.

Table 2. Participants' views on the contribution of VIG to children's problem-solving skills

Theme	Code (n)	Teacher Quotations
Contribution to Problem-Solving Skills	Development of problem-solving skills (n = 9)	T2: It improves children's problem-solving skills. T5: I believe it enhances children's problem-solving skills. T8: It helps children become more practical in solving problems.
	Generating alternative solutions (n = 7)	T2: It helps children generate different ways of solving problems. T3: They learn to solve problems using different approaches. T6: It strengthens their ability to generate alternative solutions.
	Solving problems through trial and error (n = 4)	T3: They continue thinking without giving up by using trial and error. T6: They develop solutions through trial and error. T11: They engage in trial-and-error processes while attempting to develop strategies.
	Development of strategic thinking (n = 3)	T4: They have to choose the best option.
	Promoting logical thinking (n = 1)	T6: It strengthens children's logical thinking skills.
	Recognizing problems (n=1)	T9: Concrete activities help children recognize and understand problems more effectively.
	Development of analytical skills (n=1)	T7: It would be beneficial if it included the sub-processes of problem-solving skills.

*Participants provided more than one answer.

As shown in Table 2, participants believed that verbal intelligence games made positive contributions to children's problem-solving skills. Specifically, they stated that VIG enhanced children's problem-solving skills, supported the generation of alternative solutions, and encouraged problem-solving through trial and error.

Results for Research Question 3

The analysis explored participants' perspectives on the extent to which verbal intelligence games enhance children's motivation and academic achievement. The results obtained in relation to the third research question are reported in Table 3.

Table 3. Participants' views on the effect of VIG on motivation and academic achievement

Theme	Code (n)	Teacher Quotations
Motivation and academic achievement	Increasing motivation (n = 11)	T5: It increases their motivation. T6: It significantly enhances motivation. T10: I believe it increases their motivation.
	Increasing academic achievement (n = 11)	T2: It makes a positive contribution to learning achievement. T3: It positively affects their academic success. T10: I believe it improves their academic achievement.
	Not improving motivation (n = 1)	T9: I do not think it increases their motivation very much.

*Participants provided more than one answer.

As shown in Table 3, participants believed that verbal intelligence games had positive effects on children's motivation and academic achievement. However, one participant indicated that VIG would not have a significant effect on children's motivation.

Results for Research Question 4

To address the fourth research question, participants' general perceptions of the implementation of VIG in education were examined. Table 4 presents the findings associated with the fourth research question.

Table 4. Participants' views on the Use of VIG in education

Theme	Code (n)	Teacher Quotations
Views on the Use in Education	Supporting learning (n = 5)	T2: I find the use of verbal intelligence games in education beneficial. When used with appropriate content and duration, they support learning.
	Supporting cognitive development (n = 3)	T10: I believe they positively contribute to children's cognitive development while keeping pace with the modern era.
	Increasing interest in lessons (n = 3)	T5: I think they increase students' interest in lessons.
	Providing an enjoyable learning experience (n = 2)	T6: These games make traditional teaching methods more enjoyable and interactive.
	Learning through play (n = 2)	T3: They attract children's attention because they promote learning through play.
	Integrating theory with practice (n = 1)	T7: They help reinforce the theoretical knowledge learned in class through practical application.
	Providing diverse learning experiences (n = 1)	T1: I believe that well-planned activities and games provide children with different learning experiences.
	Enhancing reasoning skills (n = 1)	T11: Intelligence games support skills such as comprehension, attention, interpretation, and reasoning.
	Supporting personalized learning (n = 1)	T6: They allow each child to progress at their own pace.
	Keeping pace with the digital age (n = 2)	T8: Positive outcomes can be achieved by helping children adapt appropriately to the age of technology.
	Inadequate infrastructure (n = 2)	T7: Internet infrastructure deficiencies in rural schools can hinder implementation.
	Screen time concerns (n = 1)	T6: Attention should be paid to issues such as screen time and educational quality.
	Differences in school resources (n = 1)	T12: Their use would certainly be beneficial in schools with adequate resources.

*Participants provided more than one answer.

As presented in Table 4, participants expressed diverse views regarding the use of VIG in education. Participants indicated that the use of VIG supported learning, promoted cognitive development, increased students' interest in lessons, and provided an enjoyable learning environment. In addition, they emphasized that the use of VIG might pose challenges, including inadequate infrastructure, increased screen time, and disparities in educational resources across schools.

Table 5. Participants' views on the contributions of VIG to children's learning processes

Theme	Code (n)	Teacher Quotations
Contributions to Children's Learning Processes	Supporting personalized learning (n = 5)	T6: They accommodate different learning styles (visual, auditory, and kinesthetic).
	Facilitating learning (n = 5)	T5: They help children learn concepts more easily.
	Making learning enjoyable (n = 5)	T8: They make learning more enjoyable and easier.
	Extending attention span (n = 3)	T3: Children can sustain their attention for longer periods.
	Increasing classroom participation (n = 3)	T2: It increases children's participation in classroom activities.
	Learning through play (n = 1)	T3: Children learn without realizing it while playing.
	Providing opportunities for repeated practice (n = 1)	T6: They increase opportunities for repeated practice.
	Providing immediate feedback (n = 1)	T6: Through immediate feedback, children can quickly learn from their mistakes.
	Developing problem-solving skills (n = 1)	T4: It helps children acquire problem-solving skills.
	Enhancing critical thinking (n = 1)	T10: It enhances children's critical thinking skills.
	Concretizing abstract concepts (n = 1)	T6: Abstract concepts become more concrete.
	Supporting adaptation to technology (n = 1)	T7: Technology use should begin in early childhood.
	Development of collaboration skills (n = 1)	T11: It fosters collaboration and self-motivation.
	Development of self-regulation skills (n = 1)	T11: It makes a significant contribution to children's social-emotional development.
	Supporting social-emotional development (n = 1)	

*Participants provided more than one answer.

As shown in Table 5, the majority of participants reported that VIG supported personalized learning, facilitated learning, created an enjoyable learning environment, and improved children's attention spans.

Table 6. Participants' views on the challenges encountered during the use of VIG

Theme	Code (n)	Teacher Quotations
Challenges	Infrastructure problems (n = 4)	T7: Technical infrastructure deficiencies need to be addressed.
	Lack of age-appropriate content (n = 3)	T1: The activities generated are not appropriate for the children's age group.
	Overcrowded classrooms (n = 2)	T4: It is difficult to reach every child in overcrowded classrooms.
	Risk of addiction (n = 4)	T9: Time limits should be imposed because these games may become addictive.
	Lack of in-service training (n = 2)	T7: In-service training should be provided on a regular and systematic basis.

*Participants provided more than one answer.

As presented in Table 6, teachers reported encountering various challenges during the implementation of verbal intelligence games. According to the participants, the most frequently reported challenges included inadequate technological infrastructure, a lack of age-appropriate content, overcrowded classrooms, and the risk of technology addiction associated with verbal intelligence games. These findings suggest that strengthening technological infrastructure, developing age- and developmentally appropriate content, and carefully planning the implementation process from a pedagogical perspective are essential for the effective integration of verbal intelligence games into educational settings.

Table 7. Teachers' suggestions regarding the use of VIG

Theme	Code (n)	Teacher Quotations
Suggestions	Development of age-appropriate content (n=6)	T2: Age-appropriate content should be selected. T3: The content should be appropriate for children's age and developmental level.
	Implementation under teacher supervision (n=4)	T2: They should be used under the guidance of teachers.
	Providing in-service training (n=3)	T6: Training programs should be provided for teachers.
	Aligning with the curriculum (n=3)	T5: They should be selected in accordance with the intended learning outcomes. T6: The content should align with the curriculum and be associated with learning objectives.
	Providing technical infrastructure (n=2)	T7: The necessary technological infrastructure should be provided in schools.
	Providing personnel support (n=1)	T4: There should be an assistant in the classroom.
	Ensuring controlled use (n=3)	T5: They should be used in a controlled manner. T10: Simple, clear, and short-duration games should be preferred.

*Participants provided more than one answer.

As shown in Table 7, teachers offered several recommendations regarding the implementation of VIG in educational settings. They emphasized that verbal intelligence games should be appropriate for students' developmental levels, aligned with the curriculum, implemented under teacher supervision, and supported through systematic in-service teacher training.

Discussion and Conclusion

To address the first research question, the study examined teachers' perceptions of how VIG contributed to the development of children's scientific reasoning and reasoning skills. The findings revealed that teachers believed VIG had positive effects on children's scientific reasoning and reasoning skills. Teachers further stated that, in addition to enhancing reasoning and scientific reasoning skills, VIG were beneficial for developing a range of higher-order cognitive skills, including establishing cause-and-effect relationships, scientific process skills, logical thinking, and analytical thinking. A review of the literature indicates that several studies have reported the positive effects of mind and intelligence games on reasoning and scientific reasoning skills (e.g., Bertizlioğlu, 2025; Bottino et al., 2009; Çetin & Özbuğutu, 2020; Kurbal, 2015; Reiter et al., 2014). The present findings extend the existing literature by providing additional evidence that VIG can effectively support the development of reasoning skills. For instance, Sulaiman and Amin (2026) reported that game-based activities support the development of individuals' reasoning skills. Similarly, Taş and Yöndemli (2018) found that intelligence games make a meaningful contribution to enhancing mathematical reasoning skills. In addition, Aslan Sürek and Özdemir (2025) found that the implementation of VIG resulted in significant improvements in the reasoning skills of seventh-grade students. Likewise, Baki (2022) reported comparable findings, providing further evidence of the effectiveness of intelligence games in promoting reasoning-related competencies. Overall, these findings suggest that intelligence games can positively contribute to the development of reasoning skills. The findings of the present study are consistent with those reported in the existing literature.

The second research question examined teachers' views regarding the contribution of VIG to the development of children's problem-solving skills. The results showed that participants viewed VIG as a valuable tool for supporting the development of children's problem-solving skills. A review of the literature likewise demonstrates that mind and intelligence games have positive effects on problem-solving skills (e.g., Daştan & Ezberci Çevik, 2025; Güneş, 2024). According to Çetin and Özbuğutu (2020), VIG positively influence the development of problem-solving skills. These games are widely regarded as instructional activities that encourage individuals to analyze problems, generate appropriate solutions, and make timely and accurate decisions (MoNE, 2013). Özdevecioğlu and Hark Söylemez (2021) examined postgraduate theses on intelligence games in Türkiye. They found that most studies focused on improving problem-solving skills, with consistent evidence supporting the positive effects of these games. Similarly, Özen (2023) investigated the impact of mind and intelligence games on students' problem-solving skills and concluded that these games significantly enhanced problem-solving abilities. Furthermore, several studies have shown that incorporating mind and intelligence games into early childhood education plays an important role in improving children's problem-solving skills (e.g., Güngör & Tuğrul, 2020; Şahin & Tezci, 2023). Therefore, the findings of the present study are consistent with those reported in the existing literature.

The third research question focused on teachers' perspectives regarding the role of VIG in supporting children's motivation and academic achievement. The findings indicated that teachers believed VIG had positive effects on children's motivation and academic achievement. A review of the literature reveals several studies reporting that mind and intelligence games improve students' academic achievement and motivation (e.g., Budak & İflazoğlu Saban, 2023; Kel & Kul, 2021). Evidence provided by İşçi and Yeşiltaş (2020) indicates that digital games can facilitate improved academic outcomes by fostering students' motivation and increasing their interest in learning. Similarly, Güneş (2024), in a study examining teachers' perspectives, found that teachers believed intelligence games positively contributed to children's motivation. Borçin Gökçe et al. (2023) investigated the effects of mind and intelligence games on primary school students' academic achievement and concluded that playing these games significantly improved academic performance. Likewise, Sinan Köşker et al. (2025) emphasized that mind and intelligence games contributed to improving children's academic achievement. Overall, the findings of the present study are consistent with those reported in the existing literature.

The fourth research question examined teachers' general views regarding the use of VIG in educational practice. The findings indicated that teachers believed VIG supported learning, promoted cognitive development, increased students' interest in lessons, facilitated personalized learning, provided an enjoyable learning environment, helped sustain students' attention, and encouraged classroom participation. Furthermore, teachers reported that the implementation of VIG might also give rise to several challenges, including inadequate infrastructure, a lack of age-appropriate content, overcrowded classrooms, and the risk of game addiction. In addition, teachers emphasized that VIG should be implemented under teacher supervision, accompanied by systematic in-service training for teachers, and supported by the development of age-appropriate instructional content. A review of the literature shows that several studies have examined perspectives on the use of artificial intelligence-supported mind and intelligence games in educational settings (e.g., Alaswad & Nadolny, 2015; Mansur, 2025; Sulaiman & Amin, 2026). Terzi and Erdoğan (2021) reported that teachers regarded intelligence games as beneficial instructional tools. Furthermore, previous research has demonstrated the educational benefits of intelligence games. For example, intelligence games have been shown to promote cognitive and mental development, while Güneş and Güneş (2024) reported improvements in students' attention, multidimensional thinking, collaborative learning, and social interaction. The consistency between these findings and those of the present study further strengthens the growing body of evidence supporting the educational value of intelligence games.

In summary, this study is expected to contribute to the existing literature by highlighting the potential contributions of verbal intelligence games to children's scientific reasoning, problem-solving skills, motivation, and academic achievement. Furthermore, the findings suggest that VIG may support the development of higher-order cognitive skills, including establishing cause-and-effect relationships, analytical thinking, generating alternative solutions, and problem-solving. The study also provides

valuable insights by identifying potential challenges associated with the implementation of VIG, such as inadequate infrastructure, a lack of age-appropriate content, and overcrowded classrooms. Accordingly, this study extends the limited literature on the use of VIG in children's educational processes and provides a foundation for future research.

Limitations and Recommendations

This study has several limitations. First, the study was limited to preschool teachers' perspectives regarding VIG. This constitutes the primary limitation of the present study. Therefore, future research could include teachers from different educational levels and disciplinary areas to examine whether similar findings emerge across educational contexts. The second limitation concerns the study's focus on the variables examined. Specifically, this research explored teachers' perceptions of children's scientific reasoning, problem-solving skills, motivation, and academic achievement rather than directly measuring these outcomes. Therefore, further research using experimental and longitudinal designs is needed to provide a more comprehensive understanding of the effects of VIG on these outcomes and how such effects may develop over time. Furthermore, studies examining the relationship between VIG and higher-order cognitive skills, such as establishing cause-and-effect relationships and analytical thinking, could be included.

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