

The Role of Game Technologies in the Development of Cognitive Skills

Zulfiyya Yolchiyeva 

Abstract. Children's games occupy a fundamental place in child development, education, and personality formation. Through play, the child acquires necessary behaviors and skills. A child's personality is most vividly expressed and developed during play. Games influence children physically, socially, mentally, psychologically, and emotionally, playing a crucial role in their overall growth. Play is an experiential process through which future behavioral patterns are acquired. Research demonstrates that motor and sports games are of great importance in developing qualities such as physical and emotional endurance in children. Physical endurance helps the child resist fatigue that arises after prolonged play. Emotional endurance, on the other hand, supports the child in coping with difficult situations in later life, maintaining composure, avoiding irritability, and, most importantly, safeguarding health. Experts believe that diverse physical activities, motor and entertaining games should be conducted at appropriate tempos, taking into account the educational environment. In such cases, both instructors and learners must feel a sense of responsibility. Without this, successful outcomes cannot be expected. When students understand their responsibility in training, their cognitive activity increases. This directly fosters a conscious approach to learning, analytical thinking, and the ability to draw conclusions. The material presented is better understood, and serious efforts are made to retain it in memory. The conscious assimilation of learning plays an important role in children's moral and psychological development. The integrated use of the above-mentioned components is considered one of the key conditions for achieving success in education. Play contributes not only to children's physical development but also to the formation of aesthetic taste and the development of emotions, which, in turn, enhances higher brain functions.

Keywords: motor games, intellectual skills, thinking, mental activity, cognitive education, social and psychological growth

Azerbaijan Sports Academy, PhD Student, Baku, Azerbaijan

E-mail: zulfiyya.yolchuyeva@sport.edu.az

Received: 14 March 2026; Accepted: 19 June 2026; Published online: 30 August 2026

© The Author(s) 2026. This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

Əqli bacarıqların inkişafında oyun texnologiyalarının rolu

Zülfiyyə Yolçiyeva 

Xülasə. Uşaq oyunları uşağın inkişafında, təhsilində və şəxsiyyətinin inkişafında əsaslı yer tutur. Uşaq lazımi davranışı, bacarıqları oyun zamanı öyrənir. Uşağın şəxsiyyəti oyun zamanı daha çox ortaya çıxır və inkişaf edir. Oyunlar uşağın fiziki, sosial, zehni, psixoloji və emosional cəhətdən təsir edir, inkişafında mühüm rol oynayır. Oyun bir təcrübədir. Gələcək davranış formaları oyunla əldə edilir. Araşdırmalar onu göstərir ki, uşaqlarda fiziki və emosional dözümlülük kimi keyfiyyətlərin

inkişafında mütəhərrik və uşaq idman oyunlarının əhəmiyyəti çox böyükdür. Fiziki dözümlülük uşağa hər hansı bir uzunmüddətli oyundan sonra baş verən yorğunluğa müqavimət göstərməyə kömək edir. Emosional dözümlülük isə uşağa gələcək həyatında qarşılaşacağı çətin şəraitə dözməyə, təmkinliliyini qoruyub saxlamasına, əsəbləşməməsinə və ən əsası, sağlamlığına çox yaxşı kömək edir. Mütəxəssislər hesab edirlər ki, müxtəlif növ, rəngarəng fiziki hərəkətlər, mütəhərrik və əyləncəli oyunlar lazımi templərdə, tədris şəraiti nəzərə alınmaqla keçirilməlidir. Bu zaman həm öyrədən, həm də öyrənənlər məsuliyyət hiss etməlidirlər. Belə olmasa, həmin təlimin uğurlu nəticəsindən danışmaq olmaz. Təlimdə məsuliyyət daşdığını anlayan hər bir şagirdin idrak fəallığı da yüksəlir. Bu isə birbaşa təlimə şüurlu yanaşmanı, düşünərək təhlillər aparmanı, müəyyən qənaətə gəlməni təmin edir. Şərh olunanlar daha yaxşı qavranılır, yadda saxlamağa ciddi səy göstərilir. Təlimin şüurlu surətdə qavranılması uşaqların mənəvi və psixoloji hazırlığında mühüm rol oynayır. Yuxarıda sadalanan komponentlərdən kompleks istifadə olunması təlimdə nailiyyət qazanılmasında ən başlıca şərtlərdən sayılır. Oyun yalnız uşaqların fiziki hazırlığına deyil, o, həm də estetik zövqün yaranmasına, hisslərin inkişafına kömək edir ki, bu da baş beyin ali hisslərinin fəaliyyətini gücləndirir.

Açar sözlər: mütəhərrik oyunlar, intellektual bacarıqlar, təfəkkür, zehni fəaliyyət, əqli tərbiyə, sosial və psixoloji inkişaf

Azərbaycan İdman Akademiyası, doktorant, Bakı, Azərbaycan

E-poçt: zulfıyya.yolchuyeva@sport.edu.az

Daxil oldu: 14 Mart 2026; Qəbul edildi: 19 İyun 2026; Onlayn dərc edildi: 30 Avqust 2026

© Müəllif(lər) 2026. Bu açıq girişli məqalə Creative Commons Attribution–NonCommercial 4.0 Beynəlxalq Lisenziyasının (CC BY-NC 4.0) şərtlərinə uyğun olaraq yayımlanmışdır.

Introduction

The formation of young people should encompass not only physical development but also intellectual and psychological aspects. Intellectual preparation is a vital component of overall development. By *cognitive education* we mean the acquisition of knowledge, intellectual skills, and habits; the development of thinking and cognitive qualities; and the formation of cognitive motives. Intellectual qualities are not equally developed in all students. Therefore, the study of intellectual qualities under different educational conditions or through various experiences is of great importance. Intellectual qualities are sometimes referred to as individual differences in the sphere of thinking or mental activity. In other words, differences in intellect, thought, and mental activity are expressed through intellectual qualities (Bayramov, 1967).

Intellectual skills are numerous

They can be grouped into general skills, skills necessary for organizing mental activity, and specific skills related to particular subjects. The brain is one of the primary organs that governs human activity. Intelligence is the product of the human brain. Individuals possessing intellectual skills hold a powerful advantage over their competitors. They can foresee potential challenges in time and prepare countermeasures. But what is *thinking*? Thinking is a complex cognitive process consisting of the generalized and mediated reflection of lawful connections and relationships between objects and phenomena. Unlike other cognitive processes, thinking reflects the internal connections and essence of objects and phenomena. Without it, understanding the external world and utilizing its regularities would be impossible (Bayramov, 1967). Thinking and cognitive skills are interrelated concepts. The expansion and improvement of knowledge are realized through a conscious approach to learning, active participation, and a creative attitude in the execution of assigned tasks (Majidov, 2018).

Methods

This study employed a qualitative literature review methodology. Scientific articles, books, reports, and other academic publications related to the research topic were collected from internationally recognised academic databases, including Scopus, Web of Science, as well as other reliable scholarly sources. The literature was selected based on its relevance to the research topic, scientific credibility, and theoretical contribution. The collected literature was analysed using descriptive, comparative, and critical analysis methods. The main findings, theoretical perspectives, and existing research gaps identified in previous studies were systematically examined and synthesised. Based on this synthesis, the conceptual approach underpinning the present study was developed.

Results

The development of children's thinking and cognitive skills is of great importance in the teaching–learning process, and this can be achieved through various game technologies. The term “game” is multifaceted and historically unstable. It serves as a manifestation of different activities, events, and sometimes even imaginary representations applied conditionally (Alekperov et al., 2006). In the process of physical education, the game method is used not only for the initial teaching of movements or for targeted influence on specific abilities, but also for the comprehensive improvement of motor activity under more challenging conditions (Nasrullayev et al., 2012). The use of board games in the classroom has significantly strengthened students' cognitive skills, social interactions, and learning motivation (Vita-Barrull et al., 2024).

Games are generally conducted in conditions of intense competition. Children chase, run, jump, hop, crawl, and search. In doing so, they acquire qualities such as attention, perception, hearing, vision, quickness, agility, endurance, determination, perseverance, and more. Over time, these qualities develop and improve, laying the foundation for the formation of an active character. Such volitional qualities are necessary for children in competitions, education, labor, and military service. In games such as “*Defense of the Fortress*,” “*Capture of the Fortress*,” “*Border Guards*,” “*Partisans*,” and “*Target Shooting*,” children act precisely and strive to defeat their opponents. These games instill feelings of love for the homeland, the people, and the army. At the same time, they inspire children toward the ideal of martyrdom and encourage them to struggle for the integrity and indivisibility of their land, motivating them to liberate occupied villages, towns, and districts from enemy control (Guliyev, 2011).

Cognitive education does not end with enriching schoolchildren with special knowledge, skills, and habits. It also plays an important role in developing intellectual qualities, attention, and memory, as well as increasing cognitive activity. In the teaching process, it is necessary to plan for the development of analytical skills, independent conclusions, and generalizations, and to make wide use of opportunities to foster these qualities (Qurbanov et al., 2006). Research shows that motor and children's sports games play a significant role in developing qualities such as physical and emotional endurance. Physical endurance helps children resist fatigue that occurs after prolonged play. Emotional endurance, in turn, assists children in coping with difficult situations they may face in later life, maintaining composure, avoiding irritability, and, most importantly, preserving their health.

Experts believe that diverse physical activities, motor and entertaining games should be conducted at appropriate tempos, taking into account the educational environment. In such cases, both instructors and learners must feel a sense of responsibility. Without this, successful outcomes cannot be expected. When students understand their responsibility in training, their cognitive activity increases. This directly fosters a conscious approach to learning, analytical thinking, and the ability to draw conclusions. The content taught is better comprehended, and students make serious efforts to retain

it. Conscious assimilation of training plays a significant role in children's moral and psychological preparation. The integrated use of the components mentioned above is considered one of the key conditions for achieving success in education (Ahmadov, 2015). Sport, as an inseparable component of a healthy lifestyle, plays an important role in modern life, where science and technology are rapidly advancing. A sedentary lifestyle negatively affects our health, making physical activity essential. Specialists also emphasize that sport positively influences mental abilities. Scholars conclude that physical education helps increase serotonin levels.

Researchers at the University of Illinois in the United States have confirmed that physical exercise positively affects children's intelligence. They reported that exercise increases the amount of white matter in the brain. For example, studies of brain images of some children aged 9–10 revealed that those engaged in sports had more white matter compared to others. According to scientists, this substance strengthens memory in different regions of the brain and enhances certain personal skills. These findings once again prove that sport and physical education, regardless of age, should become part of everyone's lifestyle. Health is the fundamental condition for living in society and contributing to it. Therefore, the physical and moral education of children and youth, and the upbringing of a healthy young generation, are among the main priority tasks of our state (Hajiyeva, 2015).

Motor games teach children to comprehend objects and events comprehensively, clearly, and accurately in all their interrelations. They provide children with new knowledge and impressions about the environment and encourage them to be observant. During play, children mentally grasp the appropriate sequence of perception. For example, in the game *"Run Around the Circle"* (*"Elimination Game"*), children listen carefully to the leader's explanation, understand how the game is played, and observe the rolling of the ball, its falling into a pit, and its passing to players or the team captain. As is well known, the completeness, clarity, and accuracy of perception are closely linked with attention, observation, and memory. Attention depends on the content and duration of the game. *Systematic reviews confirm that motor skill-oriented physical activity interventions strongly support the development of preschoolers' cognitive and academic skills* (Jylänki et al., 2022).

In grades X–XI, during physical education classes, there are boys and girls whose attention is easily distracted, who cannot focus on important goals and tasks, and who lack the habit of doing so. As a result of inattentiveness, accidents occur during movements and games—students often fall and sustain serious injuries. This usually happens due to excessive play and fatigue or failure to follow safety rules. All these factors negatively affect the effectiveness of physical training. Teachers must remember that games and movements involve physical load, and failure to provide load in accordance with appropriate norms leads to fatigue, distraction, and a decline in students' active participation. Therefore, taking into account each student's psychological and individual characteristics during games and movements positively influences overall educational outcomes and raises the level of teaching and upbringing. Forcing students to engage in games and movements through lengthy narration and explanation is not sufficiently effective.

Secondary school students are able to grasp teaching materials related to physical movements and games more effectively with the help of sensory organs such as sight and hearing. Through motor sensations, they quickly acquire the ability to comprehend the techniques and tactics of movements and games. Therefore, it is highly beneficial to develop in students the ability to independently observe their own movements and games. Experience shows that in upper grades, complex and unfamiliar movements and games are understood only through repetition. Difficult motor and game materials, when taught in parts and repeated, become more deeply rooted in the corresponding motor centers of the brain, thereby accelerating the process of assimilation. During the period of secondary education, memory is sufficiently developed, but there remains a great need to further strengthen and

enhance it. For this reason, special attention should be paid to memory development during instruction (Guliyev, 2011).

Above all, movements that restore or develop memory should be included in teaching materials. In addition, the details of movements and the techniques and tactical situations of sports games should be instilled as habits in students. Finally, movements should be performed until they are fully assimilated, and games should be repeated until students master the techniques perfectly. Strengthening and developing students' memory requires consistent and systematic adherence to the pedagogical and psychological factors mentioned above, rather than occasional application.

Discussion and Conclusion

In addition to its educational significance, play also has vital pedagogical benefits. In the learning process, children's composure, patience, and endurance positively influence its effectiveness. Play is considered an invaluable means of strengthening children's willpower. During games, children must exert serious motor effort to achieve the set goals and tasks, making purposeful use of their activity. For this reason, they must throw the ball accurately to the desired place, score goals when necessary, build strong defenses against opponents' attacks, and sometimes launch powerful, fast, agile, and unexpected combinations to defeat the opposing team and gain points. Victory can only be achieved through effort and determination. The ability to gather all efforts and direct them toward a goal is a sign of strong willpower and other motor abilities (Guliyev, 2011).

Azerbaijani national games are invaluable treasures from the perspectives of intellectual, physical, moral, aesthetic, ecological, economic, and labor education (Hashimov & Sadiqov, 1993). Examples include *"Beat the Drum, Step Aside," "Violet, Fall into the Trap," "Samandar, Oh Samandar," "My Hand Was Cut by a Knife," "Beautiful Name," "Wolf and Shepherd,"* and others. Games are one of the genres that reflect various aspects of people's lives—stages of development, early living conditions, beliefs and traditions, and the world of rituals (Nabiyev, 1988). There are dozens, even hundreds, of games for children, adolescents, youth, girls, brides, and elderly men and women (Sultanli, 1969).

Play is a vital means of ensuring children's health, physical readiness, and development, while also enhancing the functioning of the organism. Beyond physical preparation, play contributes to the formation of aesthetic taste and the development of emotions, which strengthens the activity of higher brain functions. Play improves children's mood and increases their emotionality. All of this positively influences the correct execution of physical movements and the fulfillment of assigned tasks. The findings of this study confirm that sport and motor games are indispensable components of education and upbringing. They not only strengthen physical health but also enhance intellectual, psychological, and social development. Through play, children acquire essential qualities such as perception, attention, memory, analytical thinking, and willpower, which directly influence their academic success and personal growth.

Properly organized games foster discipline, perseverance, and patriotism, while also serving as a means of emotional resilience and social integration. Research evidence demonstrates that physical activity improves brain function, strengthens memory, and supports cognitive skills, thereby ensuring holistic child development. Therefore, integrating motor games and physical education into the teaching-learning process is crucial for nurturing a healthy, intellectually capable, and socially responsible young generation. Play must be regarded not only as entertainment but as a vital pedagogical strategy that shapes the future of children and society.

References

- Ahmadov, A. (2015, February 20–23). Achieving success in the field of physical education largely depends on its effective organization. *Olympic World Newspaper*, p. 7.
- Alekperov, H. Y., Namazova, A. H., Guliyev, E. R., & Salmanov, Ch. I. (2006). *Motor games*. Bayramov, A. (1967). *The developmental characteristics of intellectual qualities in students*. Maarif Publishing.
- Guliyev, B. (2011). *Motor and entertaining games*. ADPU Publishing.
- Hajiyeva, S. (2015, May 15–18). Physical activity as an indispensable means of promoting the physical and moral development of children and youth. *Olympic World Newspaper*, p. 7.
- Hashimov, A., & Sadiqov, F. (1993). *Anthology of Azerbaijani folk pedagogy*.
- Jylänki, P., Mbay, T., Hakkarainen, A., Sääkslahti, A., & Aunio, P. (2022). The effects of motor skill and physical activity interventions on preschoolers' cognitive and academic skills: A systematic review. *Preventive Medicine*, 155, 106948. <https://doi.org/10.1016/j.ypmed.2021.106948>
- Majidov, N. B. (2018). *Theory and methodology of physical education: Part I*. Muallim Publishing.
- Nabiyev, A. (1988). *Folk songs and games*. Azerbaijan State Publishing.
- Nasrullayev, M., Huseynov, E., Aliyev, I., & Nuriyev, Y. (2012). *Theory and methodology of physical education*. Araz Publishing.
- Qurbanov, H. H., Asgarov, A. Y., & Ramazanov, A. Kh. (2006). *Theory and methodology of physical education*. Avropa Publishing.
- Sultanli, A. (1969). *From the history of the development of Azerbaijani dramaturgy*.
- Vita-Barrull, N., Estrada-Plana, V., March-Llanes, J., Sotoca-Orgaz, P., Guzmán, N., Ayesa, R., & Moya-Higueras, J. (2024). Do you play in class? Board games to promote cognitive and educational development in primary school: A cluster randomized controlled trial. *Learning and Instruction*, 93, 101946. <https://doi.org/10.1016/j.learninstruc.2024.101946>