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Aplicações Tecnológicas

Teaching chess as a pedagogical tool for schoolchildren

O ensino do xadrez como ferramenta pedagógica no contexto escolar

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ABSTRACT

Chess evolution is marked by historical events and great players, whose contribution have consolidated the game as one of the most complex and strategic in the world. The game requires the player to have a vision of the board as a whole, predicting moves and seeking the best combinations in order to achieve the goal, checkmate. Studies show that playing board games, including chess, provides benefits such as developing logical reasoning, increasing attention and long-term benefits in the educational process. The main objective of this project is to promote the practice of chess among children and adolescents from schools in the city of Cachoeira do Sul. Each semester, the project visits a specific school and the methodology applied is based on weekly meetings lasting two hours, divided in a theoretical stage and a practical stage. The theoretical covers topics such as the origin of chess, the particularities of the pieces and tactics. The practical consists of applying the concepts discussed, through games between participants, solving exercises and debates on strategic variants. In addition to activities at schools, weekly meetings are held on the campus of the Universidade Federal de Santa Maria (Federal University of Santa Maria, UFSM) – Cachoeira do Sul, involving students and teachers and following the same methodology used in schools. It is concluded that chess is a pedagogical tool with great potential, capable of promoting the cognitive and social development of students. The game develops interpersonal relationships, contributing for a more collaborative and inclusive school environment.

Keywords: Chess, Education; Logical reasoning; Cognitive development

RESUMO

A evolução do xadrez é marcada por eventos históricos e grandes jogadores, cuja contribuição consolidou o jogo como um dos mais complexos e estratégicos do mundo. O jogo exige que o jogador tenha uma visão do tabuleiro como um todo, prevendo movimentos e buscando as melhores combinações para atingir o objetivo, o xeque-mate. Estudos mostram que a prática de jogos de tabuleiro, incluindo o xadrez, proporciona benefícios como o desenvolvimento do raciocínio lógico, aumento da atenção



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e benefícios a longo prazo no processo educacional. O principal objetivo deste projeto é promover a prática do xadrez entre crianças e adolescentes de escolas da cidade de Cachoeira do Sul. A cada semestre, o projeto visita uma determinada escola e a metodologia aplicada baseia-se em encontros semanais com duração de duas horas, divididos em uma etapa teórica e uma etapa prática. A teórica aborda temas como a origem do xadrez, as particularidades das peças e táticas. A prática consiste na aplicação dos conceitos discutidos, por meio de jogos entre os participantes, resolução de exercícios e debates sobre variantes estratégicas. Além das atividades nas escolas, encontros semanais são realizados no campus da Universidade Federal de Santa Maria – Cachoeira do Sul, envolvendo alunos e professores, seguindo a mesma metodologia utilizada nas escolas. Conclui-se que o xadrez é uma ferramenta pedagógica com grande potencial, capaz de promover o desenvolvimento cognitivo e social dos alunos. O jogo desenvolve as relações interpessoais, contribuindo para um ambiente escolar mais colaborativo e inclusivo.

Palavras-chave: Xadrez; Educação; Raciocínio lógico; Desenvolvimento cognitivo

1 INTRODUCTION

The chess game, considered one of the most complex and strategic recreational activities, is widely recognized for its positive impact on the cognitive and social development of individuals^[6]. Its dynamics, which involve a dispute between two players seeking checkmate, requires a deep reflection on the positions of the pieces and the anticipation of moves, stimulating logical reasoning, critical thinking and decision-making skills. However, chess goes beyond a simple board game; it is configured as a pedagogical tool that improves the development of skills such as concentration, planning and problem-solving, contributes significantly to the learning of children and adolescents.

Academic studies corroborate the positive impact of chess on development of cognitive and social skills. In early childhood education, the game helps children to manipulate materials, socialize and develop confidence in their abilities, factors that facilitate the assimilation of academic contents^[2]. In addition, playing chess in specific classes contributes the improvement of cognitive skills, such as focus, memory and logical reasoning^[1]. In India, it was found that sixth-grade children from rural areas showed improved academic performance in social studies, English and science after a year of chess activities^[4]. Sala and Gobet^[5] have shown that chess programs in school contexts induce significant gains in academic performance,

especially in mathematics and reading. The game offers an environment in the zone of proximal development, where more experienced peers can collaborate in solving complex problems.

Therefore, this study encourages the practice of chess among children and adolescents at schools in the city of Cachoeira do Sul. We verify the impact of chess on children evolution and their involvement in the activity. In addition to the activities in schools, weekly meetings were held at Federal University of Santa Maria, Cachoeira do Sul campus (UFSM-CS), involving students and professors. We describe the methodology and the schools visited by the project and its development since the beginning of its implementation in 2017. Section 2 describes the methodology for carrying out the activities. Section 3 discusses the observed results. Conclusions are made in section 4.

2 METHODOLOGY

Our goal is to encourage children and teenagers to play chess. Since 2017, the project has been implemented in schools in Cachoeira do Sul, with weekly meetings. Each cycle of activities has a period of three months, with two-hour meetings. The activities are structured into two parts: the first, dedicated to the introduction and presentation of basic chess concepts, and the second, focused on free play, where participants have the opportunity to apply the knowledge acquired. The project has a vast collection of boards and books specialized in teaching chess, used in the development of the activities and also borrowed to students. Among the teaching materials, the books by Giusti [3] and Zlotnik et al. [8] contribute to the enrichment of the teaching-learning process.

The chess game, with its immense strategic complexity and virtually infinite number of possible configurations, offers challenges that encourage the search for optimal solutions. Although absolute mastery of the game is unattainable, at the beginning level it is possible to work with specific situations that encourage



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players to develop efficient combinations of moves to achieve objectives, such as capturing pieces, gaining a positional advantage or achieving checkmate. During the activities, participants are introduced to fundamental topics of the game, including: 1) The historical context and basic rules; 2) Special moves, such as castling, en passant and fianchetto; 3) Concepts of openings and defenses, such as the Ruy Lopez, Sicilian, Pirc and French; 4) Elementary checkmates, with one, two and three moves solutions; 5) Game strategies, focusing on pawn structure and positional evaluation; 6) Endgames, such as queen versus minor pieces, pawn endgames and mate with bishop and knight; 7) Analysis of classic games from chess literature, aiming at tactical and strategic improvement.

3 RESULTS

Below, we present some of the schools visited and the observed results. We have always invited the entire school to participate in the activities. The group at the university is open to everyone who wants to share and play this magnificent game that brings countless benefits to its players.

3.1 Schools Visited by the Project

In the first half of 2017, approximately 25 children, aged between 9 and 12, participated in chess activities at Totem School. Participants were organized into two groups: one in the morning and one in the afternoon. During the activity period, 19 children completed the course satisfactorily, achieving a participation rate of over 75% and demonstrating progress in their chess skills. This result reflects the engagement and progression of the students, who were able to improve their understanding of the game's strategies. In addition, a group was formed at Federal University of Santa Maria, which also meets weekly and continues nowadays, consolidating the project and providing continuity in the development of chess skills (Figure 1).



Figura 1 – Chess at Totem School and at Federal University of Santa Maria

In 2018, the project was implemented at the Rio Jacuí Elementary School, continuing its activities with new classes of children and adolescents. The following year, 2019, the project reached the Antônio Vicente da Fontoura High School, expanding its scope and impacting even more students. In addition, we began to encourage and actively participate in chess tournaments in Cachoeira do Sul and cities around, providing students with the opportunity to apply their knowledge in competitive environments and strengthen their interest in the game (Figure 2).



Figura 2 – Chess games at schools and tournament participation

In 2020 and 2021, due to the COVID-19 pandemic, activities were temporarily suspended. However, to maintain the connection with the game of chess and continue to stimulate the interest of participants, we have organized digital alternatives. We organized remote meetings, bringing together students from previous years for online activities. Each meeting was structured into two parts: the first, held through presentations on Google Meet, addressing chess concepts, followed by a chess tournament in a online platform, where participants were able to apply the knowledge acquired in a virtual competitive environment.

In 2022, the project returned to face-to-face meetings, with the participation of 20 students from the sixth to ninth grades of Antonio Vicente ds Fontoura school. Around 11 had an attendance rate of over 75% in the meetings, demonstrating the continuous engagement of the participants. In 2023, the project was implemented at the Borges de Medeiros Basic Education School, with a total of 19 participants, of which 10 demonstrated a more active participation in the proposed activities (Figure 3). In both schools, at the end of the cycle of activities, a get-together was organized, accompanied by a chess tournament.



Figura 3 – Chess lessons and practical activities at Schools

In 2024, the project was expanded to the Liberato Salzano Vieira da Cunha School. Even though we invited the entire school to chess activities, we had low student participation. However, we continued the activities by returning at Totem School , continuing the objective of promoting the chess game as a pedagogical tool for cognitive development and socialization (Figure 4).



Figura 4 – Chess game at Schools as a pedagogical tool



3.2 Project Development

During the weekly activities, our objective was to promote chess for children and adolescents with a deeper understanding of the board, encouraging them to reflect on the reasons behind each move, rather than simply executing random moves. The main objective was to integrate the knowledge acquired in previous meetings, reinforcing concepts and encouraging the practical application of the ideas learned. This process not only encouraged healthy competition, but also fostered cooperation among participants, promoting learning beyond the classroom.

We observed that the young participants quickly learned the game's concepts. Those who initially had difficulty understanding have made significant progress. Even players who had difficulties to understand the game process showed great perseverance, continuing to practice and seek continuous improvement. It is noted that good performance in chess, as in other areas of learning, requires constant dedication, study and practice. Skill, concentration, anticipation, experience, tactics, strategies, patience and calmness are crucial factors for success in the game. The game offers valuable opportunities for social interaction, allowing participants to share ideas, discuss strategies and establish lasting friendships. These interactions are not limited to the board environment; they also contribute to the construction of interpersonal relationships that strengthen the sense of community and collaboration among the young people. In this way, chess is configured not only as an instrument of intellectual learning, but also as a means for developing social skills essential for the formation of citizens.

Furthermore, during the weekly activities, there are countless reports of children who have started playing at home, have taught their classmates and brothers, have left the screens aside and have dedicated themselves to reading a chess book. This can also be observed in the group with students at UFSM-CS, who participate in the weekly activities, strengthen their interpersonal relationships and participate in tournaments in Cachoeira do Sul and cities around.



4 CONCLUSION

Due to the growing problem of excessive screen time among children and adolescents, this project aimed to encourage the practice and study of chess game as an educational and enriching alternative. We aimed to provide participants with an immersive experience that would encourage them to look, listen, read, talk and exchange ideas, promoting a friendly and constructive dispute on the board. Through the implementation and observations made throughout the activities, we can conclude that chess establishes itself as a valuable tool in the cognitive and social development of children and adolescents. While teaching chess to children, we have the opportunity to perceive the difference between the meaning of the game for them and for adults, which reinforces the value of chess as a teaching tool. The game teaches children to solve problems, observing and understanding the reality that presents itself. They begin to understand that every piece has a contribution for the game and do not have absolute values, but rather that it is important to control the position of the pieces, both their own and those of the opponent.

We therefore conclude that chess stands out as an essential ally in both educational and social development. By effectively integrating theory and practice, chess also offered the school community an innovative approach to preparing students to face future challenges with greater strategy, awareness, and resilience.

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