Checkmate for Children: A Review of Supporting Chess in the Classroom

Joseph E. Dib [1]✉, Diana Mats [2]
(1) Division of Psychiatry and Clinical Psychology, School of Medicine, University of Nottingham, Nottingham, United Kingdom
(2) National Pedagogical Dragomanov University, Ukraine

Corresponding Author
✉ joseph.elie.dib@gmail.com

Abstrak

Artikel ini mengeksplorasi manfaat catur, penggunaannya di ruang kelas, dan kepentingan internasionalnya. Catur dikenal untuk meningkatkan kemampuan berpikir kritis, pemecahan masalah, dan pengambilan keputusan pada anak-anak, bersamaan dengan menumbuhkan kepercayaan diri dan ketekunan. Terlepas dari potensinya, implementasi kelas tetap terbatas dan membutuhkan bukti berbasis penelitian untuk menentukan "studi Ideal". Artikel tersebut menilai literatur yang ada tentang manfaat kognitif dan akademik dari instruksi catur dan kehadirannya yang berkembang di ruang kelas di seluruh dunia. Temuan menunjukkan bahwa catur meningkatkan keterampilan matematika, membaca, dan bahasa anak-anak, sekaligus meningkatkan perkembangan sosial dan emosional seperti harga diri, empati, dan kerja sama. Namun, pengujian eksperimental catur di ruang kelas menghadapi keterbatasan. Penelitian di masa depan harus mengatasi kendala ini, mengembangkan alat penilaian dan kelompok kontrol yang andal, menyelidiki efek jangka panjang, dan mengeksplorasi potensi hambatan implementasi. Tinjauan ini menawarkan wawasan dan rekomendasi yang berharga bagi para pendidik dan pembuat kebijakan tentang pentingnya catur secara global dalam meningkatkan perkembangan kognitif, akademik, dan sosial-emosional anak-anak..

Kata Kunci: *Catur*, *Pendidikan*, *Anak-Anak*, *Prestasi*

Abstract

This review article explores the benefits of chess, its use in classrooms, and its international importance. Chess is known to enhance critical thinking, problem-solving, and decision-making skills in children, along with fostering self-confidence and perseverance. Despite its potential, classroom implementation remains limited and requires research-based evidence to determine the "Ideal study." The article assesses existing literature on cognitive and academic benefits of chess instruction and its growing presence in classrooms worldwide. Findings suggest that chess improves children's mathematical, reading, and language skills, while also promoting social and emotional development like self-esteem, empathy, and cooperation. However, experimental testing of chess in classrooms faces limitations. Future research should address these constraints, develop reliable assessment tools and control groups, investigate long-term effects, and explore potential barriers to implementation. The review offers valuable insights and recommendations for educators and policymakers on the global significance of chess in enhancing children's cognitive, academic, and social-emotional development.

Keyword: *Chess*, *Education*, *Children*, *Achievements*

INTRODUCTION

Chess is a strategic board game that has been played for centuries and is widely considered to be one of the oldest and most challenging games in the world (Dangauthier, Herbrich, Minka, &

Graepel, 2007). It has a rich history, with records of the game being played as far back as the 6th century in northern India (Dangauthier et al., 2007). Over the years, chess has spread across the world and has become a popular pastime for people of all ages and backgrounds (Sharples, 2017). In recent years, there has been growing interest in the potential benefits of chess for children's academic performance. This is because research has suggested that playing chess can have a positive impact on several aspects of a child's cognitive and emotional development.

One of the key benefits of chess is its ability to enhance cognitive development in children (Bart, 2014; Joseph, Easvaradoss, Kennedy, & Kezia, 2016; Stegariu, Abalasei, & Stoica, 2022). Studies have shown that playing chess can improve problem-solving skills, concentration, memory, and critical thinking (Adler & Bauch, 2017; Papic, Vukojevic, & Bilbija, 2017). One study by Smith (2000) cited that 120 hours of chess instruction amongst rural African American secondary school children showed that the chess group scored significantly higher in mathematical achievement than the control group. Additionally, another study byKazemi, Yektayar, and Abad (2012) conducted a study on the impact of chess on cognition. The study involved 86 male school-aged students who received chess lessons for six months, while 94 male students were selected as the control group. The participants were randomly selected from 5th, 8th, and 9th grades in schools located in Shanandaj, Iran. Both groups took a metacognitive ability test and a grade-appropriate mathematics exam before and after the intervention. The results showed that the chess group performed better than the control group in both tests. The study concluded that chess instruction has a positive effect on the mathematical abilities and metacognitive capacities of school-aged students.

Additionally, chess has shown to have improved mathematical and cognitive ability in children with learning difficulties based on their intelligence scores (70-85 IQ range) with one study involving four elementary schools in Germany, with classes randomly assigned to either an experimental group that received one hour of chess instruction per week for an entire school year, or a comparison group that received one hour of supplementary mathematics instruction per week. The study found a significant difference in the calculation abilities for simple addition tasks and counting between the two groups. Based on the results, the authors suggested that chess instruction may be beneficial for children with learning disabilities (Scholz et al., 2008). These skills are essential for success in a variety of academic subjects and can help children to perform better in school. In addition to its cognitive benefits, chess has also been shown to improve children's logical skills. The game requires players to think ahead, consider multiple possibilities, and make decisions based on pattern recognition and spatial reasoning (Fink, 2015; Papic et al., 2017). These skills are transferable to other areas, such as mathematics, where they can help children to perform better in class.

Reading skills can also be improved through playing chess. Children who play the game must understand and analyze the rules and strategies of the game, which can help to develop their reading comprehension and analysis skills (Adler & Bauch, 2017). A study conducted by Joseph, Jebasingh, and Vaddadi (2021) had an experimental group consisting of 70 children aged 5-16 train chess once a week for a year (total of around 25-30 sessions) as part of co-curricular school activities and the ANCONVA results showed significant gains in verbal reasoning compared to the control group. The results of the experimental group showing enchanged linguistic intelligence lead to improved communication, critical and analytical scales. Another study conducted by DuCette (2009) was an initial assessment of the Chess Challenge Program, the flagship initiative of ASAP/After School Activities Partnerships. Utilizing a quasi-experimental design with matching, the study compared the academic performance and behavior of chess program participants to a matched control group. The targeted sample comprised 151 students from grades 3 to 8, matched by gender, ethnicity, grade, and school to non-participating students. The data analyzed included PSSA math and reading scores, attendance, and behavior ratings. The findings revealed that ASAP students outperformed the control group in both reading and math on PSSA tests, had fewer absences, and displayed better behavior compared to the broader Philadelphia student population. Further analysis demonstrated that multi-year chess program participants experienced notable improvements in math and reading. Additionally, ASAP students exhibited greater gains in reading and math from the previous school year relative to the control group. Overall, the results strongly support the Chess Challenge Program's positive impact on student achievement and behavior.

Another benefit of chess is its ability to foster creativity in children. The game requires players to think creatively and develop their own unique strategies, which can help to foster their imagination and innovation skills (Adler & Bauch, 2017). Creativity is an umbrella term and a review paper conducted by (Jankovic & Novak, 2019) reported that introducing chess in schools was a significant motivator in ensuring children become successful and these include creative developments in: *Visualization* - Children are encouraged to mentally picture a series of actions before executing them. Strengthening visualization skills involves training them to mentally move the pieces, initially one move ahead and then multiple moves ahead. *Forward Thinking* - Children learn to think before acting, asking themselves, "If I do this, what could happen next, and how should I respond?" Chess aids in cultivating patience and thoughtfulness over time. *Evaluating Options* - Children learn not to act on the first idea that comes to mind but to identify alternatives and assess the advantages and disadvantages of each action. *Concrete Analysis* - Children develop the ability to evaluate the outcomes of specific actions and sequences, determining whether they are beneficial or detrimental. *Decision*-making becomes more logic-driven, rather than impulsive. *Abstract Thinking* - Children learn to step back from details and consider the bigger picture, as well as apply patterns from one context to similar situations. *Strategic Planning* - Children learn to set long-term goals and take steps to achieve them while understanding the need to reassess plans as circumstances change. *Balancing Multiple Factors* - Children are encouraged to consider various aspects simultaneously rather than focusing solely on one, enabling them to weigh multiple factors at once.

In addition, chess can also help children to develop important social and emotional skills. The game is a social activity that requires children to interact and communicate with others, which can help to improve their social skills and teamwork abilities (Adler & Bauch, 2017). Furthermore, playing chess can help children to develop emotional intelligence, as they learn to manage their emotions and respond appropriately to the emotions of others (Adler & Bauch, 2017).

Playing chess can also have a positive impact on children's self-esteem. Children who play the game often experience a boost in self-esteem, as they develop a sense of achievement and accomplishment through the game (Adler & Bauch, 2017). One study explores the cognitive and socio-emotional benefits of regular chess play among 170 schoolchildren aged 6-16, using a quasi-experimental design comparing chess as an extracurricular activity (n = 170) to soccer or basketball (n = 60). Intellectual and socio-affective competencies, measured by an IQ test (WISC-R), a self-report test (TAMAI), and a hetero-report questionnaire (teacher-tutor's criterion) administered at the beginning and end of the academic year, served as dependent variables. The findings suggest that, compared to the control group, chess enhances cognitive abilities, coping and problem-solving skills, and even the socio-emotional development of participating children and adolescents. These results are influenced, particularly in the socio-emotional domain, by the individual profiles of students who choose to engage in this activity (Aciego, García, & Betancort, 2012).

As such, schools and educational institutions should consider including chess in their curriculum. The objective of this review is to show the benefits of including chess in the classroom primarily within young children while highlighting the changes of introducing chess in the classroom from a number of countries internationally as well as the main methodological issue of conducting the perfect experimental design.

FINDING AND DISCUSSION

The International Context at Present

The teaching of chess in schools has gathered significant attention worldwide specifically post COVID-19 era where there was a chess boom due to the lockdowns as well as other chess related themes in the entertainment industry such as the series ‘The Queen’s Gambit’. There have been several countries in recent years that have looked to implement chess into the classroom either as compulsory or optional (Costello, 2013). Armenia, for instance, has made it compulsory that chess becomes a compulsory subject in schools for children aged 6 and over according to a worldwide news report (The Guardian, 2011). Another country that has given the option for chess to be compulsory or optional for chess to be taught in schools is Spain in order to improve mathematical ability as well as develop healthy social skills (Majorca, 2015). In the year 2011, the

country of India, the month of November is regarding as 'chess month' and headteachers were instructed to ensure children were taught chess in the time allocated for games with the aim of improving critical thinking and concentration. The government is now seeking to have chess being played on every third Saturday of the month all year round (The Statesman, 2022). In the UK, the charity 'Chess in Schools and Communities (CSC)' is now active in over 80 boroughs in the United Kingdom with parliament considering adding chess into the curriculum based on the success of this implementation in other countries.

Assessing the available evidence from Meta Analyses

Unfortunately, there have been few recent studies assessing the impact of chess and improved academic skills above and even fewer meta-analyses of the available evidence with one focusing on children (Sala & Gobet, 2016) and one looking at adults and children (Burgoyne et al., 2016). The meta analysis conducted by Sala and Gobet (2016) aimed to quantitatively assess the available empirical evidence that skills acquired during chess instruction in schools could be positively transferred into other academic domains such as mathematics, reading and other general cognitive based skills. The total number of young people included 2788 in the chess condition and 2433 in the control group with results showing a tendency for stronger effect on mathematical skills ($g=0.382$) as well as a significant and positive effect on duration of treatment ($Q(1) = 3.89$, $b = 0.0038$, $p < .05$). However, none of these studies used an ideal design which has been common in most of the research pertaining to this topic. These include no pre and post-test, random allocation of participants to conditions and both a do-nothing control group and an active control group.

The Ideal Study

In research, there are multiple ways of establishing if a given intervention (i.e. chess classes) could positively affect a behavioural outcome (i.e. academic/social scores mentioned above). Gobet and Campitelli (2006) have summarised that an ideal study would include random assignment of participants to different groups, a pre-test to ensure that there are no initial differences between the groups, a post-test to measure any potential differences due to the treatment, an experimental group, and two control groups (one to eliminate the possibility of a placebo effect). The participants and experimenters should be unaware of the nature of the group assignment, and the experiment should be carried out by different people to avoid contamination of the data. However, this ideal experiment is difficult to conduct due to practical, administrative, and ethical reasons. A simplified version of the ideal experiment such as a quasi-experiment may be used where the participants are already divided into groups, such as children who attend a chess class vs. those who do not (i.e. opt for another class). However, the conclusions that can be drawn from a quasi-experiment are limited as the direction of causality is not under the control of the experimenter. Examples postulated include are children who are in the chess group more intelligent because of playing chess or are intelligent children more drawn to chess? Or a possible third variable? However, research options are limited and a simplified version which includes a quasi-experiment should be considered in future research.

Other challenges and limitations

In addition to the methodological limitations, there are numerous other aspects that warrant further consideration. One important question is the practical implementation of chess in the classroom setting. For instance, how can the game be effectively incorporated into a class of fifty students? There are various possibilities, such as providing twenty-five chessboards for students to play against each other, or supplying each student with their own chessboard to take home for further study, practice, or even to engage in games with family members. Careful planning and consideration of these logistical concerns is essential to ensure the successful integration of chess into the educational environment. Children, especially those who are not competitive, may find it daunting to play against another classmate in the beginning. On the other hand, they may find it difficult to play by themselves. While chess has shown to beneficial in a wide range of both cognitive and socio-emotional variables, it is important that chess should be fun and engaging especially given the age range of young children hence why careful planning should be conducted on how to, at the very beginning, prepare to implement chess in the classroom.

Additionally, who would teach chess? Would it be a professional chess teacher, or would the primary teacher be informed just enough to teach the basics? Given the methodological difficulties cited in the paper, it is unknown if teaching just the basics would lead to long term benefits and having a professional chess teacher may be better suited as most professional chess teachers are qualified and experienced in teaching children. The problem arises that this may incur increased costs to the school in hiring a professional teacher which some schools may not be prepared to accept especially in low-income areas.

Finally, there is the issue of time constraints. Will chess be taught as part of the curriculum, or would it be an extra-curriculum activity with the sole purpose of improving weaknesses in the main curriculum via transfer (i.e., mathematics)? As elaborated above, some countries have opted for one of the two options and there have been no studies comparing which option has shown improved benefits. The authors take the position that both have shown independently to provide benefits and schools should not be too rigid when taking this into consideration.

CONCLUSION

While the benefits of including chess in school curriculums are well-documented, there is a lack of ideal experimental designs that can quantitatively measure the impact of chess on academic performance. Nevertheless, this paper argues that the potential benefits of including chess in school curriculums outweigh the risks associated with the absence of hard evidence. However, even if we set aside the academic benefits, it is important to note that chess promotes a sense of community and teamwork, which is vital to children's upbringing. Physical education (P.E.) is a mandatory part of most school curriculums and has been proven to be beneficial to children's well-being as it promotes teamwork and other social skills. However, it is also true that every child is different in terms of personality and athleticism. Children who are more introverted or less athletically inclined may not enjoy or benefit from traditional team sports as much as their peers. In such cases, chess can be a beneficial alternative, as it is a quiet game that lacks the peer pressure often seen in most sports.

In conclusion, while there may be a lack of ideal experimental designs to measure the impact of chess on academic performance, the potential benefits of including chess in school curriculums are significant. In addition to promoting transference skills that can overlap with other academic subjects, chess also promotes a sense of community and teamwork, which is vital to children's upbringing. Furthermore, for children who may not enjoy or benefit from traditional team sports, chess can be an effective and enjoyable alternative. As such, schools should consider including chess in their curriculums to provide children with a well-rounded education and help the.m develop critical skills for success.

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