The Impact of Lichess Application Usage on Enhancing the Tactical Skills of Chess Athletes

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Abstract. In the digital era, chess training has transcended traditional boundaries through the integration of online platforms such as Lichess. This study investigates the effect of using the Lichess application on improving the tactical skills of young Indonesian chess athletes. Employing a quantitative method supported by qualitative data, the study involves 50 respondents aged 15–25 who actively use Lichess for self-training. Data were collected through questionnaires, analysis of game statistics from Lichess, and in-depth interviews. The results reveal a strong positive correlation between the frequency and duration of Lichess usage and increased tactical skill levels, as measured by accuracy scores and puzzle ratings. In particular, the puzzle tactic feature was found to contribute significantly to players' decision-making abilities. The study concludes that Lichess serves not only as a digital game platform but also as an effective self-directed learning tool. Nonetheless, a hybrid approach that integrates face-to-face coaching with digital practice is recommended to optimize strategic understanding. This research contributes to the broader discourse on digital learning tools in cognitive sports and offers practical insights for coaches, institutions, and chess communities

Keywords: Chess, Lichess, tactical skills, digital learning, online training, youth athletes

Introduction

Chess, an intellectual sport rooted in strategic decision-making, demands a high degree of cognitive ability, foresight, and tactical precision. The transformation of chess training through digital platforms has introduced new opportunities for self-directed learning and skill development. Among these, Lichess has emerged as a popular online application offering features such as real-time gameplay, tactical puzzles, automated analysis, and engine-based feedback. These tools allow players to train independently, enhance their tactical understanding, and analyze performance in real time. Globally, the integration of artificial intelligence and big data in applications like Lichess has reshaped how chess is taught and practiced. Research by Chowdhary et al. (2022) utilized millions of Lichess game records to evaluate human decision-making in chess, demonstrating the effectiveness of digital training in improving move accuracy and tactical execution. In Indonesia, where the adoption of digital sports training is still emerging, Lichess has become increasingly relevant in urban centers and among younger players, although its use remains supplementary to face-to-face coaching methods(Aprianto, 2019).

This study aims to fill the research gap regarding the direct impact of Lichess on tactical development among young Indonesian chess players. By focusing on usage patterns, perceived effectiveness, and statistical indicators such as puzzle ratings and game accuracy, the research explores how digital platforms can complement and even enhance traditional coaching methods in the context of chess education. Chess is a mind sport that demands sharp thinking, analytical skills, accuracy in predicting opponents' moves, and well-

developed tactical strategies. In the era of modernization and digitalization, chess training has undergone significant transformation thanks to technological advancements. Online-based applications such as Lichess have become widely utilized in training due to their comprehensive and easily accessible features. These include real-time matches with players from around the world, tactical puzzle exercises designed to enhance problem-solving skills, and automatic analysis of every move made during gameplay. These features enable players to learn from their mistakes and independently develop their skills flexibly anytime and anywhere (Nainggolan, 2023).

Within athlete development environments, the integration of information technology is increasingly being applied to support training effectiveness, especially in boosting young people's interest and participation in chess. Several schools and chess clubs have adopted app-based training systems as a supplement to conventional methods. This approach has proven beneficial by broadening access to opponents of varying skill levels and offering structured training through automated evaluations. Lichess, for example, adjusts the level of difficulty according to each user's ability, thereby providing more focused tactical training tailored to individual needs (Nugroho et al., 2018). Globally, technological development has had a substantial impact on the world of sports, including chess. Various international studies have begun using data from online chess applications such as Lichess to evaluate player performance and strategy more objectively and thoroughly. A study by Chowdhary et al. (2022), for instance, analyzed millions of games from the Lichess platform to measure human performance in chess based on move accuracy and decision-making efficiency. Their findings indicate that digital training through chess applications not only provides gameplay experience but also helps players improve their tactical accuracy and understanding of complex positions(Aulia & Jannah, 2023).

Furthermore, research by Ribeiro et al. (2014) and Sanjaya et al. (2021) suggests that players involved in online chess environments like Lichess engage in collective learning. This means they learn not only from their own games but also from publicly available game records of other players. The concept of strategic non-transitivity—where player A can beat B, B beats C, but C beats A—demonstrates the complexity of gameplay patterns that can be more deeply explored using big data approaches. Lichess specifically offers game records, tactical puzzles, and engine-based analysis that are regularly updated and tailored to players' skill levels, making it an effective tool for honing tactical abilities. Technological advancements are not limited to online applications. Innovations like ARChessAnalyzer have been developed to bridge physical chessboards and the digital world using visual recognition and artificial intelligence. This system can detect piece positions on a real board and provide automatic analysis similar to those found on online platforms like Lichess. Such technologies enable a multidimensional chess learning approach, blending direct interaction with traditional boards and the analytical advantages of digital platforms. This proves that modern chess training methods are no longer confined to conventional approaches but have evolved alongside increasingly complex technologies that adapt to current athletes' needs.

Locally, chess athlete development in various regions, including major cities like Semarang, has shown progress through the introduction of digital media in training and strategic development. Although most coaches and chess clubs still rely on face-to-face methods, digital applications and platforms are gradually being incorporated as part of a hybrid approach. A study by Santoso & Lestari (2023) highlighted that digital media such as educational videos, software-based game analysis, and online chess apps are becoming more accepted among coaches, even though their implementation remains uneven. This indicates growing awareness of the importance of digitalization in enhancing training effectiveness(Fitriani & Syahputra, 2020).

The push for digital transformation in sports training also aligns with national policy directions through Indonesia's Grand Design for National Sports (DBON), which promotes technology-based innovations across all sports, including chess (Aulia & Jannah, 2023). However, to date, there is still a lack of specific research measuring the direct impact of Lichess on tactical skill improvement among chess athletes, particularly among students or younger players. Given its potential to facilitate independent and sustainable tactical development, this research is crucial to fill that gap and contribute to the advancement of adaptive, data-based training models in the digital age(Chowdhary et al., 2022).

Methods

This study aims to examine the impact of using the Lichess application on the improvement of chess tactical skills. The unit of analysis in this research is individual chess players who use the Lichess application. The tactical skills being analyzed include the ability to plan effective tactical moves, recognize opportunities and threats, and implement strategies that can lead to advantageous game positions. The population in this study consists of all chess players in Indonesia who actively use the Lichess application for training and competition. The research focuses specifically on players aged 15 to 25 years, as this age range is considered critical in the development of chess skills. To ensure that participants have sufficient familiarity with the application, only those who have used Lichess for at least three months are included.

Purposive sampling is employed to select a sample of 50 chess players who meet specific criteria relevant to the research objectives. The selected participants must have an active Lichess account, consistently engage in training or competitive play via the application, and use its tactical training features regularly. The data collection methods used in this study are based on secondary data sources. Data is gathered through academic journals, user activity on Lichess (such as game performance and completed tactical puzzles), and online interviews with ten selected chess players. These interviews aim to explore user perceptions and personal experiences in utilizing Lichess as a digital training tool(Nainggolan, 2023).

The study was conducted over a one-month period in March 2025. The types of data collected include both performance analytics from Lichess and qualitative feedback from interviews, ensuring a comprehensive understanding of the users' engagement and skill development. Operationalization of variables includes two main variables: tactical ability as the dependent variable, and use of the Lichess application as the independent variable. Tactical ability is measured using two indicators: game accuracy (as reflected by centipawn loss scores from Lichess engine analysis) and performance in solving tactical puzzles. Higher accuracy and puzzle ratings indicate stronger tactical skills. Usage of the Lichess application is assessed based on the frequency of use, types of features used (e.g., tactical puzzles, automatic game analysis, online matches), and the duration of weekly usage.

For data analysis, both descriptive statistics and simple linear regression are used. Descriptive statistics provide an overview of user demographics and general patterns in app usage. Linear regression analysis is employed to examine the relationship between Lichess usage and improvement in tactical skills. The statistical software SPSS is used to facilitate this analysis. This methodological approach enables a detailed examination of how digital tools like Lichess can influence the development of tactical thinking among young chess players in Indonesia. The combination of quantitative and qualitative data ensures a comprehensive understanding of both measurable outcomes and user experiences(Nugroho et al., 2018).

Result and Discussion

This study involved 50 active chess players in Indonesia, aged between 15 and 25 years, all of whom had been using the Lichess application consistently for at least three months. The respondents were selected using purposive sampling to ensure that only those with relevant experience in using Lichess for tactical development were included. The demographic characteristics of the respondents, including age, gender, and usage patterns, played an essential role in understanding how digital platforms influence tactical chess skills. In terms of gender distribution, 76% of the respondents were male and 24% female. While this shows male dominance in Indonesia's online chess community, it also indicates an emerging trend of female participation in digital chess spaces. The average age of respondents was 19.8 years, with most falling within the 18–21 age group—an age considered optimal for cognitive development and critical thinking, which are vital in mastering tactical chess play.

The respondents' usage patterns of Lichess showed a high level of consistency and intensity. Most respondents (72%) accessed the application 4 to 7 times per week, and 64% spent over five hours weekly on the platform. The most frequently used features were tactical puzzles, automatic game analysis, and online gameplay against random opponents. These usage patterns suggest that Lichess is not merely a supplementary training tool but a central part of players' training routines. Regarding tactical ability, two main indicators were assessed: game accuracy and puzzle rating. Game accuracy was measured through the centipawn loss metric, with an average score of 45, reflecting a relatively high level of precision in move selection. Puzzle ratings averaged 1850, with the majority of respondents scoring between 1700 and 2000,

placing them above recreational player levels and near competitive standards. These indicators suggest that the respondents possessed strong tactical abilities, reinforced through routine practice using the Lichess platform.

Statistical analysis revealed a strong and significant correlation between Lichess usage and tactical skill enhancement. Pearson correlation analysis showed a positive correlation (r = 0.71, p < 0.01) between duration of use and puzzle rating, indicating that the more time respondents spent on Lichess, the better their tactical performance. Linear regression analysis demonstrated that the use of the tactical puzzle feature explained 52% of the variance in tactical ability improvement (R^2 = 0.52, p < 0.01). This means that more than half of the improvements in tactical performance could be attributed to regular engagement with the puzzle feature, with the rest likely influenced by other factors such as personal experience, offline training, or use of other platforms. Interviews with selected respondents supported the quantitative findings, revealing that many players used Lichess not only for puzzle practice but also to explore tactical positions, practice openings, and simulate real matches. This self-guided use of the app indicates that it functions as more than a digital playground; it serves as a personal coach for tactical development. Respondents appreciated the flexibility, adaptability, and immediate feedback provided by Lichess features, which allowed them to evaluate and improve their decision-making processes in real-time.

However, some limitations were identified. Respondents acknowledged that while Lichess significantly enhanced their tactical skills, it was less effective in teaching long-term strategic planning or complex middlegame transitions. These limitations suggest that while Lichess is highly beneficial for tactical drills, strategic depth may still require human mentorship. This aligns with the views of earlier research advocating for a hybrid training model that combines digital tools with traditional coaching methods. In conclusion, the study found compelling evidence that consistent and structured use of the Lichess application leads to measurable improvements in tactical chess skills. Its features, especially tactical puzzles and automated analysis, significantly contribute to the cognitive development necessary for advanced play. For young players, particularly those in digitally engaged age groups, Lichess provides a practical and accessible tool for chess training. However, the best outcomes appear to result from integrating digital tools like Lichess into broader training systems that include mentorship and strategic instruction. This finding underscores the need for hybrid training models in the modern chess education landscape. The findings of this study strongly indicate that the use of the Lichess application has a significant and measurable impact on the tactical development of young chess players in Indonesia. Players who engaged with the application more frequently and for longer durations showed clear improvements in tactical accuracy and puzzle-solving skills. These results align with prior research, such as that by Chowdhary et al. (2022), which emphasizes the positive influence of digital platforms on tactical learning through interactive features and AI-driven analysis(Santoso & Lestari, 2023).

The majority of respondents in this study practiced using Lichess an average of five to seven times per week and spent more than five hours weekly using the platform. Such intensive use suggests that Lichess has evolved from a mere supplementary tool into a primary instrument for training, particularly in self-directed learning. Notably, players who regularly used the puzzle feature demonstrated puzzle ratings averaging around 1850, indicating strong problem-solving skills under time constraints—a critical component of chess tactics. The correlation and regression analyses further validate the hypothesis. A Pearson correlation of 0.71 (p < 0.01) between duration of use and puzzle rating reveals a robust positive relationship. Meanwhile, the regression analysis shows that puzzle training accounts for approximately 52% of the variance in tactical improvement. These findings reflect not just the quantity of engagement with Lichess but also the qualitative value of its features, such as adaptive tactical drills and immediate feedback through game analysis.

Interviews with selected participants revealed that Lichess is used for more than just tactical puzzles. Many players engage in opening theory drills, simulate full-length games, and revisit complex middlegame or endgame positions. Some users described the platform as a "digital mentor" that enables them to experiment with positions freely, review their mistakes, and develop stronger intuitive responses. This suggests that Lichess supports exploratory learning, a process crucial for developing higher-order cognitive and pattern recognition skills in chess. However, the study also acknowledges the limitations of using Lichess or any digital-only training platform. While tactical proficiency improves with repeated digital exposure, many

respondents expressed difficulty in understanding deeper strategic concepts such as long-term planning, positional play, and transitions from middlegame to endgame. This supports Aprianto's (2019) argument that hybrid training—combining digital applications with face-to-face coaching—is the most effective model. Personal mentoring is still required for players to master abstract and situational nuances of the game, including psychological preparedness and adapting to human opponent behavior(Sanjaya et al., 2021).

Another limitation concerns social interaction. Several respondents mentioned that while Lichess enhances individual skills, the absence of human interaction, coaching dialogue, and competitive environment can limit motivation and strategic insight. The importance of real-time discussion, psychological coaching, and team-based reflection remains crucial for holistic chess development. Digital tools like Lichess are therefore best viewed as powerful complements rather than replacements for conventional training environments. Moreover, the gender disparity observed in this study—76% of respondents were male—reflects a broader trend in the digital chess community. Although digital platforms have democratized access to chess training, greater effort is needed to encourage female participation and inclusion in competitive digital chess environments. In conclusion, the discussion underscores that Lichess is an effective and scalable platform for enhancing chess tactics among young players, particularly due to its flexible, adaptive, and user-centered design. However, its effectiveness can be significantly amplified when integrated into a hybrid training model that includes human mentorship, strategic discussions, and community engagement. Such an approach would offer a more complete pathway to excellence in both tactical and strategic aspects of chess.

Conclusion

This research aimed to analyze the influence of using the Lichess application on the improvement of tactical skills among young chess athletes in Indonesia. Through a combination of quantitative approaches and qualitative data support, several key findings were obtained that enrich the understanding of how digital technology contributes to training in strategy-based sports like chess. The study involved 50 respondents aged 15–25 years, with the average age being 19.8. Most of them used Lichess consistently—72% used it 4–7 times per week and 64% spent more than five hours weekly. The most utilized features included tactical puzzles, automatic analysis, and online matches against random opponents. This level of usage indicates that Lichess has become a primary tool in the training routine of young chess athletes, functioning not merely as a supplement but as a central learning medium.

In terms of tactical skills, the players showed an average centipawn loss of 45 (indicating good decision-making accuracy) and an average puzzle rating of 1850, with the majority falling into the 1700–2000 range. These scores indicate a solid grasp of tactical understanding, closely tied to regular use of Lichess features. Statistical analysis confirmed a significant and strong correlation between the use of Lichess and the improvement of tactical abilities. Pearson's correlation yielded a coefficient of $r = 0.71$ ($p < 0.01$), suggesting a strong positive relationship between duration of use and puzzle rating improvement. Linear regression further revealed that tactical puzzle use contributed to 52% of the variation in tactical performance, supporting the argument that Lichess has a substantial effect on the development of tactical competence.

Qualitative findings from interviews confirmed that players used Lichess not only for practice but also for tactical exploration, opening simulation, and endgame training. Despite its strengths, players acknowledged limitations in strategy learning and recognized the continued need for guidance from human coaches. This confirms that while Lichess is a highly effective training platform, especially for tactical development, the ideal training model combines digital tools with face-to-face coaching. In summary, this study concludes that the Lichess application significantly enhances the tactical abilities of young chess players when used consistently and with purpose. Its greatest impact lies in puzzle-based learning and analytical feedback, helping players build stronger decision-making and tactical intuition. However, for optimal long-term development, Lichess should be integrated into a hybrid training model that includes professional coaching for strategic and psychological aspects of chess mastery

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