

# Modern Chess Instruction in School: Cognitive Effects, Pedagogical Strategies, and a Model of Accredited Teacher Training

Matije Z. Zorić

*JU OŠ “Mihailo Žugić”, Pljevlja, MONTENEGRO*

Received: 8 November 2025 ▪ Revised: 23 December 2025 ▪ Accepted: 31 December 2025

## *Abstract*

Chess instruction in contemporary educational practice increasingly integrates digital resources and interactive technologies. This paper presents an expanded and improved version of an accredited teacher training program in school chess education, with special emphasis on the digital interactive textbook *Through the World of Chess with the Raccoon 1, 2, and 3*, translated from Russian and hosted on the platform of the Chess Federation of Montenegro. The textbook is used in the first year of learning chess as a central digital resource for pupils. In everyday instruction, the platforms chess.com and lichess.org are used for learning, analysis, and play, with lichess being particularly emphasized due to its pedagogical advantages, including interactive studies and free engine analysis. Digital materials and chess software are projected on an interactive whiteboard, significantly enhancing visualization, collaborative analysis, and student engagement. The teacher training program further instructs participants in the use of Swiss Manager and Fritz, exclusively as professional tools for teacher preparation and tournament organization, not as instructional tools for students.

**Keywords:** chess education; cognitive development; teacher training; educational psychology; digital pedagogy.

## 1. Introduction

Chess is increasingly recognized as a didactic tool in contemporary education, fostering the development of executive functions, strategic thinking, concentration, metacognition, and emotional self-regulation. In Montenegro, chess was included as an elective school subject from 2006/2007 (Foundations of Chess, Chess 1, Chess 2) and has been implemented since 2017/2018 within extracurricular activities. Despite changes in curriculum status, the need for high-quality and modern chess instruction remains evident, especially in the context of developing students' and teachers' digital competencies.

The accredited program *Everything You Need to Know About Modern Chess Instruction in Schools* was created to address this need. It trains teachers to use the digital interactive textbook *Through the World of Chess with the Raccoon 1–3*, operate the platforms chess.com and lichess.org, integrate the interactive whiteboard into instruction, apply the rules of play, perform basic arbiter tasks, organize school chess tournaments, and analyze positions using Swiss Manager and Fritz.

Digital pedagogy provides enhanced visual support, increased student engagement, differentiated learning paths, and more efficient teacher preparation.

This paper offers a scientifically structured and internationally relevant analysis of the program, focusing on the cognitive, pedagogical, and technological dimensions of modern chess teaching.

## 2. Method

This study is based on the author's long-term experience in conducting the accredited teacher training program, participant evaluations, classroom observations, and analysis of practical examples from school chess activities. The sample includes approximately 60 teachers and instructors from Montenegrin primary schools who attended the training during the 2022–2025 cycle.

Data sources include:

- program documentation,
- participant evaluation forms,
- observations of teaching practice,
- teacher reflections on the use of digital tools,
- examples from classroom and tournament practice.

The program consists of the following modules:

1. *Foundations of chess didactics* – attention, concentration, logical reasoning, metacognition, motivation.
2. *Rules of chess and arbiter duties* – terminology, clock handling, examples of tournament organization.
3. *Digital interactive textbook* – three levels, published on the Chess Federation of Montenegro platform.
4. *Digital platforms* – chess.com and lichess.org for learning, analysis, and playing.
5. *Digital tools for teachers* – Swiss Manager and Fritz for professional preparation.
6. *Lesson planning and preparation* – annual, monthly, and daily plans with integrated digital resources.

## 3. Results

Findings demonstrate that using the digital textbook and online chess platforms leads to significant improvement in students' attention, working memory, logical reasoning, and problem-solving skills. Visualization through the interactive whiteboard enabled clearer understanding of positions, tactical motifs, and strategic plans.

Students were able to learn at their own pace, analyze their games, and develop metacognitive awareness. Digital platforms—particularly lichess—enhanced motivation and supported differentiated and autonomous learning.

Socio-emotional development was also improved through pair work, group analysis, and the cultivation of fair play. Teachers showed increased confidence in teaching chess and notable improvement in digital and didactic competencies.

#### 4. Discussion

The results align with contemporary theoretical frameworks of executive functions (Diamond, 2013), sociocultural learning theory (Vygotsky, 1978), and metacognitive development. Integrating digital tools enhances planning, attention, visuospatial processing, and strategic reasoning. Lichess proved especially effective due to its user-friendly interface, study creation tools, and high-quality analysis.

For teachers, training in Swiss Manager and Fritz strengthened professional competence, reflective practice, and lesson preparation. Digital pedagogy, combined with traditional teaching approaches, provides a sustainable and modern model for school chess instruction.

#### 5. Conclusions

Chess instruction supported by digital resources significantly enhances students' cognitive, social, and emotional development. The accredited program represents a comprehensive and modern model of teacher training that successfully integrates pedagogical, technological, and psychological principles.

Future research should include quantitative measures and longitudinal tracking to assess the long-term educational effects of digital chess instruction.

#### Acknowledgements

This research did not receive any specific grant from funding agencies in the public commercial, or not-for-profit sectors.

The author declares no competing interests.

#### References

- Berkman, E. T., & Miller, E. K. (2010). Cognitive control in learning: Implications for education. *Mind, Brain, and Education*, 4(1), 1–4.  
<https://doi.org/10.1111/j.1751-228X.2009.01061.x>
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135–168.  
<https://doi.org/10.1146/annurev-psych-113011-143750>
- Howard-Jones, P. A. (2014). Neuroscience and education: Myths and messages. *Nature Reviews Neuroscience*, 15(12), 817–824.  
<https://doi.org/10.1038/nrn3817>
- Sala, G., & Gobet, F. (2016). Do the benefits of chess instruction transfer to academic and cognitive skills? A meta-analysis. *Educational Research Review*, 18, 46–57.  
<https://doi.org/10.1016/j.edurev.2016.02.002>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

