ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ

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Համարի ձևավորումը և համակարգչային շարվածքը Թ. Է. Նալբանդյանի

PROCEEDINGS OF THE INTERNATIONAL CHESS FEDERATION (FIDE) AND THE CHESS SCIENTIFIC RESEARCH INSTITUTE INTERNATIONAL CONFERENCE ENTITLED "CHESS IN EDUCATION" HELD ON NOVEMBER 20-21, 2021

Շախմատի միջազգային ֆեդերացիայի(ՖԻԴԵ) և Շախմատի գիտահետազոտական ինստիտուտի նախաձեռնությամբ 2021 թվականի նոյեմբերի 20-21-ին կայացած «Շախմատը կրթության մեջ» միջազգային գիտաժողովի նյութեր

ON THE EVE OF THE 100TH ANNIVERSARY OF THE KHACHATUR ABOVYAN ARMENIAN STATE PEDAGOGICAL UNIVERSITY

Խաչատուր Աբովյանի անվան հայկական պետական մանկավարժական համալսարանի 100-ամյակին ընդառաջ

An international conference entitled "Chess in Education" was held on November 20-21, 2021 on the initiative of the ASPU "Chess" Scientific Research Institute and the Education Committee of the International Chess Federation.

The multinational conference included 42 speakers from 96 countries over the course of two days. On the ZOOM platform, several topics concerning the teaching of chess and the training of chess instructors were debated, primarily in three areas. 1) Chess in pre-school settings, 2) Chess in grades 2-4, and 3) Chess in higher pedagogical educational settings.

At the conference, FIDE representatives delivered speeches. Arkady Dvorkovich, President of the Chess Federation, Vice-Presidents, Executive Directors, World Chess Champion GM Viswanathan Anand, and globally known chess specialists. The conference was attended by ASPU Rector, Professor Ashot Khoetsyan, Vice-Rector for Academic Affairs, Professor Srbuhi Gevorgyan, and Vice-Rector for Educational Processes Vahe Kirakosyan. The head of the scientific program V. Sargsyan, senior researchers T. Sargsyan and S. Khachatryan from the Chess Scientific Research Institute made speeches. The speakers presented in detail the psychologically, sociologically and pedagogically effective means of chess education, which play a significant role in the existence of appropriate conditions in the field of education.

Professor V. Zaretsky (RF) R. Trinchero (Italy) K. Saurina, L. Garcia and others spoke at the international conference "Chess in Education".A virtual round table was also organized. The participants expressed their satisfaction with the organization of the conference and the discussion of important issues (Kevin O'Connell, Dana Reizniece-Ozola and others).

The "Pedagogical University" official newspaper covered the conference and its main achievements (Marin Aghekyan's material).

Vladimir Karapetyan, Deputy Editor-in-Chief of the SCIENTIFIC NEWS.

ՀՊՄՀ «Շախմատ» գիտահետազոտական ինստիտուտի և Շախմատի միջազգային ֆեդերացիայի Կրթության հանձնաժողովի նախաձեռնությամբ 2021 թվականի նոյեմբերի 20-21-ին տեղի ունեցավ «Շախմատը կրթության մեջ» խորագրով միջազգային գիտաժողով։

Միջազգային գիտաժողովի երկօրյա աշխատանքներին մասնակցեց 42 զեկուցող՝ 96 երկրից։ Գիտաժողում ZOOM հարթակով քննարկվեցին շախմատի դասավանդմանը, ծրագրային փաթեթներին, շախմատի ուսուցիչների վերապատրաստմանը վերաբերող տարաբնույթ հարցեր՝ հիմնականում երեք ուղղությամբ. 1) շախմատը նախադպրոցական հաստատություններում, 2) շախմատը 2-4-րդ դասարաններում, 3) շախմատը բարձրագույն մանկավարժական ուսումնական հաստատություններում։

Գիտաժողովին ելույթներով հանդես եկան ՖԻԴԵ -ի ներկայացուցիչները. շախմատի ֆեդերացիայի նախագահ Արկադի Դվորկովիչը, փոխնախագահները, գործադիր տնօրենները, շախմատի աշխարհի չեմպիոն, գրոսմայստեր Վիշվանաթան Անանդը, շախմատի գծով միջազգային հեղինակություն ունեցող փորձագետները։ Գիտաժողովի աշխատանքներին մասնակցեցին ՀՊՄՀ ռեկտորի պաշտոնակատար, պրոֆեսոր Աշոտ Խոեցյանը, ուսումնագիտական գծով պրոռեկտոր, պրոֆեսոր Սրբուհի Գևոգյանը, ուսումնական գործընթացների հարցերով պրոռեկտոր Վահե Կիրակոսյանը։ «Շախմատ» գիտահետազոտական ինստիտուտից ելույթներ ունեցան գիտական ծրագրի ղեկավար Վ. Սարգսյանը, ավագ գիտաշխատողներ Թ. Սարգսյանը և Ս. Խաչատրյանը, գիտաշխատողներ Լ. Կարապետյանը, Ա. Չարչյանը։ Զեկուցողները մանրամասն ներկայացրին շախմատային կրթության հոգեբանական, սոցիոլոգիական և մանկավարժական ներգործուն միջոցները, որոնք էական դերակատարում ունեն կրթության ոլորտում համապատասխան պայմանների առկայության պարագայում։

«Շախմատը կրթության մեջ» միջազգային գիտաժողովում ելույթներ ունեցան պրոֆեսոր Վ. Զարեցկին (ՌԴ), Ռ. Տրինչերոն (Իտալիա), Կ. Սաուրինան, Լ. Գարսիան և ուրիշները։ Կազմակերպվեց նաև առցանց կլոր սեղան։ Մասնակիցներն իրենց գոհունակությունը հայտնեցին գիտաժողովի կազմակերպման և կարևորագույն հարցեր քննարկելու համար (Քեվին Օ'Քոննել, Դանա Ռեզնիս Օզոլա և ուրիշներ)։

«Մանկավարժական համալսարան» պաշտոնաթերթը լուսաբանեց գիտաժողովի ընթացքը և հիմնական ձեռքբերումները (Մարին Աղեկյանի նյութը)։

«Գիտական Տեղեկագիր» պարբերականի գլխավոր խմբագրի տեղակալ Վլադիմիր Կարապետյան

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ARCADY DVORKOVICH

FIDE President

Dear friends, it's my honored pleasure to welcome you at the opening session of the "Chess in Education" international online conference. The first major conference FIDE has organized in the context of educational chess.

I want to start my speech with gratitude to everyone who contributed a lot to the organization of this conference and generally to the development of educational chess.

I would like to note Kevin O'Connell, Smbat Lputian, Leontxo Garcia, Bartek Macieja and others for their invaluable investment in the methodology for educational chess. My appreciation to our managing director Dana Reizniece-Ozola for coordinating this event together with the Chess in Education Commission. You have carried out a great project by bringing together all these people around the world and let me express my gratitude and appreciation for your efforts.

I want to mention the European Chess Union and our collaboration last year that let us collect the best educational chess practices and lessons worldwide and now we are more skilled to conduct projects with better understanding of various approaches of educational chess: whereas it's a curriculum or extra curriculum chess, transversal chess in schools or something else.

Thanks to all the people who have submitted their thesis and papers sharing their experience with us. Also, to people who were unable to submit their papers because of language barriers or time limitations but were eager for the meeting. I have read some papers we have received and came across to the same conclusions that we discussed based on our theoretical and methodological experience. I think we should give these people an opportunity to introduce themselves.

Today you will hear both keynote speakers and authors' presentations regarding the education chess experiences around the world in two languages – English and Spanish. Of course, this will expand our capacity to reach a major chess community around the world. I find it very important and for the future we will try to include even more languages in our projects.

I would like to mention that we use educational chess as a contribution to our developmental, social goals as well (e.g. to reach convicts in prisons, children with autistic spectrum disorders, etc.).
I don't want to take too long as we have lots of speakers today including one of the chess world champions Viswanathan Anand and many other great people. I wish good luck to this conference and all the participants: enjoy it and have a great insight to implement in your further practice.
Thank you, stay safe and healthy.

VISWANATHAN ANAND

INDIAN CHESS GRANDMASTER AND A FORMER WORLD CHESS CHAMPION (2000-2002, 2007-2013)

Hello everyone at the "Chess in Education" International online Conference.
What is the role of chess in education?
- I believe that it tabs a giant unique urge to compete and uses it to improve and practice good habits, to enhance the skills one will need both in-game and in life.
What are the habits of chess training? – Here are some of them.
Chess trains memory. - You need to see lots of games, process this information, understand, and sort it out and recall it as needed on the board. But the impact is not only the memory but the ability to apply that information in new and challenging situations. We don't just memorize something in chess but try to discover the essential ideas and implement them in new situations. That's why I believe that chess in education is a simple path to a healthy mind.

Chess increases the student's self-confidence. – While I was working with a prestigious Indian IT Education company, we implemented the idea of introducing chess to the school where this company had already conducted computer-based education. In the 5-6th years of this, we conducted a survey, and the results showed that not only the students but also teachers have noticed the increase in self-confidence. They mention the students became more open-minded in school, gave more questions, and generally studied difficult subjects in a new way. I believe children need this confidence they gain from chess to face and solve unexpected problems.

How does chess bring us these benefits? - I think we should emphasize the importance of handling new and challenging problems constantly. This process of doing something difficult and getting through that keeps this learning process. Otherwise, it can stagnate very fast.

And now we came across a different requirement - the need for fundamentally good teachers. Those who can always propose new situations and challenges to children. And those, who keep those different kids having different sources of motivation. I can see the results within my own observations of my son, who started to play chess recently, and I can follow how he benefits from this constant practice of chess.

Nowadays it's become essential for students to understand that not all the answers can be available instantly. We live in a world of instant gratification and chess is a chance for them to learn to think before making decisions (moves), about their consequences, and the deeper meanings of given solutions. Just because answers are available instantly doesn't mean you have understood them.

I've been experienced in chess, and I believe this can be a vital tool for students. It trains healthy habits - concentration, focusing and non-surrender.

These are the values I found in chess, and I hope that in this online international conference we will come up with lots of intelligent ways to teach and promote the role of chess in education.

Thank you and all the best.

DANA REIZNIECE-OZOLA

Deputy Chair of FIDE Management Board,

FIDE Managing Director

Dear Mr. President, Mr. Lputian, honorable guests,

I have a great pleasure to welcome all of you to this first online international conference dedicated to chess in education that is organized by the FIDE Educational Commission in strong Cooperation with the Armenian Chess Scientific Research Institute.

International sports organizations, and FIDE in this case, are not working only for professional sports, but more for its benefits for society, for education and opportunity to enhance careers, develop talents and give ground for a better future. And that is the reason for chess in education to be a significant topic for us. It was quite a successful year. The Education Commission has carried out various important activities, such as the development of Certification of Lecturers (CEL) and Preparation of Teachers (PoT) training programs to be able to support the countries that try to develop chess in education. We have also started working on preschool and university chess activities and programs development. The other major project of the year was the global survey carried out jointly with The European Chess Union. The survey found out the numbers: - How many kids are involved in chess-related activities? (Survey shows that more than 25 million). - How many teachers and what qualification systems are there? But the purpose is to reveal the whole picture on how chess is used to educate the kids, what are the best practices, what are the support systems in place, etc.… so we can facilitate the dissemination of the best examples and moreover ensure the role of FIDE. And we clearly reconfirm the idea that FIDE should act as a facilitator to enhance the awareness about the importance of chess in education and this conference is one of those facilitation activities. To promote or facilitate chess in education we need to be comprehensive. So, we mean not only the examples of the countries (e.g. Armenia) where chess has been introduced as a school subject or the transversal opportunities of chess to be used for successful acquiring in other subjects. By being comprehensive we emphasize all the

ages of education, not only the kids but also the youth and I believe in the nearest future we should expand to the life-long learning, also including the grownups. This resembled today's conference agenda, where you can find all the major education levels covered and we are more than happy to see the best practices on each of those. I genuinely believe chess is a promising aspect of education. Recently I came across the World Economic Forum Future Jobs report, which states the most vital skills youth need to acquire to be competitive in the future: the competencies of problem-solving, critical thinking, creativity, and emotional intelligence were among them. And honestly, I cannot imagine any better subject or tool to develop these skills in kids rather than using chess. I also believe that chess gives a necessary answer to international organizations, to governments that are now looking for new ways of delivering education. The dynamic changes in the world force the education systems to comply with new needs and challenges. There are three global trends or perspectives to change the education systems: 1. the challenge of usage of digital tools and all its capacities, 2. the risk of diminution of the schools as physical institutions and their importance, 3. as experts mentioned, the perspective of gamification. And again, chess has the potential to succeed in all three aspects: we have more than enough digital tools; we are easily accessible and still, chess is a game. So, there is an enormous potential, and you are the best experts to reconfirm it. I hope these two days will be very fulfilling for you. Wish you have innovative ideas to take with you and enjoy sharing your own experiences. I exhort you to keep in mind that we prepare persons for the future, and we prepare them to shape that future. So, let us do it through chess!

SMBAT LPUTIAN
President of the Chess Academy of Armenia
First vice-president of the Chess Federation of Armenia
Chairman of FIDE EDU Commission

Dear Mr. President, honorable guests of the first "Chess in Education" international online conference, I am delighted to greet all of you in this virtual environment. I am inspired by the idea that chess has acquired such significance and interest in terms of education. I believe from this point forward such events would be recurrent, so all of us will have an opportunity to share the experience, trials, ideas, and discoveries in educational chess. Everyone in this conference represents various aspects of educational chess and in turn, everyone has a contribution in making chess a powerful tool for education. I hope that the discussions that are going to take place during these two days will help us learn more about the steps taken towards chess in education.

I want to wish good luck to everyone.

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

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INTERCONNECTION BETWEEN SENIOR PRESCHOOLER'S PRIOR KNOWLEDGE ON CHESS AND DIVERGENT THINKING

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ABSTRACT

The article discusses the issue of proper organization of children's developmental process during learning, when understanding of the presented material, its reconstruction practical application becomes important. From this, children's prior knowledge play an important role, which is also essential in perceiving chess. In the article, on the one hand, we referred to the methodology of the formation of senior preschoolers' (5-6 years old) prior knowledge on chess, emphasizing its investment in the whole pedagogical process of preschool educational institutions (lessons on preschool educational methodologies, games, various work with children, electronic game-tasks), on the other hand, the impact of chess prior knowledge on children's development process, where the transition from the ''zone of actual into proximal development" is essential in the acquisition of knowledge, abilities, skills, a new level of development. In this context prior knowledge is connected with the components of intellect.

However, it should be noted that less attention is paid to the importance of children's prior knowledge in kindergartens, while the latter has a significant impact on preschoolers' development process promoting the formation of divergent (alternative) thinking, which is included in the structure of intelect suggested by J. Guilford. In addition, prior knowledge on chess acquired at senior preschool age is a solid basis for properly mastering Chess at school, which is a compulsory subject for primary classes in Armenia.

The aim of the research is to reveal the impact of chess prior knowledge on senior preschoolers' development and prove the interconnection of the latter with divergent thinking.

The effectiveness of our research has been revealed through Williams's diagnostic methodology. The gained results are presented in a three-dimensional model at low, average and high levels.

Key words: prior knowledge, preschool educational methodologies, zones of "actual" and "proximal" development, divergent thinking, structure of intellect.

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INTRODUCTION

The 2004 Concept for the Development of Preschool Education in the Republic of Armenia emphasizes the role of education in the comprehensive development of a child. This means that the educational system should be aimed at the proper organization of the development process. Hence, the initial objective of preschool education is to promote preschoolers' development, teach them to think and find effective solutions to problem situations. Therefore, the content of education organized in preschool educational institutions, the ways of organizing work with children, the chosen methods, means should be aimed at the effective organization of preschoolers' development process.

In order to provide children's development in education it's important to take into account the theory of zones of "actual" and "proximal" development suggested by L. S. Vygotsky.

The zone of proximal development (ZPD) is defined as an overarching concept that integrates the main tenets of Vygotsky's theory of human development. This zone refers to the range of abilities an individual can perform with the guidance of a teacher, but cannot yet perform on their own. When children are close to mastering a skill set required to complete a task, but still need the guidance of a teacher to do so, they are considered to be in their zone of proximal development. It is the distance between a child's actual and possible development. When children are able to solve a problem on their own, without the help of an adult, it indicates the zone of actual development. The possible development is when the child is able to learn, to master the presented material [1, p. 78].

There are three stages of ZPD: a)when a child can't accomplish the task even with assistance, b)when a child can accomplish the task with assistance, c)when a child accomplish the task without assistance.

This means that for ZPD to take place it's important to take into account a child's initial notions on represented material, base on it pushing the development process forward, find a child's next ZPD and encourage further learning. Hence, the acquisition of new abilities occurs in the zone of proximal development where children's prior knowledge in the process of development gets importance.

It should also be noted that L.S. Vygotsky's theory is quite general. In order to achieve the ZPD the direction of a child's development should be clarified.

It's known that there are mainly four areas of development: social, cognitive, emotional and behavioral. In our research, we emphasized the cognitive development through formation of prior knowledge on chess, which is formed on the basis of visualization. The latter is the main factor in chess learning. From this, there is a need to find out the essence of prior knowledge.

According to Armenian explanatory dictionaries 'prior knowledge is considered as: elementary information, initial knowledge of a discipline, skill, necessary information for studying the main subject. The synonyms to 'prior knowledge' are: "principle", "element", "initial awareness" [2].

The term of 'prior knowledge' is widely used in a number of psychological theories:

1) **constructivism**, when it is stated that knowledge arises as a result of activating what is already known, in the process of its reconstruction by learners, when they integrate it in their present experiences and perceptions of the reality,

2)**cognitive theory**, according to which learners actively connect new information to what they already know [3, p. 52].

Therefore, prior knowledge is an integral part of learning. During presenting a new material, children's initial ideas play an essential role in the organization of learning process as prior knowledge organizes, integrates new information, making it sensible.

Prior knowledge also has a positive effect on the process of solving cognitive problems. It is a powerful factor in mastering the subject. Consequently, the lack of prior knowledge makes the learning process complicated, the low level of children's prior knowledge makes it much more difficult to master a new material. Trying to learn something without having a preconceived notion can lead to a rote memorization of the material, in the result of which a child is unable to make connections between new material and previously acquired notions. Prior knowledge is hierarchical, dynamic in nature. In this context, in the structure of prior knowledge, declarative and procedural knowledge is distinguished. Each of them is characterized by corresponding criteria and processes. Declarative knowledge provides a low level of knowledge, which implies knowledge of facts when a child simply remembers, enumerates or reproduces it. This component provides knowledge about a phenomenon, it implies the mechanical mastery of facts, without ensuring the integration of knowledge. Procedural knowledge allows to integrate knowledge, perceive the connections among phenomena, classify, compare objects, apply knowledge for problem-solving. It is referred as "knowing how" and is closely related to cognitive abilities [4, p. 48].

Comparing these two types of knowledge we can say that declarative knowledge just provides awareness and procedural knowledge provides the perception of the presented

material and application of the acquired knowledge. Therefore, in the formation of prior knowledge it is essential to pay attention to this factor and not to promote to mechanically reproduction of the presented material by a child but to stimulate the integration previously perceived notions with a new material, which is essential in problem-solving process.

In connection with the above, we emphasize the formation of senior preschoolers' prior knowledge on chess which leads a child:

1) to reconstruct prior knowledge all the time, when a new material is presented,

2) to implement that differently trying to find alternative solutions to a task,

3) to gain knowledge visually, imagine the changes of positions of chess pieces on the chessboard.

Therefore, prior knowledge is connected with three dimensions of the intellect (See Figure 2 – The structure of intellect by J. P. Guilford).

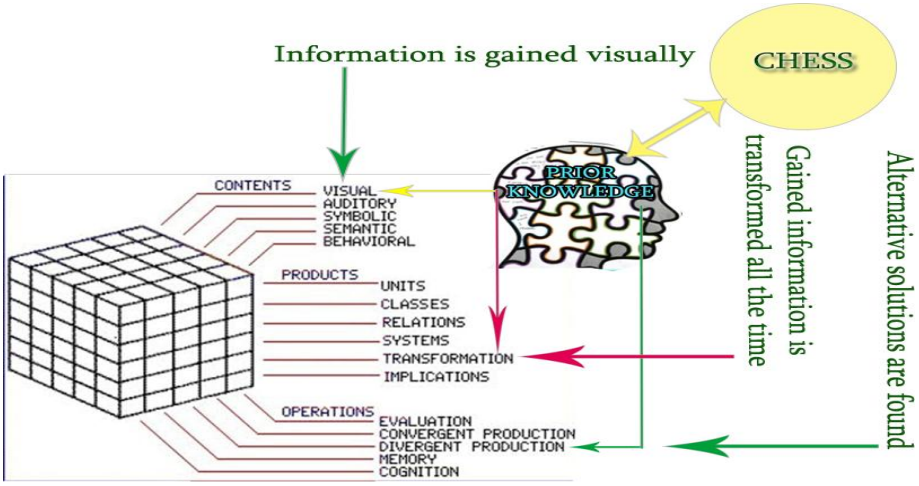

Figure 2 The structure of the intellect

As it is seen from Figure 2, in the structure of intellect J. P. Guilford separated three dimensions: operations, contents and products with their components.

The Operation dimension includes five intellectual processes (operations), of which prior knowledge is connected with divergent production (thinking), when a child generates multiple solutions trying to solve a problem creatively. Divergent thinking is described with its creativity, originality. It gives a child an opportunity to test different solutions to a task and find a creative one [5, p. 67].

The Contents dimension includes five areas of information to which human intellect applies operations. Of these, prior knowledge is connected with visual component.

The Product dimension contains results of applying particular operations to specific contents. Of these areas prior knowledge is connected with transformation which supposes changes, perspectives, conversions, mutations to knowledge [6, p. 27].

Preschoolers' prior knowledge is formed visually, it is used in alternative way by a child providing its reconstruction and transformation, which leads to the achievement of ZPD, where not only the role of an adult but the whole pedagogical process in kindergarten (the content of work, methods, means and ways) become urgent.

METHODOLOGY

In the preschool institutions of the Republic of Armenia lessons, various works on preschool methodologies are organized (Speech development, Formation of elementary mathematical notions, Fine arts, Ecological education, Physical education), which form initial notions in children, as a result of which the content of relevant subjects is more easily mastered at school. In case of forming prior knowledge on chess, in elementary grades , "Chess" will easily be mastered by children, too.

However, in forming senior preschoolers' prior knowledge on chess we do not aim to present chess as a separate subject to children, but rather to invest chess prior knowledge in the entire pedagogical process of preschool educational institutions.

We'd like to mention, that such an approach is a result of the work carried out by the lecturers of the chair of Preschool pedagogy and methodology in ASPU.

Our approach is more evidently presented in Figure 3 .

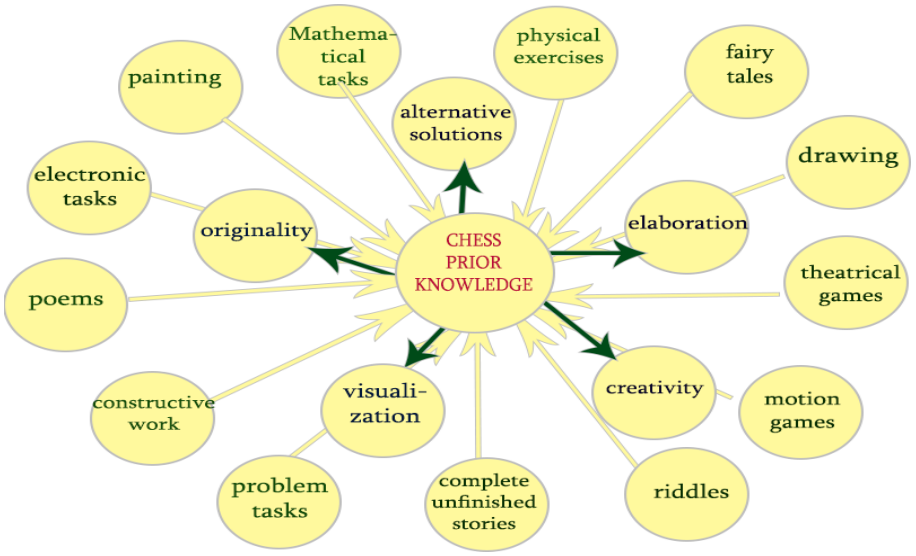

Figure 3.
The content of the work aimed at forming prior knowledge on chess

It is obvious that the process of developing senior preschoolers' chess prior knowledge has been carried out on the principle of integration, when the pedagogical approaches, forms, methods are introduced in the content of preschool methodologies, as well as in pedagogical practices (organized for students in kindergartens), modern pedagogical technologies,

organization of additional education (English teaching), in electronic game-tasks and materials.

The following principles in the formation of prior knowledge on chess have been worked out:

- entirety, interconnection of the pedagogical process of the kindergarten,
- availability, sequence, coordination of the formation of prior knowledge on chess,
- encouraging children's activity in acquiring chess prior knowledge,
- providing children's interest, their involvement in the work and active participation in it.

Basing on the principles the objectives have been driven out:

- developing children's interest to chess,
- introduction of the chessboard, its structure,
- presentation of chess pieces, their movements, the role of each piece in the game,
- formation of the ability to move the chess pieces freely on the board,
- development of skills to solve chess tasks trying to find alternative solutions to them.

The mentioned objectives were solved by presenting the worked out material in the following sequence:

- formation of prior knowledge on the chessboard (the structure of the board, directions),
- formation of prior knowledge on chess pieces (names of pieces, their movements, meaning and role of each),
- free movement of chess pieces on the board (problem solving tasks).

The outcomes of our work have also been worked out: a) the child thinks while moving the pieces on the chessboard, b) carefully follows friend's steps and evaluates them, c) orients in moves of chess pieces, plans the next move, d) justify the necessity of the move done by him/her in problem-solving situations, e) finds alternative solutions to gain the goal.

During the organization of the work, we took into account children's initial notions on preschool methodologies, for example, Elementary mathematics (numbers, squares, angle, edge, center, spatial concepts: right, left, backward, forward), Speech development (king, queen, white, black, row, column). At the age of 5-6 children already have above-mentioned initial notions.

Such an approach not only leads to master chess but solve the objectives of the preschool methodologies as well.

Let's comment on the above with the examples of Speech development methodology and Elementary Mathematics.

During Speech development lessons children name chess pieces, separates the first and last sounds of their names, make new words with those sounds, find and describe the missing

chess piece on the chessboard using synonyms, antonyms, make sentences, learn small poems, make situations or short stories about the pieces (eg. 'Why the knight changes the colour of squares all the time …?, What will happen if the pawns move backward…?), guess riddles, tell fairy tales, give questions to each other about chess, estimate peers' answers, complete unfinished stories etc.

It's obvious that by introducing a material with chess content in Speech development methodology, at the same time it is possible to solve the objectives of the latter and form children's prior knowledge on chess.

During lessons on Mathematics children not only maintain their notions on cardinal, ordinal numbers, spatial notions, geometric figures through chessboard, adding and subtraction through the points of each chess pieces but also solve problem tasks (eg. How many geographical figures can you find on the chess board? How many possible ways does the Queen have to gather all the flowers?, What piece will the white Bishop take? - See Figure 4).

Figure 4.

Taks

This kind of tasks, on the one hand, help children to perceive chess board, chess pieces, their moves, on the other hand, find different ways for solving the tasks.

In other preschool methodologies we also invested such situations, which allow the child to think and find alternative solutions.

DISCUSSION

The effectiveness of the research has been revealed by William's diagnostic methodology. It consists of 12 different images that children should complete and name. The diagnostic methodology reveals the level of the following five components, which estimate children's divergent thinking: smoothness, flexibility, originality, elaboration, giving a name.

The choice of Williams's methodology is conditioned by the fact that prior knowledge, as we mentioned above, is connected with divergent thinking.

The experiments were carried out in three kindergartens. On the whole, 60 senior preschoolers took part in the experiment.

According to the final results, 38 (63%) children manifested high level, 16 (27%) average and 6 children (10%) low level.

We must also note that before organizing the work with children the initial data were as the following:

20 (33%) children manifested high level, 25 (42%) children-average, 15 (25%) children low level.

The data are presented in Chart 1.

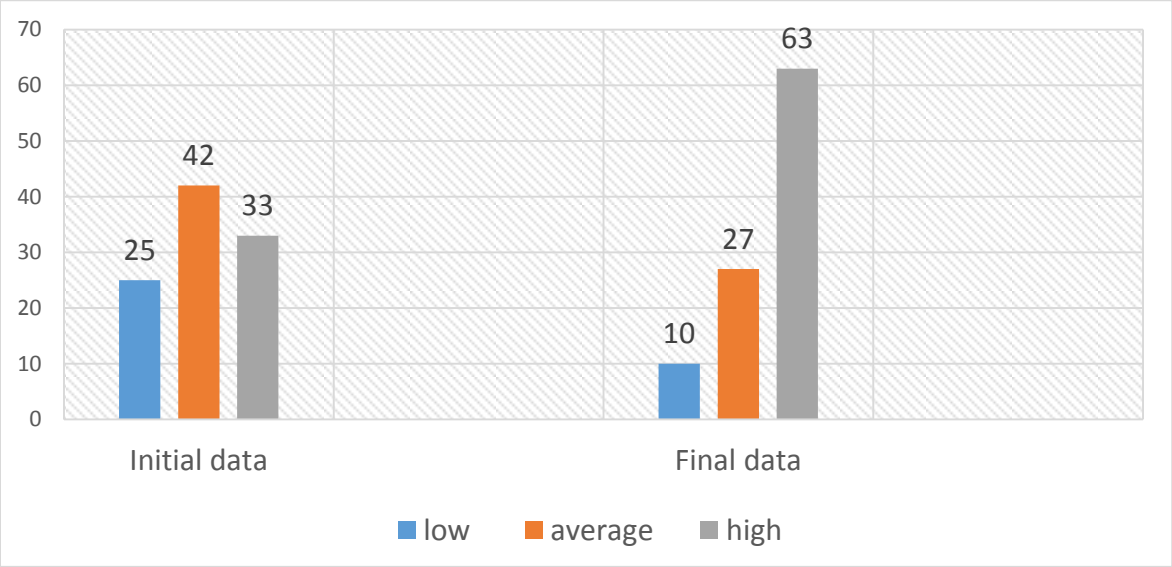

Chart 1.
Initial and final data of the research

As it is seen from Chart 1 after the work conducted with children there is an increase in high level and reduction in average and low levels.

The obtained results justify the effectiveness of our approaches of developing senior preschoolers' prior knowledge on chess providing transition from zones of actual development into proximal

We'd like to mention some risks in the initial stage of the research. On the one hand, they were connected with the insufficient chess knowledge of kindergarten teachers, on the other hand, with the concern to involve the children in the process. The mentioned risks were gradually reduced, as systematic work was carried out with the kindergarten teachers (Chess training). As for the children, they gradually involved in the process, showing a positive attitude, especially to the lessons with chess prior knowledge content.

CONCLUSION

The results of our theoretical and experimental work have proved:

- the effectiveness of our approach to the formation of prior knowledge on chess when the latter is included in the whole process of preschool educational institutions, in various activities organized with children, which continuously strengthens children's chess notions by using different forms and methods.
- interconnection of prior knowledge on chess and divergent thinking,
- senior preschoolers' prior knowledge on chess, which, in fact, is connected with divergent thinking, provides the transition from the zones of 'actual' into 'proximal' development,
- such an approach increases the level of preschool education and reveals new opportunities of development in children.

REFERENCES

1. Vygotsky L.S. Mind in society. Cambridge. MA:MIT Press. 1978. p. 78.
2. Linguistic Institute after H. Acharian. Explanatory dictionary of modern Armenian Language, Yerevan, 'Academy of Science' Press. 1969.
3. Atkin J. M., Black P. & others. Classroom assessment and the national Science education standards. National academies. 2001. p. 52.
4. Hailikari T., Katajavuori N. The Relevance of Prior Knowledge in Learning and Instructional Design. American journal of pharmaceutical education. 72(5). 2008. p. 48.
5. Runco M.A. & Acar S. (2012). Divergent thinking as an indicator of creative potential. Creativity Research journal. 24(1). 2012. p. 67.
6. Guilford J.P. Some changes in the structure of intellect model. Educational and Psychological Measurement. (48). 1988. p. 27.

ԱՄՓՈՓՈՒՄ

ԱՎԱԳ ՆԱԽԱԴՊՐՈՑԱԿԱՆԻ ՇԱԽՄԱՏԱՅԻՆ ՆԱԽԱԳԻՏԵԼԻՔԻ ԵՎ ԴԻՎԵՐԳԵՆՏ ՄՏԱԾՈՂՈՒԹՅԱՆ ՓՈԽՊԱՅՄԱՆԱՎՈՐՎԱԾՈՒԹՅՈՒՆԸ

ԱՄԻՐԱՂՅԱՆ Մ. Գ.

Հոդվածում քննարկվում է ուսումնադաստիարակչական գործընթացում նախադպրոցական տարիքի երեխաների զարգացման կազմակերպման հարցը, որտեղ կարևոր գործոն է նախագիտելիքը: Վերջինս էական է նաև շախմատ խաղը յուրացնելու համար: Այստեղից էլ, մի կողմից, անդրադարձել ենք ավագ նախադպրոցականների (5-6 տարեկան) շախմատային նախագիտելիքի ձևավորման խնդրին, ընդգծելով դրա ներմուծումը նախադպրոցական ուսումնական հաստատությունների մանկավարժական գործընթացում (տարբեր մեթոդիկաներից

կազմակերպվող պարապմունքներ, խաղեր, տարատեսակ աշխատանքներ, էլեկտրոնային խաղ-առաջադրանքներ), մյուս կողմից, շախմատային նախագիտելիքի ազդեցությունը զարգացման գործընթացի վրա՝ ապահովելով անցումն իրական զարգացման գոտուց դեպի մերձական՝ խթանելով երեխայի հնարավոր զարգացումը:

Այնուամենայնիվ, հարկ է նշել, որ մանկապարտեզներում նվազ ուշադրություն է դարձվում երեխաների նախագիտելիքի խնդրին, մինչդեռ վերջինս էական դեր է խաղում նաև դիվերգենտ (այլընտրանքային) մտածողության զարգացման գործում: Վերջինս ներառվում է Ջ. Գիլֆորդի կողմից առաջադրված ինտելեկտի կառուցվածքի մեջ: Այստեղից էլ, հետազոտության նպատակն է բացահայտել շախմատային նախագիտելիքի ազդեցությունն ավագ նախադպրոցական տարիքի երեխաների զարգացման վրա և ցույց տալ վերջիններիս փոխկապվածությունը դիվերգենտ մտածողության հետ:

Հետազոտության արդյունավետությունը բացահայտվել է Վիլյամսի կողմից առաջադրած հայտորոշիչ մեթոդիկայի միջոցով: Ստացված արդյունքները ներկայացված են եռաչափ մոդելով՝ ցածր, միջին և բարձր մակարդակներով:

Հիմնաբառեր. շախմատային նախագիտելիք, նախադպրոցական կրթության մեթոդիկաներ, «իրական» և «մերձակա» զարգացման գոտիներ, դիվերգենտ մտածողություն, ինտելեկտի կառուցվածք:

РЕЗЮМЕ

АМИРАГЯН М. Г.

ВЗАИМОСВЯЗЬ МЕЖДУ ШАХМАТНЫХ ПРЕДВАРИТЕЛЬНЫХ ЗНАНИЙ И ДИВЕРГЕНТНОГО МЫШЛЕНИЯ СТАРШИХ ДОШКОЛЬНИКОВ

В статье рассматривается вопрос организации развития дошкольников в образовательном процессе, где предварительные знания являются важным фактором. Последнее также необходимо для овладения шахматной игрой. Отсюда, с одной стороны, мы затронули вопрос развития предварительных знаний по шахматам у старших дошкольников (5-6 лет), сделав акцент на их внедрении в педагогический процесс дошкольных образовательных учреждений (занятия, игры, электронные игры-задания), с другой стороны, влияние шахматных предварительных знаний на процесс развития, обеспечивающих переход из зоны «актуального развития» в «ближайшую», стимулируя возможное развитие ребенка.

Однако следует отметить, что в детских садах проблеме предварительных знаний детей уделяется меньше внимания, а последние также играют значительную роль в

развитии дивергентного (альтернативного) мышления. Последний входит в структуру интеллекта предложенной Гилфордом. Таким образом, цель исследования - выявить влияние шахматных предварительных знаний на развитие старших дошкольников и показать их взаимосвязь с дивергентным мышлением.

Эффективность исследования была выявлена с помощью диагностической методики, предложенной Уильямсом. Полученные результаты представлены в трехмерной модели на низком, среднем и высоком уровнях.

Ключевые слова: предварительные знания по шахматам, методик дошкольного обучения, зоны «актуального» и «ближайшего» развития, дивергентное мышление, структура интеллекта.

Approved for publishing by doctor in psychology, professor V. Karapetyan
08.12.2021թ.

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

COMPARATIVE ANALYSIS OF THE STAGES OF SOLVING MATHEMATICAL AND CHESS PROBLEMS AIMED AT DIVERGENT THINKING OF PRIMARY SCHOOL LEARNERS

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Annotation. The article presents the chess-mathematical problems of primary interest to primary school learners, the stages of its solutions, as a result of which comparative analyzes are conducted.

Keywords. Mathematics, chess, condition, unknown, chess, finger, chessboard, version, diagram, stage, requirement, division, chess pieces.

Submitted to the editor 24.11.2021

SUMMARY

Since 2011, in the Republic of Armeniathe subject "Chess" has officially been taught in the 2nd-4th grades.In parallel with the analysis of the process of teaching chess in the primary school, such issues were singled out, which are mostly connected with the solution of the problems of mathematics envisaged in the same classes. More precisely, the clarifications of the issues ate raised below:

1) to get acquainted with the conditions of chess and mathematical problems;
2) to evaluate the given position in the chess problem, to separate the condition from the demand in mathematical problems in a similar way, to perform an analysis aimed at divergent thinking;
3) to make a plan for solving chess-mathematical problems;
4) to choose a method or methods for solving chess-mathematical problems;
5) to organize the solution of chess-mathematical problems in groups or individually;

6) to apply guiding questions during the solution of chess-mathematical problems;
7) to use even the wrong solutions to chess-mathematical problems for finding the right ones;
8) to summarize, analyze and conclude the solutions of chess-mathematical problems according to the categories of divergent thinking.

The aim of the article is to find out the results that the 4th graders achieved in solving the problems set by the subjects of "Mathematics" and "Chess" in the conditions of choosing similar methods aimed at divergent thinking.

The set of experiments and the venue. The process of solving the following mathematical and chess problems was tested at Yerevan AYB School using new teaching technologies. 40 participants from the 4th grades took part in the experimental workfrom February 2020 to October 2021. Mathematical-chess problems with their complexity correspond to the educational programs of the 4th grade of the Republic of Armenia.

Methods and materials. During the research the materials used include - methodological instructions provided by the given subjects of the primary school, the creative thinking tests (William's divergent thinking test), the interview method in individual lessons and statistical methods. For the study of divergent thinking, 3 tasks were set each, with 40 minutes of "Mathematics" and "Chess" subjects, taking into account the results of the initial experiments and the abilities of the children. The interview was conducted by the teachers teaching mathematics and chess in the given class in order to study the components of divergent thinking.

Introduction

In elementary school, students solve many problems in the process of teaching mathematics and chess. The article attempts to analyze and compare the stages and process of solving first mathematical and then chess problems in terms of divergent thinking.

> **Problem 1.** The girl found 36 mushrooms and the boy 28. It turned out that 6 of those mushrooms cannot be eaten. How many mushrooms did the children find to eat? [1, page 5]

Usually the analysis of the problem starts with the clarification of the following questions: What are the conditions mentioned in the request? Since the number of mushrooms collected by the children is alreadygiven separately in the request.The number of mushrooms that are not edible is also known. The demand of the problem is to find out the number of mushrooms children picked to eat. Surely, the problem can be solved in different ways, which serve as a basis for making judgments about the components of divergent thinking. We ask guiding questions in advance. 1) Do we know how many mushrooms the children picked together?, 2) Can we find out how many mushrooms they found together, 3) Do we have data on the number of mushrooms not to eat? 4) If we find the whole number of

mushrooms and we have the number of mushrooms not to eat, can we find the number of mushrooms to eat?

Now let's move on to the process of solving a similar chess problem in terms of content.

Problem 1. Consider the one-step chess problem (see Figure 1) where whites start at a given position [2, p. 46].

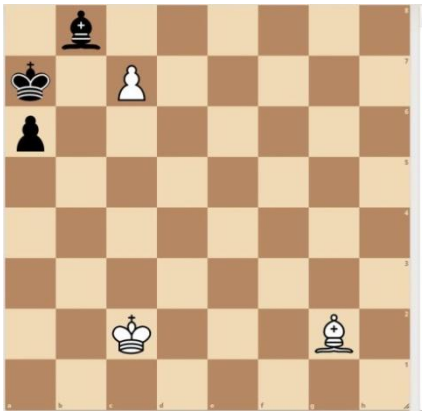


Diagram 1

In the following position, the whites must checkmate the blacks' king. Before solving the problem, one should carefully understand the position .To solve the problem, one must evaluate the position and first of all, the position of the kings. Since the whites are to checkmate in one step, it is enough to assess the position of the black king. It is necessary to notice the possible steps of the black king. Assessing the position, one must take into account the fact that the whites have a white Bishop that cannot check the black King. Therefore, it is necessary to find possible checks by whites. Here the method of excluding the solution of the problem can be used [3, p. 5], if we exclude the possibility of checking with the white bishop and the king, then it remains only to check with a pawn, who can check the black king only in case of being converted to a knight, as a result, the black king appear in the position of a checkmate.

During the solution of the mathematical problem the given condition and the requirement are separated, during the solution of the chess problem the given position is evaluated.When solving a mathematical problem, we try to find the solution to the problem through reasoning. In solving the chess problem, we used a method that helps to find the "checkmate" step. The chess problem is simple, but to solve it, the learner should imagine the possibility of converting a pawn, excluding other checkmates by whites' chess pieces beforehand. In both cases the learner should imagine the solution to the problem. In order to solve it, the vital necessary skills that should be include- creativity, ability to imagine the further steps beforehand, perception of a new position and assessment. Now back to the process of solving the mathematical problem observed in the same class.

Problem 2. The perimeter of a triangle is equal to 27 cm. The length of one of the sides is 8 cm, the other - 10cm: Find the length of the third party [1, Page 7].

Of course, in order to solve the problem, it is necessary for the learner to have some knowledge about the perimeter of a triangle as well as the unit of measurement of length. If the learner knows that the perimeter of a triangle is the sum of the lengths of the three sides of the triangle, then finding the solution to the problem leads to subtracting the lengths of the two sides from the given perimeter. The result is the length of the third side of the triangle.

Let's move on to the chess problem.

Problem 2. Consider a two-step chess problem (see Figure 2). In the given position, the launch is given by whites, following checkmate in 2 steps [3, p. 30].

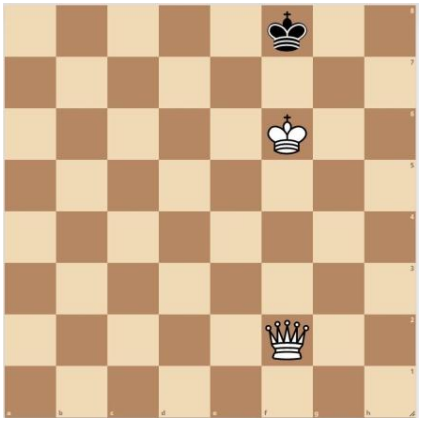


Diagram 2

To solve the problem, children first use the step-by-step transfer method. E.g. the step belongs to the blacks'. In the position, the children see two possible steps of the blacks' king. 1….Kf8-e8 and 1….Kf8-g8. After observing the mentioned steps of the blacks' King, children are to try to find out from which field the Queen of whites' is to checkmate the blacks' King. It is not difficult for fourth graders as they is familiar with checkmate positions. Finding the whites 2.Q e7#, 2.Qg7# steps the child infers in which field the white queen should be in order to simultaneously control e7 and g7 fields. Learners find the - 1.Qf2-a7 - step. It turns out that in order to solve the problem, it was necessary for the learner to know the checkmate positions with the queen. The difficulty in solving a chess problem relies on the idea of taking mental steps and imagining a position. However, when using problem-solving methods, it is easier to find a solution. Chess problems are solved on a "simple to complex" basis. The learner imagines the final position, then, according to knowledge perceived, creates that position from one or several steps in his/her mind, without moving the pieces. Solving such problems develops the child's creative mind, expands visual perceptions, refines the counting technique, strengthens the sense of time, therefore, knowing the final position, he/she takes a step to reach the final position he/she imagined or knew in a short time.

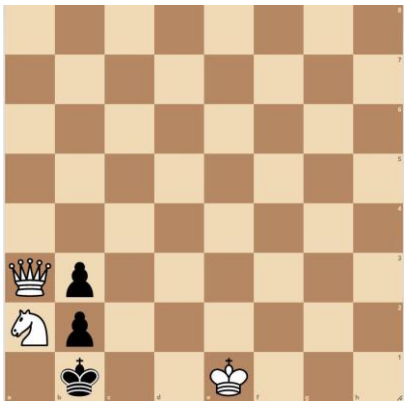
Learners are reminded in advance how to calculate the perimeter of a triangle and create a checkmate position with a queen. To solve the math problems children read the requirement of the problem, although there were children who needed additional explanation so that the teacher could "present the problem once more" and then many children could find the answer to the problem, and some could do so through guiding questions. As a result of applying the "Exclusion" method in the chess problem, the students found the Qa7 step leading to checkmate.

The students completed the task without moving the pieces, imagining the checkmate position. Then, without placing the pieces, they imaginedthe whites Ke6, Qe3 blacks' Ke8 position on the field, the requirement of which is the same: Is it possible to declare a two-step checkmate? In this case, having the answer to the problem, the children moved the pieces to the vertical E.

The pre-analyzed position helped them to imagine the next position, what the teacher had said before. The answer was correct, again with the help of step Qa7, the whites declare a checkmate in two steps. Let us now consider a mathematical problem that requires active imagination and logical operations.

Problem 3.A clock in Ashtarak strikes three times in four minutes. In how many minutes will it strike nine times? [4, p. 26]. To solve the problem, it is necessary for the learners to find the time (period) from one beat to the next. But before that, they must find the number of intervals between the three beats. Learners find that there are two ranges for three beats. Then they find the interval between the striking beats by dividing the 4 minutes into two equal parts. That is, it took 2 minutes from one beat to the next. Now let's move on to the problem requirement. How many minutes will the nine beats take? Again, the number of ranges must be determined first. Since there are nine beats, the children find the number of beats, which is one less than the number of beats. Then the number of ranges will be 8. The children found that it takes 2 minutes from one beat to another, so in the case of 8 intervals it will be 8x2 = 16 minutes.

In parallel, let's move on to the chess problem.



Problem 3. Now consider a two-step finger problem. In the given position (see Figure 3), the turn is for whites' to move, checkmate in two steps [3, p. 9].

Diagram 3

To solve this problem, let's try to use the methods of creating a checkmate position and step transferring. The point of the checkmate positioning method is to visualize the emerging checkmate position before finding a solution. It is necessary to apply the step first transfer method: Suppose the step belongs to the blacks'. They have 1….Kb1-a1, 1….Kb1-c2 and 1….b3xa2 three-step capability. If 1….Kb1-a1, then (if the queen of whites is left << a2. Na2-c3 #. And if 1… . Kb1-c2, then the whites will have the opportunity checkmate with the queen from the fields of e4, f5, g6, h7. If 1… .b3xa2, then in the resulting position the whites can checkmate only from the field d1, that is t say 2. Qd1#. If we combine the above judgments, it will become clear that the queen of whites must stay on the "a" vertical and at the same time be able to control any of the d1, e4, f5, g6, h7 fields. And this can be done by moving the queen to the a4 field. Then the solution to the problem is 1. Qa3-a4 step, after which the characters appear in the Zugzwang situation. If 1….Kb1-c2, then 2. Qa4-e4#, 1….b3xa2 will be followed by 2. Qa4-d1#, and 1….Qb1-a1 with 2. Na2-c3#:

As a result of this type of study, it turned out that additional skills are required by the learner when solving a chess problem. To recite: 1) imagining the given position in mind, calculating the approximate values of the pieces, 2) moving them in mind without touching the pieces, 3) imagining each new position in mind, discussing and calculating possible steps in the new positions, 4) seeing intersections of the steps of the pieces, 5) to checkmate the opponents King in the current position 6) to create mental checkmate positions, 7) to find all possible steps of the opponent.

With the above-mentioned logical operations, children are able to solve mathematical-chess problems by following the same logical operations. It turned out that children solve the chess task clearer and faster than the math one. The reason is poorly connected with the peculiarities of mathematics and chess. The solution of a math task or problem presupposes a precise calculation, which leads to at most one answer in elementary school, and in the case of chess we can say that the directions of calculation are very different.

In any position, the opponent has many opportunities to take steps, so the child must be taught the ability to take all the steps mentally. Of course, the children see the pieces on the chessboard, but they cannot move them, using the step transfer method, throwing the opponent into the Zugzwang situation and winning in two steps. This is why the development of a child's two-way thinking is vital, when he/she not only observes his step, but also all the possible steps of the opponent and mentally imagines the position, evaluates it and creates checkmate positions that he/she initially imagines. The listed skills are developed in the process of solving chess problems, which are useful in solving mathematical problems, too. In addition, during the game of chess, the learner constantly calculates how many points he/she has. For example, one can count how many points each side has in the starting position. The learner adds the approximate values of the pieces in his/her mind, of course, for

convenience, he/she starts with the pawn-8 points, after which increases the value of rooks - 10 points, total number is 18 points. Then he/she adds the values of four light figures, 4 pieces of 3 points, that is, 12 points, total number is 30 points. In the end he adds the value of the queen equal to 9 points, final number is 39 points.

During this calculation, the learner acquires a preliminary knowledge of the approximate values of the pieces, the rest, while imagining, he/she performs in his mind the addition, possibly multiplication operation, without writing or seeing numbers. A child playing chess visually calculates which piece controls the most fields, which makes him/her active, and he/she compares which piece controls the most fields with his opponent. Unlike chess math exercises and problem solving, the learner's eye sees the numbers or writes them on his/her own. It can be said that due to the solution of chess problems, the learner develops the ability to turn images into numbers and to act on them [8]. Solving chess problems develops a series of static pieces - imagining and seeing the trajectories of their movement, which is also a very important skill, especially when solving problems related to movement; it is also possible when solving geometric problems.

The process of solving chess-mathematical problems was studied with an individual approach through an interview. After recording the personal data of 40 students, the arithmetic mean of the data was calculated to give a general idea of divergent thinking. [5]

Since divergent thinking involves the **fluency of thinking** [6], we mean that it is a characteristic of speed, which indicates the performance of actions in accordance with the requirements of the problem in a given time, the next transition for finding a large number of solutions. As an indicator we have chosen the number of steps taken sequentially per unit time when solving both mathematical and chess problems. The duration of one lesson (40 minutes) is defined as a unit of time for fluency of thinking and other components.

As for the **flexibility of thinking** [6], we can say that it shows the number of out-of-standard but on-demand actions at the specified time. Observe the movements of the pieces with a different approach. For example, to checkmate other ways. Non-standard thinking. See what else can be done so that the opponent does not understand (backup step).

Let us now turn to the **originality of thinking**. Thinking creativity shows how much the child sees the whole playing field, the possible movement of the pieces from the opponent.

The **elaboration of thinking** [6] describes one of the primary characteristics of a child as the process of discovering cause-and-effect relationships involved in chess moves or actions involved in solving a mathematical problem.

Name: [6]. What is the name of each chess or math problem given by the learner (one or two words or phrases)?

Characteristics of divergent thinking (According to F. Williams)	Average data of the step-by-step solution of mathematical problems of forty 4th grade students according to the characteristics of divergent thinking	Average data of step-by-step solution of chess problems of forty 4th grade students according to the characteristics of divergent thinking	Characteristics of divergent thinking (According to F. Williams test)
1) Fluency of thinking or fluent thinking	4	5	6
2) Flexible thinking (flexibility of thinking)	6	8	7
3) Originality of thinking (thinking creativity/originality)	3	4	5
4) Elaboration of thinking	6	8	5
5) Naming	4	3	5

The study of correlation relationships shows:

1) The connection between mathematics and chess is 0.9065.

2) The connection between the components of chess and Williams' divergent thinking - 0.5353.

3) The relationship between the components of mathematics and Williams' divergent thinking is 0.5783.

Thus, a comparative analysis of the stages of solving mathematical-chess problems shows that the actions included in the mathematical-chess problems are based on almost the same logic [9]. It can be assumed that in terms of correlations, their data are quite close to each other (correlation coefficient - 0.9065). The comparison of the components of divergent thinking in mathematics showed that their relative correlation was 0.5783, and the correlation of divergent thinking in chess showed 0.5353. These differences are less pronounced in specific features, as the game of chess is more the product of imagination and Williams' divergent thinking test is more based on imagination. [7].

In both cases it is necessary to evaluate the position, and in the case of mathematics it is necessary to clarify the given condition and requirement as much as possible. As for the solution of math and chess problems, it can be stated that although the same methods have been used, they still have their specific applications.

REFERENCES

1. Plochko A.S. Bantova-m-a-moro-m-i-pishkalo-a-m-matematika-dasagi8q-3-rd-dasarani-hamar, Erevan, 1981, 207
2. Tumanyan H.T. Shachmat 2.Vargutyunneri tetr, Erevan, 2020, 77eg
3. Misakyan S., Shachmat 2-4, Metodakan dernark, Erevan, 2018,172 eg
4. Hakobyan A., Hrimyan N. Tramabanakan chndirner, 2000, 198 eg
5. Belocerkovec N.I. Chupaha I.V. Razvitie divergentnogo mishlenia mladshih shkolnikov-istoria problema poisk reshenia mir nauki kulturi obrazovania 2, 2018 s.178-180
6. Gilford dp strukturnaa model intelekta psishologia mishlenia M.,2005, s-37-45
7. Divergentnoe mishlenie available at https brainapps ru blog, 2016, 01, divergentnoe-myshlenie-brainapps-ru-7-shto-takoe-divergentnoe-i-konvergentnoe-mishlenie-available-at-http-newgoal-ru-chto-takoe-divergentnoe-i-konvergentnoemyshlenie-newgoal-ru
8. Zaharova M. Divergentnoe mishlenie kak asnova tvorchestva ichnosti available at http fbru article 43347 divergent noemyishlenie kak osnova tvorchestva lichnosti fb-ru
9. Terehova G.V. Razvitie kreativnih spaspbnstei mladshih shkolnikov v uchobnom procese- chelyabinskk, 2006, s.48-50

ԱՄՓՈՓՈՒՄ

ԿՐՏՍԵՐ ԴՊՐՈՑԱԿԱՆԻ ԴԻՎԵՐԳԵՆՏ ՄՏԱԾՈՂՈՒԹՅԱՆԸ ՄԻՏՎԱԾ ՄԱԹԵՄԱՏԻԿԱԿԱՆ ԵՎ ՇԱԽՄԱՏԱՅԻՆ ԽՆԴԻՐՆԵՐԻ ԼՈՒԾՄԱՆ ՓՈՒԼԵՐԻ ՀԱՄԵՄԱՏԱԿԱՆ ՎԵՐԼՈՒԾՈՒԹՅՈՒՆ

ԿԱՐԱՊԵՏՅԱՆ Վ.Ս., ՄԻՍԱԿՅԱՆ Ս.Զ., ՍԱՐԳՍՅԱՆ Շ. Գ.

Հայաստանի Հանրապետությունում 2011 թվականից 2-4-րդ դասարաններում պաշտոնապես դասավանդվում է «Շախմատ» ուսումնական առարկան: Կրտսեր դպրոցում շախմատի դասավանդման գործընթացի վերլուծություններին զուգահեռ առանձնացվել են այնպիսի հարցեր, որոնք առավելապես կապված են նույն դասարաններում նախատեսված մաթեմատիկայի խնդիրների լուծման հետ: Ավելի կոնկրետ նկատի ունենք ստորև առաջադրված հարցերի պարզաբանումները. 1) ուշադիր ծանոթանալ շախմատի և մաթեմատիկական խնդիրների պայմաններին, 2) գնահատել տրված դիրքը շախմատային խնդրում, նմանատիպ ձևով մաթեմատիկական խնդիրներում առանձնացնել պայմանը՝ պահանջից, կատարել

դիվերգենտ մտածողությանը միտված վերլուծություն, 3) կազմել պլան շախմատային և մաթեմատիկական խնդիրների լուծման համար, 4) ընտրել մեթոդ կամ մեթոդներ շախմատային և մաթեմատիկական խնդիրներների լուծման համար, 5) խմբային կամ անհատական տարբերակով կազմակերպել շախմատային և մաթեմատիկական խնդիրների լուծումը, 6) կիրառել ուղղորդող հարցեր շախմատային և մաթեմատիկական խնդիրների լուծմանը ընթացքում, 7) օգտագործել շախմատային և մաթեմատիկական խնդիրների նույնիսկ սխալ լուծումները ճիշտ լուծումներ գտնելու համար, 8) ամփոփել, վերլուծել, եզրակացնել շախմատային և մաթեմատիկական խնդիրների լուծումները՝ ըստ դիվերգենտ մտածողության կատեգորիաների։

РЕЗЮМЕ

СРАВНИТЕЛЬНЫЙ АНАЛИЗ ЭТАПОВ РЕШЕНИЯ МАТЕМАТИЧЕСКИХ И ШАХМАТНЫХ ЗАДАЧ, НАПРАВЛЕННЫХ НА ДИВЕРГЕНТНОЕ МЫШЛЕНИЕ МЛАДШЕГО ШКОЛЬНИКА

КАРАПЕТЯН В. С, МИСАКЯН С. З., САРГСЯН Ш.Г.

В Республике Армения с 2011 года предмет «Шахматы» официально преподается во 2-4-х классах общеобразовательных школ. Параллельно с анализом процесса обучения шахматам, в начальной школе были выявлены некоторые вопросы, которые в большей степени связаны с решением математических задач в тех же классах. Более конкретно мы имеем в виду разъяснения приведенных ниже вопросов. 1) Внимательно ознакомиться с условиями шахматных и математических задач. 2) Оценить данную позицию в шахматной игре, аналогично отделить условие от требования в математических задачах, провести анализ, направленный на дивергентное мышление. 3) Составить план решения шахматно-математических задач. 4) Выбрать метод или методы решения шахматно-математических задач. 5) Организовать решение шахматно-математических задач групповым или индивидуальным методом. 6) Задавать наводящие вопросы при решении шахматно-математических задач. 7) Использовать даже неправильные решения шахматных и математических задач, чтобы найти правильные решения. 8) Обобщать, анализировать, решать шахматно-математические задачи по категориям дивергентного мышления.

Approved for publishing by PhD, lecturer Marianna Amiraghyan,
08.12.2021թ.

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

FUNCTIONS OF ALGORITHMIC THINKING IN THE PROCESS OF DEMONSTRATING CHESS SKILLS

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LET'S THINK ANOTHER WAY
Steve Jobs

New ideas will not come to you if you sit down and wait for them. Talk to people, watch the world, get out of the closed house-work chain, ask yourself questions and look for the answers. Try it. **You will never know what you are looking for until you find it.**

Abstract: Technological upgrades, progressive scientific and technical developments are a direct reflection of the challenges of the 21st century, the overcoming of which implies a review of the content of education and the results obtained from it, aimed at developing a creative, self-planning, results' predicting personalities. The acquisition of the mentioned qualities is ensured by the introduction of a chess game in the educational process, the purpose of which is not only to learn chess, but also to develop cognitive, emotional qualities at young age (K. F. Chabris), action prediction, thinking quality, decision-making quality (E. S. Herts), performing analytical actions (G. Kasparov), etc.
Keywords. algorithmic thinking, algorithmic-logical ways,

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However, the mentioned approaches apply to primary school children, while we try to discover new age opportunities by introducing these chess elements in pre-school educational institutions, assuming that the mentioned abilities may be available to pre-school children as well. As for the relevant specialists, it can be stated that the system of training specialists, with its multi-vector developments, is practically directed to the formation of a specific priority type of thinking. After all, the processes of receiving, processing and transmitting information include not only elements of sensory knowledge, but also natural manifestations of certain connections.

Information retrieval and processing is related to the discovery of causal links, the find out possible causes, which, in fact, presupposes the existence of programming skills. It is estimated that 90% of new professions will require programming skills in the future, and on what thinking basis? The solution to the problem of child programming today requires the development of logical-creative thinking, which can eventually lead to the introduction of quite complex projects. Through the introduction of educational programs, algorithmic-logical thinking is considered within the framework of the educational subject, which, in fact, is a mandatory component in the field of programming and robotics. Algorithmic-logical ways of thinking, in their diversity, however, are specified in various spheres of life. In the case of chess, it is more appropriate to formulate the idea that "To understan someone else's algorithm means to understand your own one". The algorithm as a unique way of thinking and style, the application of thinking schemes with complete observations, are sequential actions that develop the child's intellectual abilities with both logical and pictorial thinking. The creative potential, based on logical thinking, shifts to algorithms. Algorithms and the development of algorithmic skills in the learning process lead to the effectiveness of children's educational activities, which is a prerequisite and effective means of intellectual development in the process of developing chess knowledge. A question arises; in terms of intellectual capacity development, what are the preconditions for emphasizing the unique role of algorithmic thinking in elementary school, especially when teaching chess?

At the conceptual level, many authors have addressed the child's cognitive motives, cognitive interests (N. Belik, V. V. Davidov, A. Leontev, etc.), aspirations, memory, attention, mental processes, emotional-behavioral qualities. D.E. Knut views an algorithm as the final set of rules that establishes a sequence of operations to solve specific problems. **Programming is essentially a process of creating and applying algorithms.**

The algorithmic thinking is the art of arguing about the algorithmic processes of the surrounding reality, the ability to plan the actions involved, the ability to plan different actions involved, to predict different scenarios and to agree on them. However, systematic studies of algorithmic thinking, programming, and planning do not sufficiently consider the possibilities of developing algorithmic thinking in any subject so that they can be applied in other subjects. In chess, on the other hand, the "reflection of hidden actions" as a revelation-evaluation, brings us closer to the practical side of algorithmic thinking, which is one of the necessary conditions for planning cognitive activities. After all, any planning process presupposes ensuring a sequence of actions. Everyone should plan to learn, because it teaches thinking (Steve Jobs).

In fact, **the game of chess is the application of the chosen sequence of actions,** but this is already a problem of children's programming.

A brief description of the functions of algorithmic thinking

The value of algorithmic thinking as a necessity for a new type of educational outcome is focused on accomplishing or solving real-life tasks. The child has a number of general educational skills, as the mental apparatus is formed, includes the development of logical-algorithmic thinking. The goal of purposefully chosen moves (actions) during a chess game, with its changes, is the ability to be continued until the end of the game.

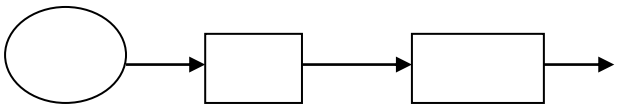
If we list the actions in chess according to the sequence of performance, it will become clear that regardless of everything (position analyzing, moves' studying, etc.) the actions are mental in the conditions of the process. Of course, first the children test the move in their minds, then they take it. The priority is to develop the ability to plan at the level of individual moves and stages, but in the end, as a result, the child masters the practical, intellectual-cognitive tasks and general methods of solution.

Specific functions of algorhythmic thinking. By mastering the intermediaet and final results of their activities, monitoring and evaluation activities, children can first plan their goal, steps (actions) and then implement them.

Algorithms and algorithmic skills are an effective way to develop the preconditions for children's educational activities in the learning process. After all, an algorithm is a way of accepting and maintaining the purpose of its future chess learning activity, which is a sequence of moves (functions) for the implementation of practical-educational tasks. Mastery of the algorithm, as a method, allows to solve the chess problem or perform similar tasks, as their abilities are not only constantly generalized, but also become transferable in the process of clarifying new chess situations. The actions of monitoring, self-control and directing are very typical of algorithmic thinking. **These are essential functions.** The sequence of moves (actions) is performed in a strictly defined manner, at least once. The algorithm is characterized by the fact that there is a condition that must be followed, if it is fulfilled, we will have a sequence of moves in one direction, if not, then there is another direction (in the case of networking). There is also another approach, for example, the Cyclic algorithm contains a few operations that need to be repeated several times before a certain condition is met.

Among the subjects taught in primary school, the teaching of chess, in addition to its standard orientations, basically reveals the existence of 3 types of algorithms.

Linear algorithm, when chess moves (actions), transitions go in only one direction - a clear "straight line".



Let's bring simple examples from chess.

Example N 1

In a given position (see Diagram 1) it is the whites' turn; mate in 7 moves.

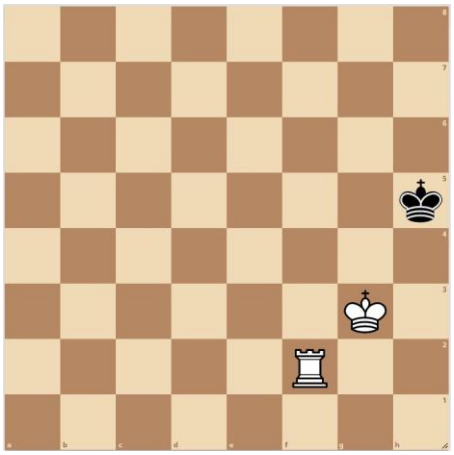


Diagram 1

Whites can mate the black king only on the edge line. Therefore, one should try to keep the black king on the edge line. The position of the white king is not favorable in the given position; therefore, his position needs to be improved. The white king must bypass the black king by 1. Kg3-f4 move, to prevent him from escaping from the edge. But the black king tries to go away from the edge by 1.… Kh5-g6 move. It is natural that the white king moving 2. Kf4-g4 opens the way for the rook to prevent the black king from escaping. The black king is obliged to do the following move 2.… Kg6-h6. The white king with the same logic tries to bypass the black king moving 3. Kg4-f5, to keep him on the edge. Of course, the black king will not stay on the edge line, he will try to escape from the edge line with 3.… Kh6-g7 move. The white king, again moving 4. Kf-g5, opens the way for the rook, not allowing the black king to escape from the edge. The black king is forced to move to the edge by 4.… Kg7-h7. Once again the white king tries to bypass the black king moving 5. Kg5-f6 to keep him on the edge line. Of course, in this position the moves of the black king 5.… Kh7-g8, or 5.… Kh7-h8 are almost equivalent, because in the first of the mentioned moves the white king makes a move 6. Kf6-g6, followed by the only 6.… Kg8- h8 move, followed by 7. Rf2-f8 #. And the move of black's 5.… Kh7-h8, is responded by the whites' 6. Kf6-f7 move, followed by 6.… Kh8-h7, the whites have to mate by 7. Rf2-h2 move.

Chess example N2

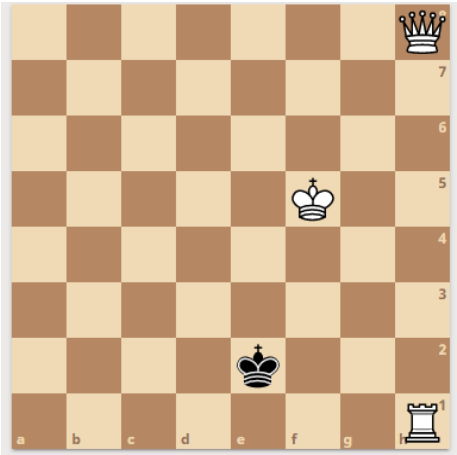
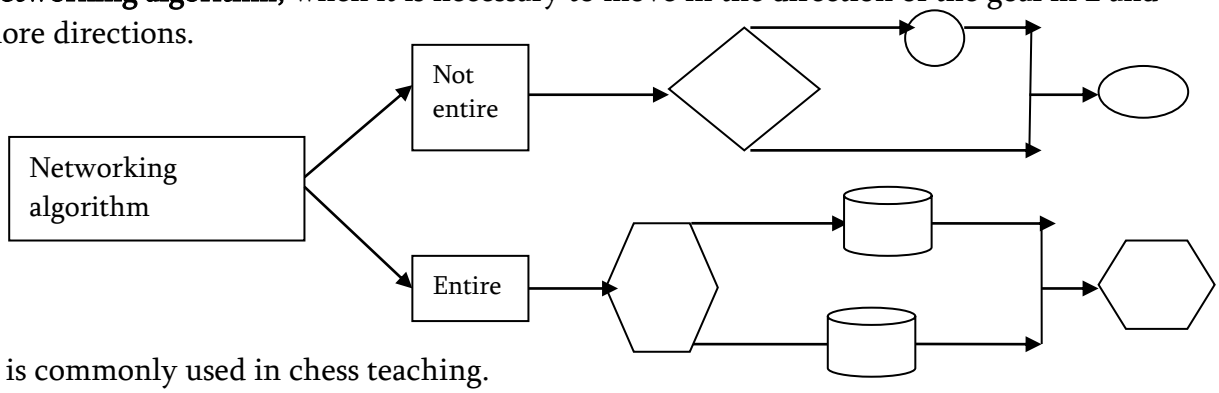


Diagram 2

Mate in 2 moves. The white king moves to e4 and then the white queen moves to h2.

In the next position (see Diagram 2), the whites mate the black king in two moves. There are 10 different solutions to this problem. The planning of moves is aimed at constraints the black king´s moves. To do this, first the white king moves (e4), then the white queen moves (h2). The variety of moves does not yet indicate a networking algorithm.

Networking algorithm, when it is necessary to move in the direction of the goal in 2 and more directions.



It is commonly used in chess teaching.

Chess example N 3

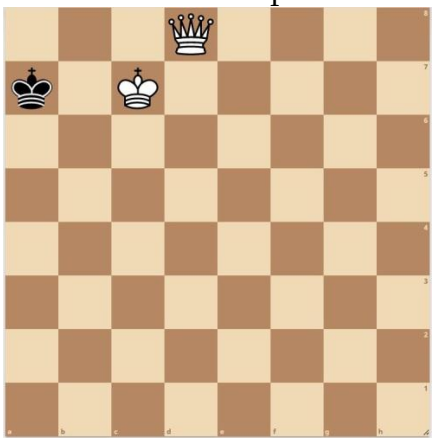


Diagram 3

To find the solutions to the problem, the set of solutions can be divided into four subsets. This is also an example of networking algorithm, according to the priority of the goal, because the goal is also an action (as a verb).

1. The whites can check the black king by the first moves, those are two: 1. Qd8-b8 +, 1. Qd8-d4 +, the mentioned moves can be responded by 1.… Ka7-a6, followed by 2. Qb6 #.
2. The whites can control the a6 with the queen with the first move, and they can do it with 1. Qd8-d6, 1. Qd8-f6, 1. Qd8-d8-d3 moves, to which the blacks will respond by 1.… Ka7-a8. And the whites mate with 2. Qa6
3. The whites may not control the a6 with the queen, but allow the blacks to move to the a6 with the king. Of course, in this case, the white queen must control the a4, in order to mate from that square. That's why the whites take the following moves with the queen. 1. Qd8-e8, 1. Qd8-d7, 1. Qd8-h4, 1. Qd8-d1, which will be followed by the possible move of the black king 2. Qa4 #.
4. Of course, we should not forget about the possible move of the white king. The white king move 1. Kc7-c6 is responded by the black king 1. Ka7-a6, followed by 2. Qd8-a8#, or 2. Qd8-b6#.

Combined algorithm, the use of which presupposes the existence of a linear and networking agorithms, which we have already discussed.

Thus, the algorithmic way of thinking greatly contributes to the development of systematic knowledge and skills, also in chess subject's teaching.

The study of chess positions and mate situations leads to programming, and the algorithm defines a clear sequence of steps in the form of a linear or networking algorithm. The ability to think is becoming one of the most important priorities in the culture of modern high-tech applications in the world; the teaching of chess brings us closer to the gradual solution of this complex problem.

REFERENCES

1. Ershov, A.P. School Informatics: concepts, constituencies, perspectives [Text] / A.P. Ershov, G.A. Zmenigorodsky, Yu.A. Pervin. - reprint №152 VC SO AN USSR, Novosibirsk, 1979. p- 51
2. Soklakov, E.N., Algorithmic Motion [electronic resource]. URL: http://kursk-sosh41.ru/obychenie/metod-kopilka/31-biblioteka-statej/109-%20algoritmicheskoe-myshlenie.html "
3. What is an algorithmic thinking [electronic resource]. URL: http://algol.adept-proekt.ru/chto-takoe-algoritmicheskoe-mchlenie "
4. Federal State Education Standard of primary education
5. Gubina T.N. Yelets State University named after I.A. Bunina, c. Elets, Russia. Methodological acceptance of the development of algorithmic thinking of IT teacher of future

6. Kushnirenko, A.G. 12 lessons on that, for what is a necessary the school IT course and how to teach it [Text] / A.G. Kushnirenko, G.V. Lebedev. - Informatics. - 1999. - №1. - pp.2-15.
7. Luchko, L.G. Solution for tasks in the course of informatics [Text]: school-methodical position [Text] / L.G. Lucko. - Omsk: OmGPU, 2001. p. 80
8. Gazeikina, A.I. Thinking and programming teaching styles for students of pedagogical university [Electronic resource] / A.I. Gazeikina // Information technologies in education. 2006. Available mode: http://ito.edu.ru/2006/Moscow/I/1/I-1-6371.html
9. Leontiev Dmitry. The problem as a developmental resource, Main issues of pedagogy and psychology (Scientific periodical), 2020 (2), p.32-39

ԱՄՓՈՓՈՒՄ

ԱԼԳՈՐԻԹՄԱԿԱՆ ՄՏԱԾՈՂՈՒԹՅԱՆ ԳՈՐԾԱՌՈՒՅԹՆԵՐԸ ՇԱԽՄԱՏԱՅԻՆ ԿԱՐՈՂՈՒԹՅՈՒՆՆԵՐԻ ԴՐՍԵՎՈՐՄԱՆ ԳՈՐԾԸՆԹԱՑՈՒՄ

Վ.Ս.ԿԱՐԱՊԵՏՅԱՆ

Տեխնոլոգիական վերազինումները և առաջադեմ գիտատեխնիկական զարգացումները 21-րդ դարի մարտահրավերների անմիջական արտացոլումն են, որոնց հաղթահարումը ենթադրում է կրթության բովանդակության և դրանից բխող արդյունքների վերանայում՝ ուղղված ստեղծագործական, ինքնուրույն պլանավորման կարողությունների և արդյունքները կանխատեսող անձանց զարգացմանը: Նշված որակների ձեռքբերմամբ բարձրանում է շախմատային խաղի ներդրման արդյունավետությունն ուսումնական գործընթացում: Գերակա նպատակը ոչ միայն շախմատ սովորելն է, այլև փոքր տարիքում ճանաչողական և հուզական որակների զարգացումը, նպատակամետ գործողությունների կանխատեսումը, մտածողության և որոշումների կայացման նոր որակների ձեռքբերումը, ճյուղավորված ալգորիթմական գործողությունների յուրացումը:

РЕЗЮМЕ

ФУНКЦИИ АЛГОРИТМИЧЕСКОГО МЫШЛЕНИЯ В ПРОЦЕССЕ ПРОЯВЛЕНИЯ ШАХМАТНЫХ УМЕНИЙ

КАРАПЕТЯН В.С.

Технологические обновления, передовые научные и технологические разработки являются прямым отражением вызовов 21 века, преодоление которых предполагает пересмотр содержания образования и получаемых результатов, направленных на развитие творческих, самопланированных и предикторов результатов . Приобретая указанные качества, повышается эффективность внедрения шахматной игры в учебный процесс. Основная цель - не только научиться шахматам, но и развить когнитивно-эмоциональные качества в молодом возрасте, предсказывать действия, приобретать новые качества мышления, принятия решений и выполнять аналитические действия.

Approved for publishing by PhD, lecturer Marianna Amiraghyan,
08.12.2021

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

THE PECULIARITIES OF THE THINKING OF PRIMARY SCHOOL PUPILS STUDYING CHESS

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SUMMARY

The relevance of the research is due to the lack of experimental data aimed at studying the level of explicit – illustrative thinking of students studying the subject of "Chess" at school.
The aim of the research is to find out the level of explicit – illustrative thinking of primary school students.
The results of the survey: Summing up the analysis of the results of the methods used during the experiment, we conclude that Chess as a subject has a positive effect on the development of students' logical thinking, on the development of the stability of attention, which contributes to the effectiveness of mental activity, in particular the ability to analyze and compare, as well as spatial orientation.
Key words: Chess subject, elementary school, explicit – illustrative thinking.

Submitted to edition 24.11.2021

Introduction. The initial period of school life covers the period from 6-7 years old to 10-11 years old. The socio-psychological boundaries are not the same in this age group. They may change depending on when the school starts and the child's school preparation period. Various mental qualities of a person are formed and developed in primary school age. Therefore, in the context of modern educational reforms, psychologists have focused their attention on the issue of intellectual development and the problem of studying age opportunities [2].

The educational activity is leading in the primary school age, because it forms the main relations of the child with the society, and in the field of that activity the formation of the main personal qualities of the school-age child, as well as the separate mental processes are carried out. Attitudes towards oneself, the world, society, and other people are formed through the elementary school educational activities. These relationships are primarily shaped by attitudes toward teaching content, methods, teacher, classroom, and school [7].

The thinking of a primary school learner in the first stage is in many ways similar to the thinking of a preschooler, it is obvious-practical. Children rely on real objects or substitute images when thinking. Considering this feature, elementary classes give a lot of importance to observational teaching, which is mainly built on the basis of ideas. However, the nature of the thinking of the students transferred to the 3rd grade changes to some extent. Gradually, primary schools learners master the concepts that are formed on the basis of individual features, previously accumulated ideas, perform mental analysis, comparisons, and generalizations [2].

Since 2011 Chess has been taught as a compulsory subject in the 2nd-4th grades of the secondary school of the Republic of Armenia. Naturally, this educational innovation immediately attracts the scientific attention of researchers to find out what is the role of this subject in the field of general education. Experimental studies in various psychological fields have been conducted in Armenian schools since the beginning of the teaching of chess and continue to this day. We are more interested in the results of research conducted to identify the development that takes place in the thinking processes of primary schoolchildren during the teaching and mastery of chess.

Thus, in 2012, in one of the schools of Yerevan, Chess was taught for 2 months on an experimental basis as a subject in the 2nd and 3rd grades, and then the students' logical thinking was studied through experimental research. The analysis of the results shows that the current level of a number of components of the logical thinking of primary school students who have studied chess, such as awareness, similarity, repetition of numbers, is higher compared to their peers who have not studied chess as a subject [5].

The results of the research conducted with the students in the fourth grades of schools No. 7 and No. 1 in Stepanakert, the capital of the Artsakh Republic, for the purpose of comparative analysis are also interesting. Having only one classroom in that region, where, unlike all other schools, Chess was not taught as a subject, the "Raven Progressive Matrices" methodology was used. It was found that according to the principles of progressive change in the similarity between pairs of figures, 4th graders passing chess were better able to demonstrate the ability to find symmetry, quick observation, constant change in their decision, and later developed their logical thinking [8].

Another group of researchers finds that in chess lessons and games, convergent and divergent thinking types are manifested in combined forms, which determine the role of chess in primary school as an intellectual game. It is possible that depending on the situation, thinking will transition from divergent to convergent and vice versa, which are included, are typical, go beyond stereotypical thinking. Depending on the situation, it is possible that thinking will move from divergent to convergent and vice versa, which are included, typical and go beyond stereotyped thinking [1].

The structure and methods of the research: In 2018, a group of psychologists from the Chess Research Institute organized and conducted a diagnostic experiment. The target group of the study was the group of pupils studying Chess in primary school, in particular, 2nd and 3rd graders. The research was conducted among 30 students with high, medium and low

academic achievement of the basic school of the Kh. Abovyan Armenian State Pedagogical University.

The purpose of the diagnostic experiment was to record and analyze the level of explicit – illustrative thinking of the pupils, to reveal the existence of visual ideas during the solution of cognitive problems.

The stages and methods of experimental research.

The research was conducted in two stages.

1 . Selection of appropriate methods from the "Egoscope" complex of objective psychological analyzes and testing, experimental application to reveal the cognitive style of learners [6]:

2. Analysis of research results.

In accordance with the purpose of the research, the children's version of the "Raven Progressive Matrices" method was selected from the "Exoscope" complex of objective psychological analyzes և testing complex [6]:

The Raven Progressive Matrices are a non-verbal test of intellect and are based on gestalt psychology, “Perception of Form” [4], and Ch. Spearman's “Theory of Neogenesis”[**3**]: The test was proposed by L. Pentoluz and J. Raven in 1936. It was developed in the English school in accordance with the traditions of intellect research, according to which the best way is to discover the relationship between abstract images. By developing tests that would be a useful tool for identifying hereditary and environmental conditions for the development of intellect, Raven has consciously set himself the task of creating tests that will be both theoretically grounded, straightforward, easy to conduct, and applicable at laboratory, home and school.

The two most popular are the black and white and colorful matrices. The color version is designed for children aged 6-9. It is sometimes permissible to use it for rehabilitation purposes with persons over 65 years of age. The colorful version consists of 3 series: A, AB, B, each with 12 matrices.

- In series A, the subject must fill in the missing part of the image. During the work with the matrix of this series, the following main speculative processes are carried out:
  - ✔ Distinguishment of the main elements of the structure and identification of the connections between them
  - ✔ Identification of the missing part of the structure and comparison with the presented examples.
- The process of performing the tasks of the AB series is the analysis of the main and missing figures in the picture (analytical-comparative thinking activity).
- When working with series B matrices, the experimenter looks for similarities between two pairs of figures. He discovers this principle through the gradual discovery of its components.

According to the theory of form perception, each task can be considered as a certain set of interconnected elements. It assumes that the matrix is initially a global evaluation of the task, followed by an analytical perception by revealing the principle underlying the development of the series by the subject. In the final stage, the separated elements are combined into a complete image, which helps to find the missing part of the image.

In the Raven Progressive Matrices test, the test subjects solved the specially complex specific problems that were gradually becoming more complicated through the "Egoscope" objective psychological analysis and testing complex. The primary school learners were asked to find the order of the particles in the matrix and mark one of the pictures below the screen. Studying the structure of the large matrix, the child had to choose the part that best corresponded to the logic of horizontal and vertical alignment of the picture.

The instruction given to the subjects particularly mentioned: "We are starting the game. We need an electronic pen for the game. One of the pictures is missing. On the left you will see 6-8 numbered images, one of which you have to place in the open part, indicating the image number on the right side of the screen".

Figure 1. Experimental research with Egoscope complex

The "Ego Scope" complex has made it possible to mechanically calculate the number of correctly solved matrices and present the correct answers according to them, expressed in percentages (%). Below is the conclusion of the scientific-experimental research, with the example of one subject with average progress in the 2nd grade of school N 57 in Yerevan.

Intermediate level of intelligence was registered- test scores are 14 and the number of correct answers is 58 out of 100. The percentage was 50% in A Series and 67% in AB series.

The quantitative results obtained after the end of the experiment are presented in the form of a diagram, which shows the average values of the correct answers of the students in the 2nd and 3rd grades, expressed in percentages (%).

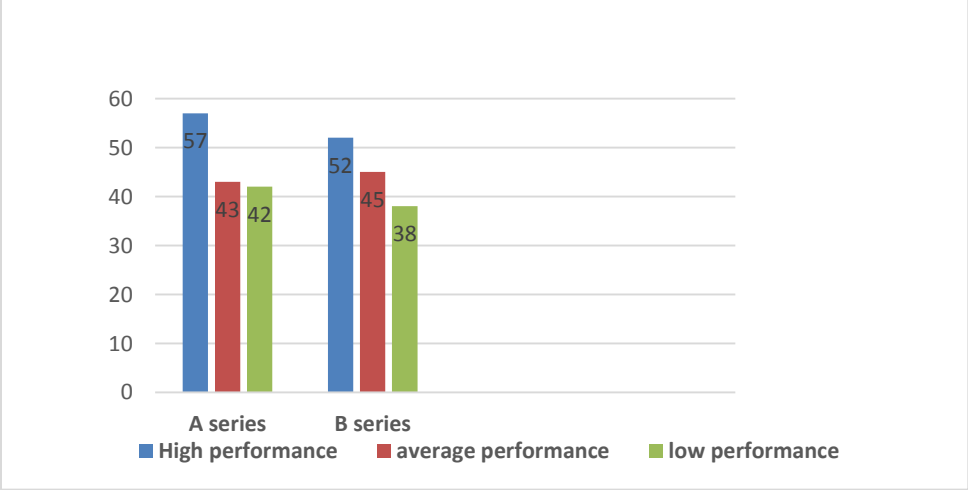


Diagram 1. "Raven Progressive Matrices" methodology results analysis, 2nd grade

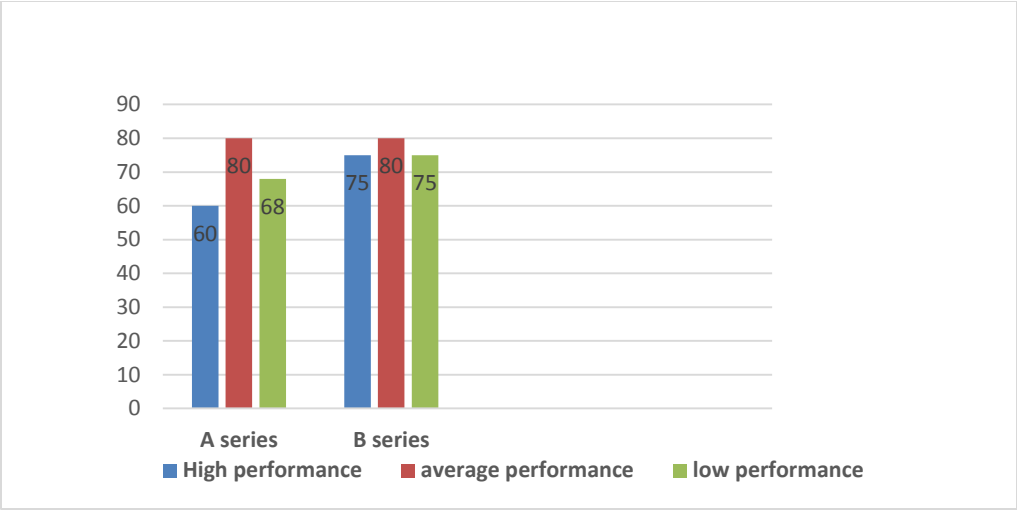
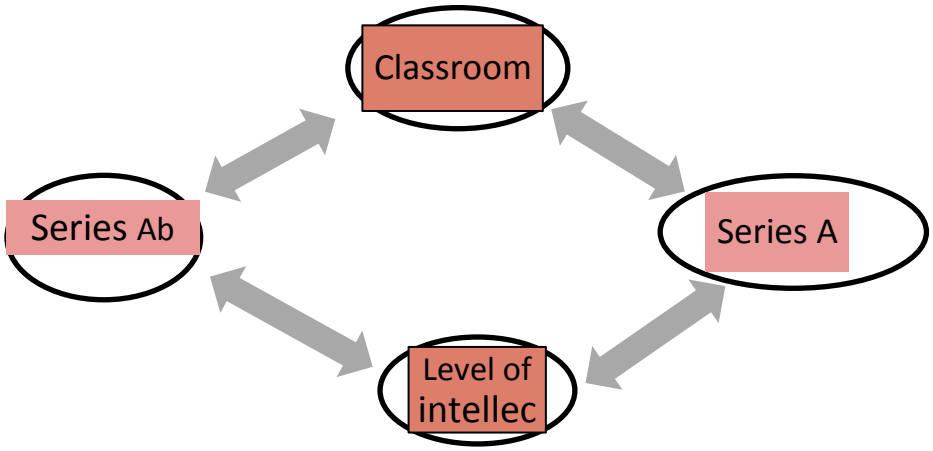


Diagram 2. "Raven Progressive Matrices" methodology results analysis, 3rd grade

Quantitative analysis of the results of the "Raven Progressive Matrices" method reveals that in the conditions of teaching and mastering the "Chess" educational subject, in comparison with the 2nd, in the 3rd grade, regardless of the academic progress, a positive movement of indicators was observed. the number of correct answers has increased, the number of wrong answers has decreased. The results of the experimental studies were subjected to correlation analysis.

Figure 1. External correlation manifest



The analysis of the results shows that there is a high correlation / above 0.7 / between the level of intellect of the learners and the combination of images, the ability to analyze, as well as the indicators of spatial orientation. There is also a high correlation between 2nd and 3rd graders and their level of intelligence. We conclude that Chess as a subject enables the learner to develop logical thinking and stability of attention creates conditions to discover new aspects and connections of the observed object, which as a precondition affects the implementation of effective mental activity.

REFERENCES

1. Gevorgyan S., Karapetyan V., Movsisyan N., Sargsyan T., Kostanyan E., Divergent mtatsoghutyan orinachap drsevorumnery shakhmatayin karoghutyunneri bacahaytman gortsyntacum, Shakhmatayin krtutyan ardi vitchaky ev zargacman mitumnary. Mijazgayin gitadjoghov. Tsaghkadzor 2019.-Er.: Qopy Print, 2019.-144 p., p. 22-30
2. Krtser dprocakani hogebanutyun. Usumnametodakan dzernark /HH KGN, Gorisi Pet. Hamalsaran; Kazm. J. Tunyan, L.-Er.: En-Ve Print, 2013.-288 p.
3. Drujinin V.N., Psichologia obshikh sposobnostey, SPB, «Piter», 2007 g., p. 27-28., Eremin A. L. , Noogenez I teoriya intellekta, Uchebno-metodicheskoe posobie, Krasnodar: «Sovetskaya Kuban», 2005. — 356 p.,
4. Jean Piaget. Psichologia intellekta, SPb.: "Piter", 2003. p.192
5. Pogosyan S.G., Aghuzumcyan R.V., Vliyanie Shakhmat na razvitie kreativnosti imintellekta v mladshem shkolnom vozraste, Hogekan aroghjutyan hajkakan hands 2013; 4 (1), p. 26-30
6. «Egoskop», Rukovodstvo polzovatelya, Chast 1, 2013, p. 56-62, 70-74
7. Elkonin D.B., Psikhologicheskie voprosi formirovanaiya uchebnoy deyatelnosti v mladshem shkolnom vozraste //Khrestomatiya po vozrastnoy I pedagogicheskoy psikhologii. M., 1981, p.84
8. Khachatryan A., Sargsyan A., Chess Research Laboratory, International Conference “Chess in Schools”.-Yerevan:”Zartprint” LLC, 2014-136 p.

ԱՄՓՈՓՈՒՄ

ՇԱԽՄԱՏ ՈՒՍՈՒՄՆԱՍԻՐՈՂ ԿՐՏՍԵՐ ԴՊՐՈՑԱԿԱՆՆԵՐԻ ՄՏԱԾՈՂՈՒԹՅԱՆ ԱՌԱՆՁՆԱՀԱՏԿՈՒԹՅՈՒՆՆԵՐԸ

ԽԱՉԱՏՐՅԱՆ Ա., ՍԱՐԳՍՅԱՆ Ա., ԳԵՎՈՐԳՅԱՆ Ն.

Հետազոտության արդիականությունը պայմանավորված է դպրոցում «Շախմատ» առարկան ուսումնասիրող սովորողների ակնառու-պատկերային մտածողության մակարդակի ուսումնասիրմանն ուղղված փորձարարական տվյալների սակավությամբ: Հետազոտության նպատակն է՝ բացահայտել կրտսեր դպրոցականների ակնառու- պատկերային մտածողության մակարդակը: Հետազոտության արդյունքները: Ամփոփելով գիտափորձի ընթացքում կիրառված մեթոդիկաների արդյունքների վերլուծությունը՝ եզրակացնում ենք, որ Շախմատը որպես ուսումնական առարկա դրական ազդեցություն է ունենում սովորողների տրամաբանական մտածողության, ուշադրության կայունության զարգացման վրա, ինչն էլ նպաստում է մտավոր գործունեության արդյունավետությանը, մասնավորապես վերլուծելու, համադրելու կարողությանն ու տարածական կողմնորոշմանը:

Հիմնաբառեր՝ Շախմատ ուսումնական առարկա, կրտսեր դպրոցական, ակնառու-պատկերավոր մտածողություն:

РЕЗЮМЕ

ОСОБЕННОСТИ МЫШЛЕНИЯ УЧАЩИХСЯ НАЧАЛЬНОЙ ШКОЛЫ, ИЗУЧАЮЩИЕ ШАХМАТЫ

ХАЧАТРЯН А., САРГСЯН А., ГЕВОРГЯН Н.

Актуальность исследования обусловлена отсутствием экспериментальных данных, направленных на изучение уровня образного мышления учащихся, изучающих предмет «Шахматы» в школе.

Цель исследования - выяснить уровень эксплицитно-иллюстративного мышления младших школьников. **Результаты исследования:** Подведение итогов анализа результатов проведенных в эксперименте методов, заключаем, что «Шахматы» как предмет положительно влияет на развитие логического мышления учащихся, на развитие устойчивости внимания, что и способствует эффективности умственной деятельности, в частности способствует формированию умения анализировать, синтезировать и ориентироваться в пространстве.

Ключевые слова:предмет «Шахматы», начальная школа, образное мышление.

Approved for publishing by researcher of CSRI Sona Nersisyan
01.12.2021թ

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

DISTINCTIVE FEATURES OF THE NEW STANDARD OF THE "CHESS" SUBJECT

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SUMMARY

The statement of the problem and the purpose of the study.

At various stages in the origin and evolution of society, different demands have been placed on the educational system and its content. As we all know, in the past, knowledge was all that mattered. Then it became evident that knowledge alone was insufficient. It is essential not just to recognize what you know,but also how you can use your knowledge. The skills were much more crucial at that point. However, gradually it became evident that this was unsatisfactory; because it is crucial for what purpose a person uses his/her knowledge and abilities, as well as how he/she reacts to certain changes. Views and attitudes also became influential at this stage. Today's world is growing more and more reliant on the integration of information, skills, attitudes, and abilities (competences). And here are Armenia's new general education standards, which were developed in 2021 and are based on capabilities.

Within this article, we discuss the importance of competence-based education, teaching principles/methods, and the eight skills that form the foundation of the Republic of Armenia's general education standard. The reflection of these competences in the standard of chess taught as a compulsory subject in the 2nd-4th grades of the Republic of Armenia's secondary schools is also introduced; some of the final results presented to the elementary school graduate are also shown, as are the requirements for the "Chess" subject.

We've also conducted a thorough comparative analysis of the new and current standards of the "Chess" subject.

The findings of the analysis of the questionnaire developed by us during the testing of the new standard and sent to instructors are also included in the article. Teacher input can aid in the development of a teacher training module.

Keywords: Competences, Competence-Based Education, Teaching Principles, Elementary School Outcome, Standards of the "Chess" Subject, Final Outcome of the "Chess" Subject.

Submitted to edition 04.12.2021

The essence of education based on competencies:

Armenia's new school education standards, which will be adopted in 2021, are based on competences.[1]

Different requirements have been addressed to content challenges at various points in the history of the educational system. Previously, only knowledge was valued. Then it became evident that just knowledge was insufficient. What you know is crucial, but so is what you can accomplish with what you know. Viewpoints became significant at this point. Competencies, which are based on the integration of knowledge, skills, and attitudes, are becoming increasingly common in today's world. The 1996 report of Jacques Delors[4], former director of UNESCO, in which he proposed the four pillars of education, was influential in the development of competency-based education. It comprises:

1) **learning to Know,** 2) **learning to do**, 3) **learning to Be,** 4) **learning to Live Together.**

Delors broadened the breadth of educational requirements with this report. It is critical because the individual in the twenty-first century must be adequately equipped to confront the difficulties. Modern man has numerous opportunities to act. As a consequence, it is vital that the educational system has the vision to turn knowledge, skills, and attitudes into action. The following formula illustrates this concept:

Competence = Knowledge + Skills + Attitudes = Action.

Competence is defined as skillful application of knowledge and values in one's own activities.

Mulder defines competence as "an integrated combination of knowledge, skills, and attitudes that come together to tackle specific challenges in a particular context."[3]

1. **Knowledge** consists of facts, numbers, ideas, and theories that contribute to the comprehension of a given subject and problem.
2. **Skills** are the ability to perform particular activities and apply your knowledge to obtain desired outcomes.
3. **Attitudes** are principles on the basis of which a person responds to ideas, people and events.

Some professionals also include values and motivation in the formation of competencies.

The Armenian state standard for general education, which is based on 8 competencies, was established in 2021. They are as follows: 1) language competency and literacy, 2) competency of “learning to learn”, 3) self-awareness and social competency, 4) democratic and civic competency,
5) digital and media competency, 6) mathematical and scientific-technical competency,
7) cultural competency, 8) economic competency.

The primary purpose of competence-based learning is to develop an individual capable of understanding and evaluating various circumstances, solving issues, and expressing a civic attitude by combining knowledge, skills, and attitudes.

The principles of competency-based teaching are as follows:

1. In the educational process, provide a safe, supporting, and growing atmosphere.
2. Build education on fundamental and long-term concepts.

3. To ensure the ongoing and spiral teaching of essential and lasting ideas at all levels of education.
4. Always provide material in the perspective of the wider context. Connect the material to essential concepts.
5. Use examples to teach crucial concepts and relate those to the learner's personal experience as much as possible.
6. Implement the graduation principle, bringing the learner to the level of autonomous learning and mastery of the material.
7. Allow pupils sufficient time and opportunities to put what they've learned into practice.
8. Assist with mistake correction and development through formative assessment
9. Demonstrate judgment and creativity when planning and implementing teaching, taking into account the uniqueness of each classroom and class.
10. Create an opportunity for learners to teach each other by building a learning community.
11. Incorporate research elements into the teaching process to understand what occurs to students as a consequence of their learning, what works, what doesn't, and what can be reviewed in the future.

Matching the results of the elementary school and the "Chess" educational subject.

Along with the development of new educational standards, from 2019 the standard of "Chess" educational subject was also revised.[4] It should be noted that since 2011 the subject of "Chess" has been taught in the 2nd-4th grades of all schools of the Republic of Armenia. The expected final results of the elementary school (grades 1-4) were derived from the 8 competencies envisaged by the standard of general education. (Outcomes are about what the student should be able to know, what values and attitudes the elementary school graduate should have.) These generic results were derived from the subject outcomes.

In this article, we will present some of the outcomes and requirements presented to elementary school graduates for the subject of "Chess," which will allow chess teachers to have a clearer idea of the relationship between competencies and outcomes, will be visible, and we believe will be useful in shaping students' expected outcomes. Thus.

- **The Outcome of Elementary School** is to communicate freely in both written and oral literary Armenian, to read, grasp, and reproduce basic fiction and informational texts, as well as the main concept of the text. (In the case of national minorities, it may also be in their native language, and in the case of special educational needs, through appropriate alternative communication).

  The corresponding outcome of the chess subject: Read the chess texts and problems; understand the requirement trying to solve them. Interpret chess concepts. Try to understand the main idea of the lesson.
- **The Outcome of Elementary School** is to use the knowledge and skills to measure, count, compare, describe objects, evaluate their quantitative, qualitative and spatial simple ratios.

  The corresponding outcome of the chess subject: Ability to compare chess pieces according to approximate values and situation, also to count and present the

quantitative and qualitative differences of the field, pieces, steps and other concepts, and compare them.

- **The Outcome of Elementary School** is to recognize and draw geometric figures, and have a basic spatial idea.

  The corresponding outcome of the chess subject: Show and name the lines and parts of the field. Use a pawn's square. Checkmate with 2 bishops, using triangle. Checkmate with rook, using the rule of square and rectangle.
- **The Outcome of Elementary School i**s to build basic physical and mathematical models.

  The corresponding outcome of the chess subject: Build models with tactical tricks. Endgame checkmate with Queen and Rook, checkmate with 2 Rooks, checkmate with 2 Bishops. Checkmate with Queen and checkmate with Rook builds endgames according to trained models.
- **The Outcome of Elementary School** is to provide simple reasoning, generalizations and simple classifications when expressing thoughts .
- **The corresponding outcome of the chess subject:** Prove the steps taken, ability to make generalizations in different end-games, in typical positions, ability to make simple classifications based on the basics of opening, mid-game and end-game.
- **The Outcome of Elementary School** is to demonstrate logical and creative thinking, be able to reflect and respond to the work created by oneself and others.

  The corresponding outcome of the chess subject: Perform logical steps during the game. Create checkmate positions. Implement plans during the game opposing the opponent's plans.
- **The Outcome of Elementary School** is to prioritize learning by demonstrating curiosity.

  The corresponding outcome of the chess subject: In the 2nd grade, game teaching is carried out, the learner appreciates the role of knowledge; in the first half of the lesson, the learner receives and perceives knowledge; and in the second half of the lesson, the learner participates in the appropriate theme game, using his or her knowledge. The learner values attention and knowledge since these are the keys to triumph.

Comparison of previous and present standards. The author group assigned itself the task of researching this new educational document, comparing it to the previous standard, noting parallels and differences, identifying new approaches, and putting the standard to the test both in the classroom and in the teacher-student educational process, identify issues, devise solutions, and seek methods to improve.

The work was conducted in several stages. A comparative study of the criteria was undertaken in the first step. A variety of conceptual, structural, and content characteristics have been highlighted in this article. Let's have a look at them.

Table 1. Comparative analysis of current and new standards. Conceptual and structural differences.

	The current concept and standard of the "Chess" subject	The new concept and standard of the "Chess" subject
1	Three level	One level
2	The intended outcomes are broad and non-measurable. For example, the student has an idea, identifies it, knows it, and so on. The verb "to know" describes the end results of the topics of the end games, for example, to know the checkmate positions of the rook.	Expected outcomes are expressed using active verbs that indicate activities that demonstrate that the learner has achieved the desired consequences. For example, the learner will take a step, create, remark on it, evaluate it, plan it, and so on, create checkmate positions by rook, announce checkmate with the rook.
3	It is mostly based on the acquisition of knowledge.	The standard is based on the development of competences.
4.	The anticipated outcomes are based on the chess content.	There are a number of broad cross-cutting notions that create interdisciplinary links and assist the elementary school learner in forming a comprehensive image of the world.
5.	There are thematic written modules.	There are 2 project works in 3rd and 4th grades, which replace thematic written modules.
6	The standard is based on an equal ratio of theoretical knowledge and practical tasks.	The standard is based on a theoretical knowledge to practical task ratio, with the practical component taking precedence.
7.	The practical tasks are exclusively related to the solution of chess problems.	Practical tasks are various: • "tiny" themed games • Chess "live" game • Chess solving problems • educational projects • discussions, debates • competitions.
8	There is a discrepancy between the current standard - textbook - workbook content and requirements.	The standard-textbook-workbook, compliance with the content link and requirements.
9.	The standard is generalized.	The objective of the themes, the final outcomes, the time, the methods for reaching the outcomes, the interdisciplinary linkages, and the crossing ideas are all clearly stated in the standard.
10	The themes and times are specified in a logical order, limiting the teacher's freedom to act and make decisions.	The teacher is allowed sufficient flexibility to chose, make decisions, and innovate. For example, the teacher determines the order in which the pieces are taught, as well as the amount of time allotted.:

As can be seen, the new standard has only one level and is easy to accomplish; it generates measurable results; it is based on the development of competences, it includes general cross-concepts that emphasize interdisciplinary connections; the practical component takes precedence over theoretical knowledge; and the teacher is given freedom.
Let us now compare the content of existing and new standards.

Table 2. Comparative analysis of current and new standards. Differences in content.

	The current concept and standard of the "Chess" subject	The new concept and standard of the "Chess" subject
2nd grade		
1	The end result of the role of the king is missing. Regarding the king, there are two rules.	There is an end to the role of the king Regarding the king, the rules are various.
2	The mid-game principles are lacking.	There are mid-game principles adopted.
3	Introduce subjects such as eternal chegkmate and others.	Comment about the significance of the eternal checkmate. **It's tough**, therefore it's been moved to the third grade program.
4	Checkmate with one rook.	**It is tough and has been transferred from 2 to third** grade program.
5	Know the "fork" tactic with the knight	Create a double attack with the "fork" initially with all the pieces, then with the knight at the end, preserving the notion of "moving from simple to complex."
6	Checkmate at the final horizontal, “Child checkmate” themes. The themes are unrelated to the entire curriculum, and the learner is unsure when to employ them.	They are challenging, and they are included into the fundamentals of the game at the opening and middle, so that the learner grasps the meaning and applies it during the game.
7	Theme with a Hanging piece.	The theme is integrated in "Double Stroke" and "Draw" themes.
8	“Open attack" tactical trick.	**It is tough and has been transferred from 2 to third** grade program.
9	The types of “draw/tie”. Complex rules that the pupil must memorize.	There are several rules that the pupil should not memorize. The learner establishes "a tie" with all of the pieces.

10	There isn't a practical game for every topic.	Each topic has a practical "tiny" game and a "live game" associated with it; the games allow the learner to instantly use the new content obtained, to apply the knowledge in the same lesson. The games allow the teacher to determine whether or not the student has learned the new content and come to the conclusion of the lesson.
11	There isn't any live game. The learner solves tasks on his or her own or with the assistance of others.	The subject of "chess" is taught to the child as a game, an engaging battle. Not only does he remember what a mate is, but when he proclaims a mate during practical games, he gets the thrill of producing his own checkmate. In his own game, he notices his mistakes, corrects them, and accepts responsibility for them, but in a "real" game, the learner utilizes his knowledge.
12	The student have to be aware of the fields f2 and f7, as well as the weaknesses of the previous level.	During the real game, the learner employs the f2 and f7 fields, as well as the weaknesses of the previous level. The learner learns by self-organization and by making mistakes. In the game, he applies his expertise.
13	There are no chess fundamentals topics.	The fundamentals aid the learner in understanding the game's goal and meaning, as well as visualizing it as a whole.
14	There are no competitions to reinforce the topics covered.	There are 5 lessons with one-step checkmate problem competitions in which we strengthen the pieces, check, checkmate, stalemate, chess field, fields' names, "draw", "double attack" topics.
15	There are tactical trick eployed.	The majority of the tactical techniques have been shifted to the third grade program and are no longer available to the majority of learners. Only connection "draw" and double attack methods are available in the application.
16	There are no lessons on how to set up checkmate positions.	There are five lessons on creating checkmate positions. With three and then 4.5 pieces, the learner develops checkmate positions.
17	There is no practical game. In practice the principles are not applied.	Only by playing, according to game principles, and utilizing the "live game" can the 2nd grader prepare for the 3rd and 4th grades in terms of understanding tactical techniques and thinking about strategic plans, evaluation, planning, and implementation.
18	The subject's gaming potential is not utilized.	One may develop a love for the subject "Chess" by focusing on the gaming aspect of the subject.
3rd grade		

21	Suicidal rook.	The title was changed to "self-sacrificing rook." The emotional maturity of the elementary school pupil was taken into consideration.
22	Assistant checkmate.	This topic is not included.
23	Endgames are overwhelming for learners, and in some circumstances, teachers as well.	The end games are simplified, and the important notions, such as the "idea of collaboration," are taught.
24	All topics were prepared with one, at most two years of experience in consideration.	All topics were written after ten years of testing and investigation.
25	There is no position evaluation.	Position evaluation is a method that is used to guide learners in tactical and strategic circumstances.
26	The strategy section is complicated; it does not evolve from simple to complex idea.	Starting from the second grade, the strategy section evolves in a spiral, eventually integrating into the topics. The strategy section is the summit of chess learning, since it hones the learner's abilities to assess, plan, execute, predict, and avoid the program. It's essential that these topics are only presented when a sufficient foundation of knowledge has been developed.
27	Learn about the world champion's biography and one game.	The strategy of the world champion is being discussed.
28	There aren't many tactical tricks.	There are several tactical tactics. It is the strategy that propels the development of alternative thinking. For example, there are many typical steps and options in the position, but the learner must seek out and do the most unlikely, maybe profound, step or option

As we can see, the new standard is based on the dominance of the chess game aspect, which teaches the fundamentals of the game.

Complex themes have been eliminated from the standard, several tactical tactics have been added, and the strategy section has developed in a spiral while adhering to the sequence principle.

Lesson-competitions have also been created, which review prior information in a fun competitive environment.

The teaching of the end games is based on the concept of collaboration, which creates an acceptable value system for the learners.

To assess the efficiency of the new standard, we created a questionnaire and distributed it to the teachers taking part in the test.

In August 2021, 114 teachers took part in the study. The findings are as follows:

Figure 1. The results analysis of the assessment of the "chess" subject new standards

Question 1. *What do you think about the topics of the new standards of "chess" subject?*

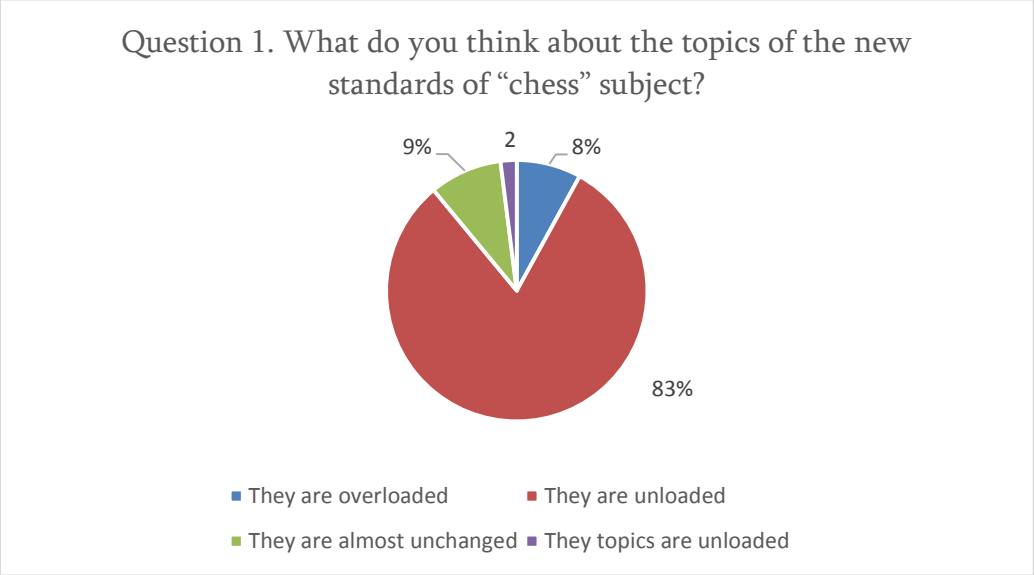


Figure 2. The results analysis of the assessment of the "chess" subject new standards

Question 2. *What do you think about the structure of the new standard for the "Chess" subject?*

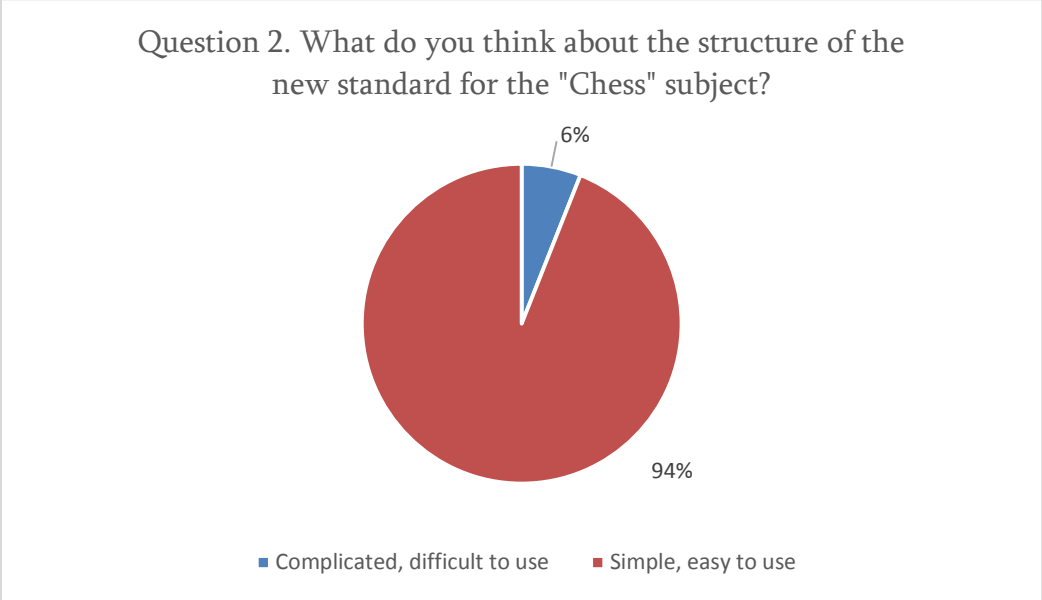
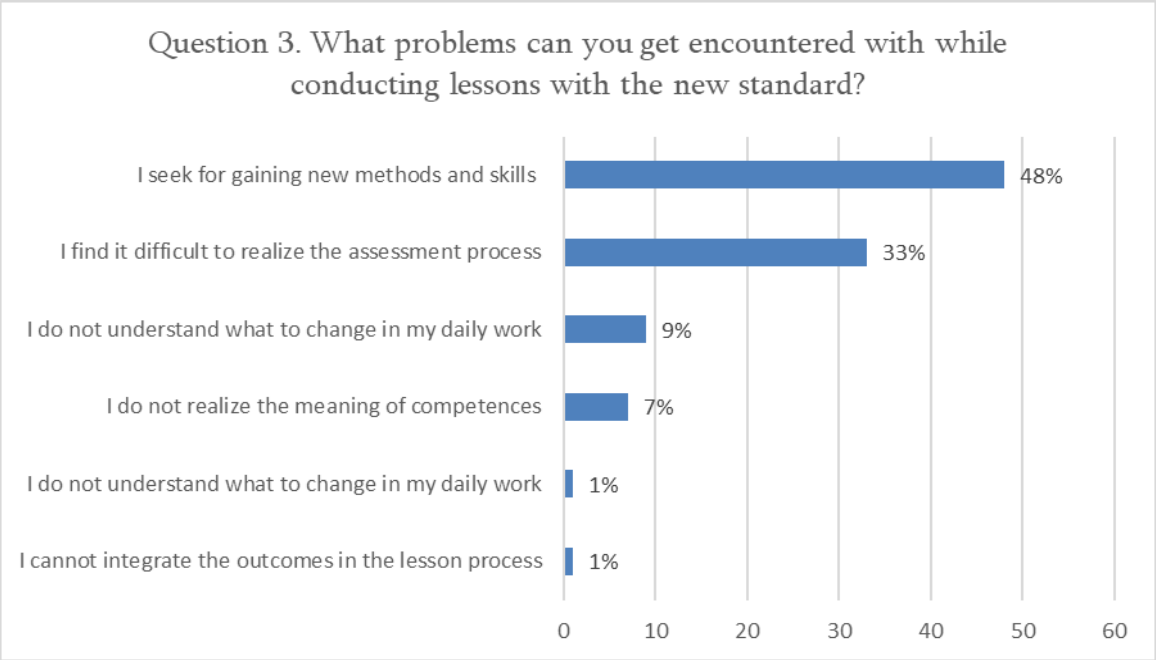


Figure 3. *The results analysis of the assessment of the "chess" subject new standards*

Question 3. *What problems can you get encountered with while conducting lessons with the new standard?*



As can be shown, the majority of teachers consider that the regular topics of the subject "Chess" are unloaded in terms of content and simpler to orient in terms of structure. As for the challenges, it's evident from the responses that teachers need new teaching approaches and abilities in order to organize competence-based learning and shape learners' desired outcomes.

We feel that the findings of the study mentioned above, as well as teachers' feedback, should be taken into account when developing a chess teacher training module.

REFERENCES

1. [1,p.3] Hanrakrtakan petakan chaporoshich, 2021, https://www.arlis.am/documentview.aspx?docid=149788
2. [2, p. 3] Delors J. et al. (1996). Learning: The Treasure Within / UNESCO. http://www.unesco.org/new/en/ education/themes/leading-the-international-agenda/rethinking-education/resources/
3. [3, p. 4] Mulder M. (2011). The concept of competence: Blessing or curse? / I. Torniainen, S. Mahlamäku-Kultanen, P. Nokelainen, P. Ilsley (eds). Innovations for Competence Management. Lahti: Lahti University of Applied Sciences. P. 11–24.
4. [4, p. 5] Hanrakrtutyan petakan ararkayakan chaporoshichneri ev orinakeli tsragreri nakhagits/Shakhmat/ 2021, https://escs.am/am/news/6707

ԱՄՓՈՓՈՒՄ
«ՇԱԽՄԱՏ» ՈՒՍՈՒՄՆԱԿԱՆ ԱՌԱՐԿԱՅԻ ՆՈՐ ՉԱՓՈՐՈՇՉԻ ԱՌԱՆՁՆԱՀԱՏԿՈՒԹՅՈՒՆՆԵՐԸ

ԽԱՉԱՏՐՅԱՆ Հ.Վ., ԽԱՉԱՏՐՅԱՆ Ս. Հ., ՄՈՎՍԻՍՅԱՆ Ն.Ն.

Հասարակության ձևավորման և զարգացման տարբեր փուլերում կրթության համակարգին, նրա բովանդակությանը ներկայացվել են տարբեր պահանջներ: Ինչպես գիտենք, նախկինում կարևորվում էր միայն գիտելիքը: Այնուհետև, պարզ դարձավ, որ միայն գիտելիքը բավարար չէ. կարևոր է ոչ միայն այն, թե ինչ գիտես, այլև այն, թե ինչ կարող ես անել քո իմացածով: Այդ փուլում ավելի կարևորվեցին նաև հմտությունները: Բայց աստիճանաբար պարզ դարձավ նաև, որ դա էլ բավարար չէ, քանզի կարևոր է, թե ինչ նպատակով է մարդն օգտագործում իր գիտելիքներն ու հմտությունները, ինչ ձևով է արձագանքում տարբեր զարգացումներին: Այս փուլում կարևորվեցին նաև դիրքորոշումները, վերաբերմունքը: Գիտելիքների, հմտությունների, դիրքորոշումների ինտեգրման հիման վրա, այսօր աշխարհում մեծ տարածում են ստանում կարողունակությունները (կոմպետենցիաները): Եվ ահա Հայաստանի հանրակրթության 2021 թվականին հաստատված նոր չափորոշիչները հիմնվում են կարողունակությունների վրա:

Ներկայացվող հոդվածում մենք անդրադառնում ենք կարողունակությունների վրա հիմնված կրթության էությանը, դասավանդման սկզբունքներին, ներկայացվում են այն 8 կարողունակությունները, որոնք ընկած են ՀՀ հանրակրթության չափորոշչի հիմքում: Քննարկվում է նաև այդ կարողունակությունների արտացոլումը ՀՀ հանրակրթական դպրոցների 2-4-րդ դասարաններում որպես պարտադիր առարկա դասավանդվող շախմատի չափորոշչում, կոնկրետ ցույց են տրվում տարրական դպրոցի շրջանավարտին ներկայացվող մի քանի վերջնարդյունքներ ու դրանցից բխող պահանջներ «Շախմատ» ուսումնական առարկայի համար:

Մեր կողմից կատարվել է նաև «Շախմատ» ուսումնական առարկայի նոր և գործող չափորոշիչների բազմակողմ համեմատական վերլուծություն:

Հոդվածում ներկայացված են նաև նոր չափորոշչի փորձարկման ընթացքում մեր կողմից կազմված և ուսուցիչներին տրամադրված հարցարանի վերլուծության արդյունքները. ուսուցիչների արձագանքները կարող են օգտակար լինել ուսուցիչների համար նախատեսվող վերապատրաստման մոդուլի մշակման ժամանակ:

Բանալի բառեր. Կարողունակություններ, կարողունակությունների վրա հիմնված կրթություն, դասավանդման սկզբունքներ, տարրական դպրոցի վերջնարդյունք, «Շախմատ» ուսումնական առարկայի չափորոշիչ, «Շախմատ» ուսումնական առարկայի վերջնարդյունք:

РЕЗЮМЕ

ОТЛИЧИТЕЛЬНЫЕ ОСОБЕННОСТИ НОВОГО СТАНДАРТА ПРЕДМЕТА "ШАХМАТЫ"

ХАЧАТРЯН Э. В., ХАЧАТРЯН С. О., МОВСИСЯН Н.Н.

На разных этапах становления и развития общества к системе образования и его содержанию предъявлялись разные требования. Как известно, раньше первенство отдавалось только знаниям. Очень скоро стало ясно, что одних знаний недостаточно: важно не только то, что вы знаете, но и то, что вы можете сделать на основе этих знаний. На этом этапе была дополнительно усилена роль навыков. Но постепенно стало понятно, что и этого мало, ведь важно также с какой целью человек использует свои знания и умения, как он реагирует на разные события. На этом этапе стали использоваться также позиции и установки. На основе интеграции знаний, умений и установок на сегодняшний день в мире широкое распространение получают умения (компетенции). И вот, новые стандарты общего образования в Армении, утвержденные в 2021 году, основаны на компетенциях.

В представленной статье мы обращаемся к сути образования, принципам обучения, представлены 8 умений, которые лежат в основе стандарта общего образования РА. Обсуждается также отражение этих умений в стандарте шахмат, который преподаются как обязательный предмет во 2-4 классах общеобразовательных школ РА.

Нами также представлен всесторонний сравнительный анализ новых, действующих стандартов предмета «Шахматы».

В статье также представлены результаты анализа анкеты, предоставленной нам учителями во время тестирования нового стандарта. Отзывы учителей могут быть полезны при разработке учебного модуля для учителей.

Ключевые слова: умения, образование, основанное на умениях, принципы преподавания, конечный результат школы, конечный результат предмета «Шахматы», стандарт учебного предмета «Шахматы».

Approved for publishing by, PhD in pedagogy, Docent Lusine Poghosyan
07.12.2021

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

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CHESS IN MEDICAL EDUCATION AT UMANAND PRASAD SCHOOL OF MEDICINE & HEALTH SCIENCES (UPSM&HS) IN FIJI

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KEYWORDS/Abbreviation :Chess,Education,MBBS-Bachelor of Medicine and Surgery, BPHC-Bachelor of Public health science, BMHS-Bachelor of Medical Health science, BNSCH-Bachelor of Nursing science with honour, UPSM&HS-Umanand Prasad School of Medicine & Health science, UNIFIJI-The University of Fiji

Abstract

Chess is a board game played by two people against each other. Chess is an abstract strategy game with no hidden information. It is played on a chessboard with a 64-square square grid and a 64-square square chessboard. At the start, each player has sixteen pieces (one king, one queen, two rooks, two knights, two bishops, and eight pawns): one king, one queen, two rooks, two knights, two bishops, and eight pawns. To acquire relevant information for the study, a literature review and a survey were done.

The study's goal was to identify the link between chess and cognitive development in medical students, as well as the relationship between various game kinds and the multiple

advantages the students received, and to correlate the level of chess players with their academic achievement.

This study found that chess has an influence on or increases abilities in learning and development. Playing chess produces the phenomenon of repeating, practicing, and mastering a strategy to influence the game result; similarly, on a learning platform, this method aids in memory retention of knowledge. Repetition, practice, and mastery are important in medical education because medical internships and residencies build students' confidence, knowledge, and practical skills.

Correspondence rounds are preferred at the starting level to assist learning of chess lessons, and as one improves, they progress to Rapid, Blitz, and Bullet.

More study is needed before educators may be deployed or taught to utilize chess in the classroom. A well monitored research survey may also provide a more definitive evaluation of the impact of chess in medical education in universities.

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Introduction

Chess is a strategic game that originated in India around 1500 years ago. According to legend, the emperor of India instructed his wise men to design a method for teaching the royal family's children to become greater thinkers and generals on the battlefield. The outcome was chess. Chess has expanded to every country on the planet in the centuries since its creation. While many other games have gone out, chess has survived. Many educators, from Benjamin Franklin through former U.S. Secretary of Education Terrell Bell, have endorsed it in the United States. Chess programs are offered in over 70 schools and a dozen libraries in Western Pennsylvania, reaching thousands of youngsters each year.

We introduced chess into the classrooms because we feel it has a direct impact on academic achievement. Chess makes children smarter. It accomplishes this by instilling the following abilities:

- Focusing - Children are taught the importance of paying close attention and focusing. They can not respond to what is going on if they don't pay attention to what's going on, no matter how brilliant they are.
- Visualizing - Children are asked to picture a series of events before they occur. We really improve their capacity to imagine by training them to relocate the pieces in their minds, one at a time, then many steps ahead.
- Thinking Ahead - It is taught to children to think first, then act. We educate kids to question themselves, "What may happen if I do this, and how might I respond?" Chess helps to build patience and thinking over time.

- Weighing Options - Children are taught that they do not have to perform the first thing that comes to mind. They learn to recognize options and weigh the benefits and drawbacks of various activities.
- Analyzing Concretely- chess teaches children to examine the outcomes of specific actions and sequences. Is this sequence beneficial or detrimental to me? Decisions are better made when logic rather than emotion is used to guide them.
- Thinking Abstractly - Children are taught to take a step back from specifics and analyze the broader picture on a regular basis. They also learn to apply patterns learned in one setting to different but similar ones.
- Planning teaches students to set long-term objectives and take efforts toward achieving them. They are also taught the need of reevaluating their strategies as fresh events alter the scenario.
- Managing Multiple Projects Simultaneously -Children are advised not to become unduly involved in any one topic, but to attempt to weigh several considerations at the same time.

None of these abilities are unique to chess, yet they are all required to play the game. The beauty of chess as a teaching tool is that it stimulates children's minds and assists them in developing these abilities while having fun. Children become more critical thinkers, better problem solvers, and autonomous decision makers as a consequence.

Chess may be more than just fun and delight for youngsters. Many parents, teachers, academics, and others believe that "Chess Makes Kids Smart" (a tagline coined by the United States Chess Federation) is more than just a community term.

Some studies in this subject have proposed a relationship between math ability and chess skills. Jeffrey Chesin, a chess teacher in Philadelphia, feels that the mental processes in arithmetic and chess are comparable. "But it isn't the entire story," he continues. "Youngsters who thrive in chess are likely to excel at math or in any problem-solving circumstance," Chesin adds, "but youngsters who excel at arithmetic are not always brilliant chess players."

Chess does not require children to be exceptionally brilliant. Chesin insists. "The bulk of the children I work with would be classified as 'average.' Some of them are below average. But they get interested and work hard at it. Determination is unquestionably a component."

Chess is thriving in several parts of the nation thanks to well-organized clubs. Adults who believe in chess and its benefits for children have tried to make it possible for kindergarten pupils to form teams and play the game. While teachers are frequently the chess instructors and sponsors, parents or other adults frequently accept some or all of the tasks.

After the first lockdown of 2020 because of COVID-19, the University of Fiji formed a chess club for its students for their extracurricular activity. This made way for The University to compete in both local and international competitions.

Review of related literature

According to Forrest, et al (2005) the chess coaching input functioned as a stimulus for educational improvement, as did the social relationships formed with instructors, parents, and students. This new type of social capital becomes a source of increased achievement. Chess-playing and chess-teaching became inextricably linked in this social interaction that rejected low expectations and challenging behavior.

They also stated that chess, like other educational efforts, cannot replace social policy measures that address the material poverty of low income and a long working day for many parents; nonetheless, it can help children's personal growth and resilience in poverty-stricken situations. If the affluent and powerful's major source of social capital is the 'holding of privilege' through extended family resources and the buying of educational opportunities – then chess-play, as a kind of cultural capital, can help to correct some of these educational opportunities inequities.

According to Gobet et al (2006) there is a significant gap between the bold claims frequently seen in chess literature and the very unconvincing findings of a small number of studies. The available evidence suggests that (a) the potential effects of optional chess instruction are still unknown; (b) compulsory instruction is not recommended, as it appears to cause motivational problems; and (c) while chess instruction may be beneficial at first, the benefits appear to diminish as chess skill improves, due to the amount of practice required and the specificity of the knowledge that is acquired.

Gobet et al also stated (2006) while chess may not "make kids smarter," it may provide what De Groot refers to as "low-level advantages" for our society, and it would be a shame not to take advantage of this chance.

According to Scholz et al, (2008) chess might be an excellent learning tool for youngsters with learning impairments. It has been found that chess teachings are being transferred to the strengthening of basic maths abilities.

According to Mirzakhanyan et al 2017 (1) Chess as an academic discipline is commonly referred to as a positive factor for pupils' personal development; (2) Parents' educational level is one of the frequently expressed contextual factors for adequate implementation of chess in schools; (3) Based on current research findings, the chess achievement evaluation test should be improved: Some curriculum adjustments in the school chess program may be required. (4) Appropriate parental support and home conditions for pupils' lesson preparation are also priority and critical variables for the effective introduction

of chess in school curricula: This area should be investigated further in order to understand the approaches and capabilities of schools for improving learning quality; (5) Teachers' pedagogical influence and attitudes toward education for everyone are also important for effective chess education in elementary schools. The research findings will enable the appropriate staff to promote best practices and investigate weak spots at many levels of education planning, spanning from national to student (individual) level.

According to Williams (2014) despite a solid scientific foundation that decisively points to the possible academic benefits, introducing chess will be a risky enterprise. Despite these challenges, policy advocacy change necessitates bold action and, to use another interpretation of the quote above, thinking outside-the-box. Most individuals find dramatic change difficult to embrace, and the use of chess as an educational tool represents a shift in the academic environment and what we as educators have previously deemed acceptable practice.

According to Mc Donald, methodically taught chess is a suitable incentive system to accelerate the rise of IQ in elementary age children of both sexes from all socioeconomic levels. This study looks to have extremely intriguing results about the transfer of chess thought to other fields of study.

Sala et al (2017) stated that chess teaching has been linked to improved arithmetic performance in the general population of primary and middle school pupils in the short term, but not in the long term. As a result, further study is required to validate chess as a teaching tool. A thorough experimental design is required to give information on (a) the possible placebo effects of chess education, (b) the cognitive mechanisms behind the transfer of chess abilities to mathematical skills, and (c) the optimal type and duration of the teaching for this transfer to occur.

Objectives:

1. To establishment chess the correlation and its development in cognitive development in medical students
2. To find out the correlation of different game types to the different advantages the students have acquired.
3. To co-relate the level of chess players (beginner, amateur, intermediate, pro or expert) have influenced chess on their academic success.

Scope and Limitations:

Scope

The purpose of the study was to find out the relationship between playing chess and the education of students in Umanand Prasad School of medicine . The data for this study was

gathered from the students of Umanand Prasad School Of Medicine,the questionnaire was circulated at randon of which 141 students answered. The study was conducted for 3 days

Limitation

There were several notable limitations while compiling this research.

- The number of respondents was a major limitation in this research because of the current COVID-19 restrictions, therefore we could not reach the maximum number of participants. This limitation could not be overcome because of the legislation imposed by the current government of Fiji islands.The effect of this limitation has severely reduced the population size of the research.
- No face to face interviews were conducted due to the authors following strict COVID-19 protocols therefore the fact that the authors of this research could not interview the participants directly was our second major limitation. This limitation could not have been overcome because the authors did not want to come into close contact with any respondents. This limitation has severely hindered the author's ability to conduct this research and compile the data.
- Poor internet connectivity was another issue faced by the authors and the participants. Some of the participants who have answered questions were located in rural areas of Viti levu (main island) and Vanua Levu (second main island) of Fiji where there is weak internet connectivity. This limitation could not be overcome because the author's do not have any control over the internet connectivity.

Methodology

The purpose of this research was to find out the relationship between playing chess and the medical education of students in UPSM&HS in Fiji. The only logical way to gain access to logical and relevant information was to question the students first hand and gather their views and experience regarding their education and the relevance of chess to it. The research article was therefore written in a series of well formulated steps to ensure the most optimal and streamlined process to formulate a well written research paper.

The primary method for gaining this information was through the help of questionnaires circulated via online social media networking sites and student groups randomly. The questionnaires were circulated for well over days with ample publicity among the students to ensure that the data was obtained from as many students as possible. The questionnaires were sent to the various groups of students via class representatives and the major social groups of the faculty to ensure maximum participation amongst students. The questionnaires received a total of 141 responses over the span of 3 days.

The next step was to ensure that the questionnaires were as simple as possible to avoid ambiguity amongst the respondents. Therefore, the questionnaires inquired about the basic information of the players such as their preferred mode of playing chess, their familiarity

with the board game and their Fédération Internationale des Échecs (FIDE) ratings. The student's were also asked about their opinions regarding the benefits of chess and the ways in which chess had helped them become better students and better people as a whole.

The final step of this process was to compile the data obtained from the questionnaires and have it reviewed by the authors to formulate the final discussion.

The total time frame required to complete the research article was approximately 1.5 weeks.

Result and Discussion:

The Unifiji chess club is almost a year old since its commencement.The chess club is open for anyone willing to join and has attracted those who had previous knowledge of chess to those who did not have any knowledge and were willing to learn and play the game,this is most done recreationally and in after school program.Currently we have a chess coordinator who is also the teacher and other volunteers, who willingly help in training,in addition chess members(include:educators and students) have been encouraged to use online platforms in training themselves additional chess instruction and to play as many games as possible.

Some research encourage the implementation of Chess instruction in curriculum but this has some challenges because the educators need to have some level of knowledge in chess and also the student need to choose to play or not rather than be forced to (Wiliams, 2014)

The data finding shows that the majority of the students do not play chess ,this might be because the program is still in its infancy stage but with continuous research a shift will be noted and strategies to implement.

This survey had more students from MBBS participating than other courses. Showing that more students taking MBBS also play chess as compared to BPHC, BMHS and BNS(H) (Fig 1).

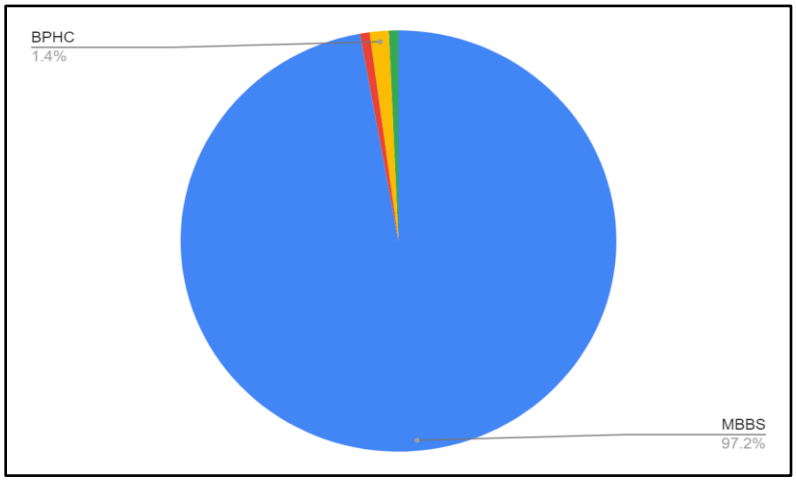

Figure 1:The number of participant in the survey showing 97.2 % ,1.4%,and 1.4 %respectively for MBBS,BPHC and(MBHS and BNS (H)

Chess improves students' learning ability positively in preparation,concentration and participation (confidence) among others in all medical subjects .Students are able to focus,think through and make correct judgement in the shortest time possible in a clinical setting.(Fig 2 and 3)

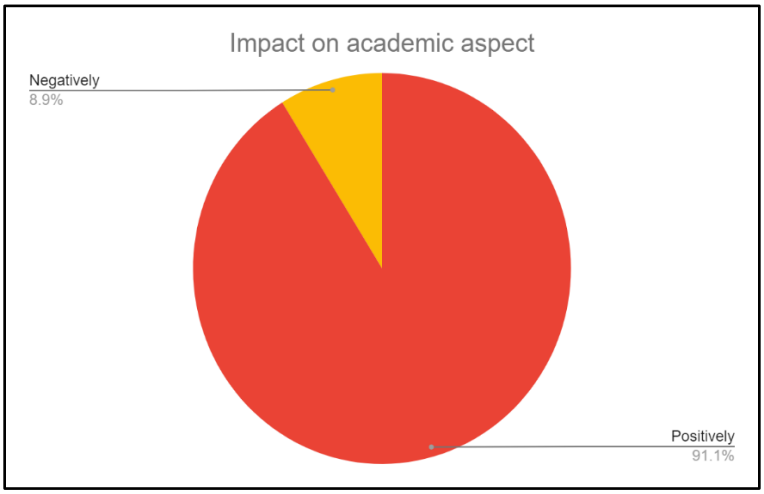

Figure 2: Chess effect in academic, 91.1% positive effect and 8.9 % negative effect

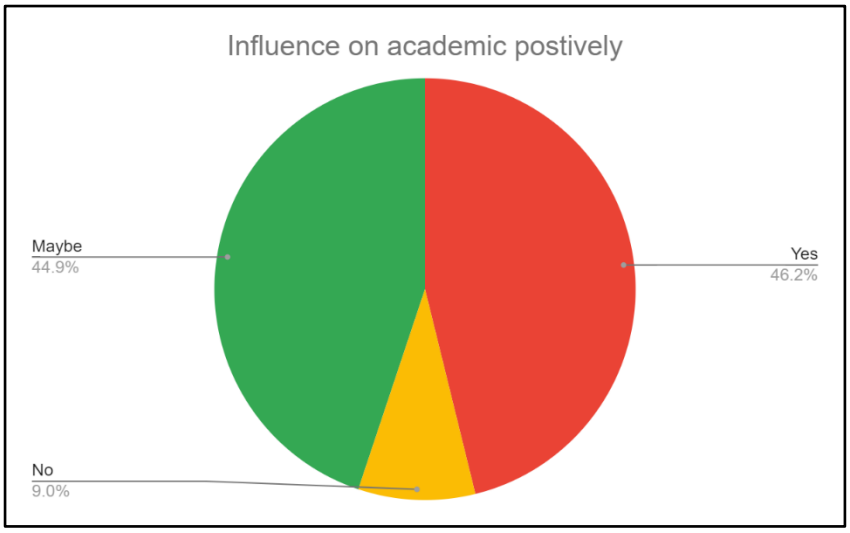

Figure 3: Chess associated with academic improvement supported by 46.2%

Chess as a game is becoming more famous and influential, 58.7% of the participants had played at least one game in 2021 while 41.1% had no interaction with chess (Fig 4).The Unifiji early this year hosted 3 face to face (traditional board gaming) chess tournament in conjunction with Chess Fiji, which attracted at least 34, 32, 36 participants respectively, with approximately 20 observers.

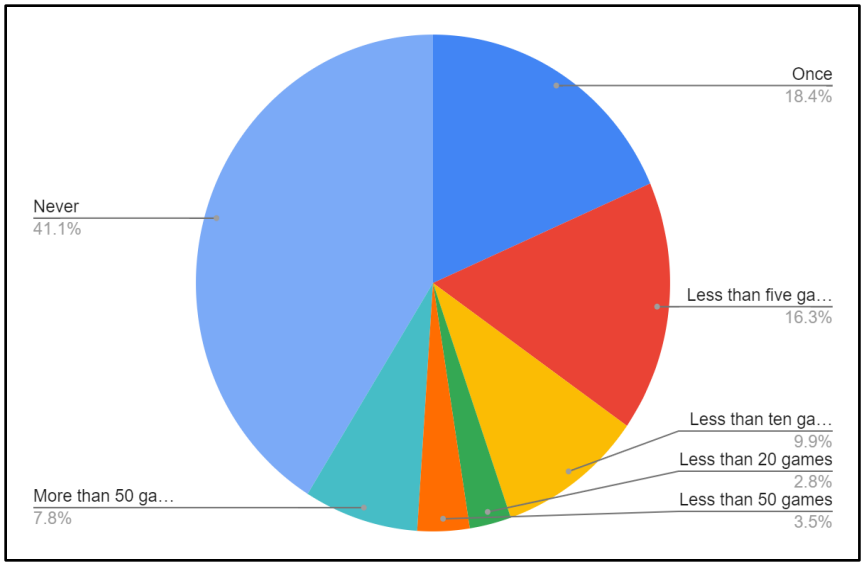

Fig 4:The number of games played within this year (2021)

COVID-19 has changed the dynamic as to how the game is played from traditional to online digital platform with 57.6% of our participants adapting to it while 42.4% still not using online platforms and would prefer traditional gaming (Fig 5 and 6). This has also further improved their skills in use of online platforms since learning is also administered online.

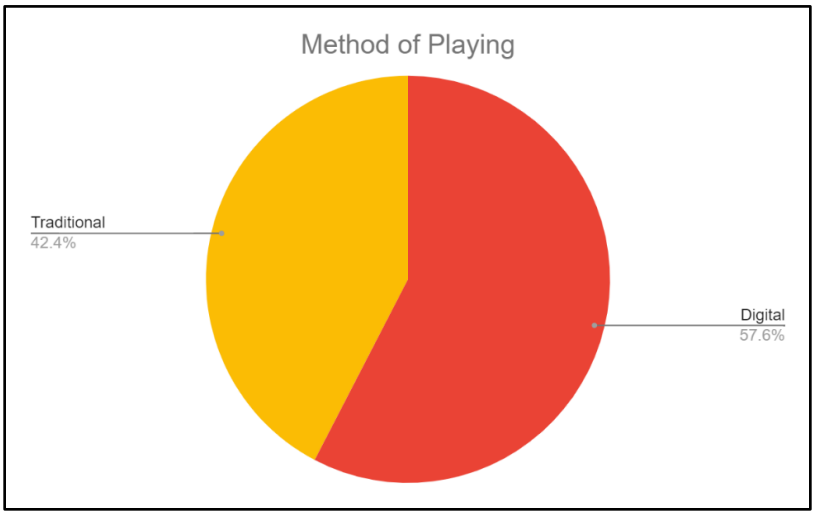

Figure 5:Preference in mode of playing chess

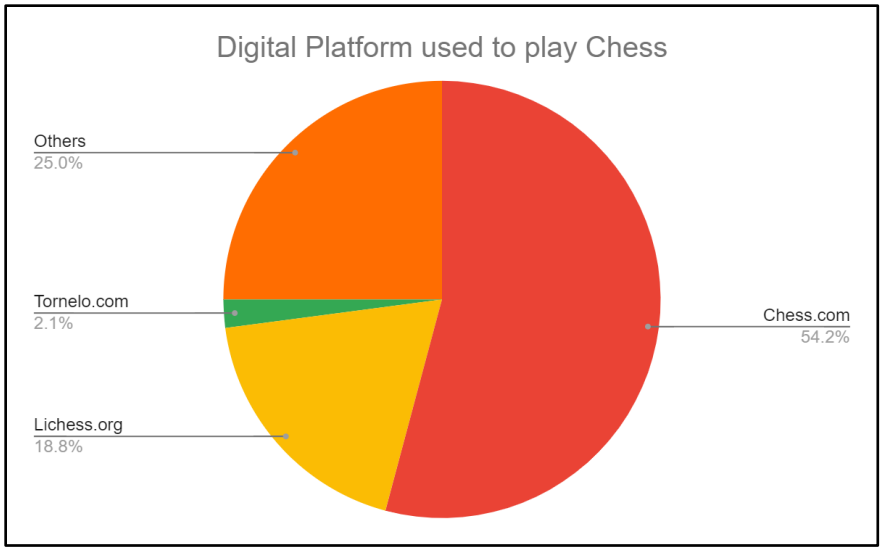

Figure 6: Platforms used to play digital Chess

In regards to the playing level, 71.8%, 22.4% and 5.9% of the students are at the beginner level, amateur and intermediate respectively, hence the introduction of Chess has created a platform for learning of the game and interest (Fig 7). More than 90% participants play chess once a week (Fig 8).

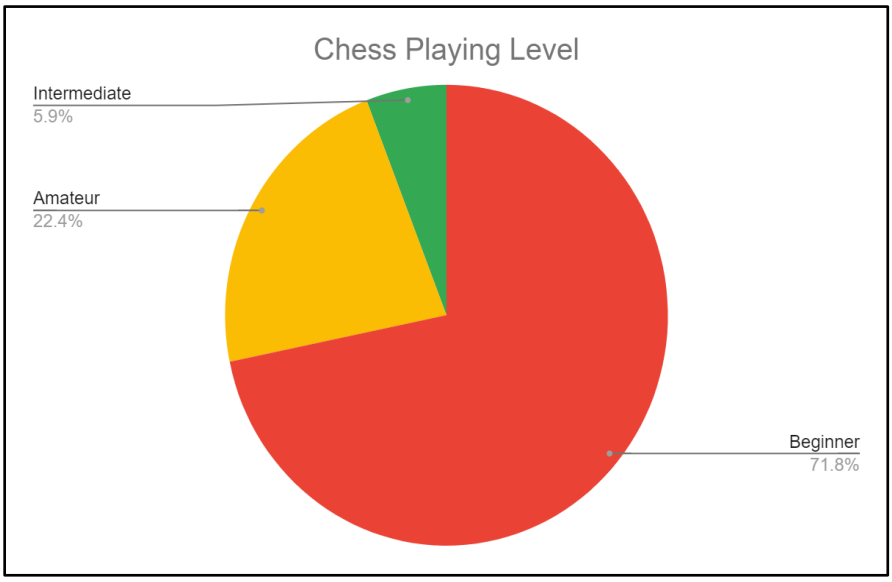

Figure 7: Chess playing level

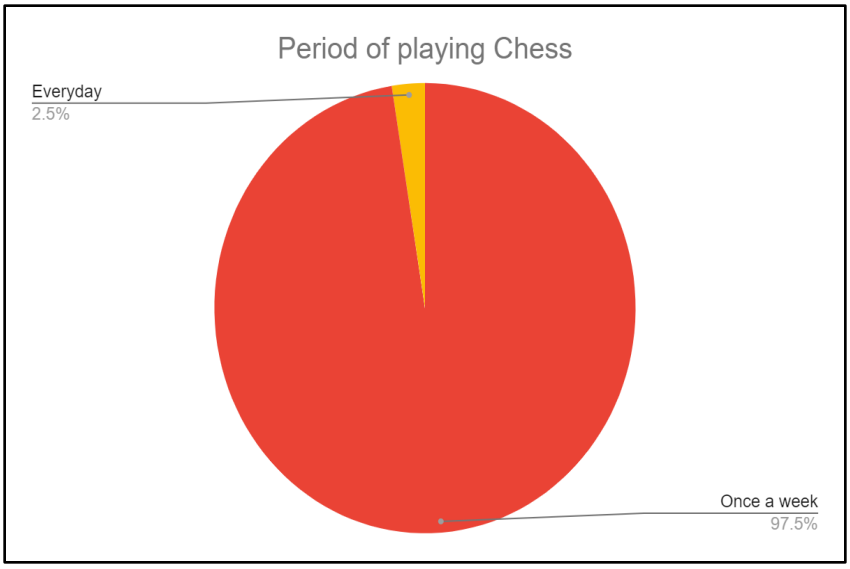

Figure 8: Period of playing chess

WIth the time spent on playing chess, 41.8% prefer Correspondence rounds at the starting level to allow for the acquisition of chess teaching, and as one improves, they move to Rapid, Blitz, and Bullet rounds (Fig 9).

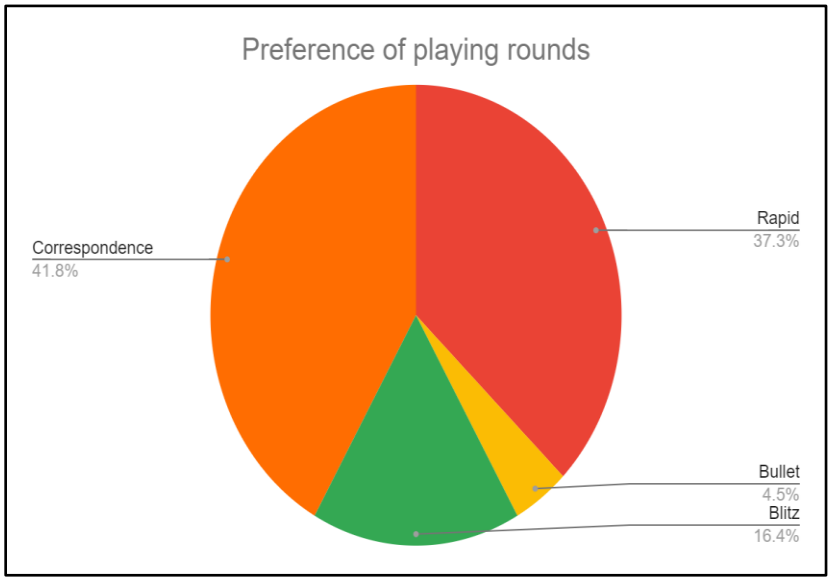

Figure 9: Preference of playing rounds.

Conclusion

This research shows that Chess influences or improves to some extent skills in learning and development skills. Playing Chess creates a phenomenon of repeating, practising, mastering some technique to influence the game outcome,similarly in learning platform this technique helps in memory retention of knowledge. In Medical Education,

repetition, practise and mastery play an important role since medical internship and residency enhance the student's confidence, knowledge and practical skills.

At beginner level, Correspondence rounds are prefered to allow learning of chess instruction and as one gets better they advance to Rapid, Blitz and Bullet. More research needs to be done in order to implement or train educators to use chess in education. A close monitored study survey can also give a more conclusive study of the effect of Chess in Medical education in universities. Experimental research is also suggested as with Sala et al.

REFERENCES

1. Anderson, J. R. (1990). Cognitive Psychology and its Implication (3rd Edn). New York: Freeman.
2. Barnett, S. M., and Ceci, S. J. (2002). When and where do we apply what we learn? A taxonomy for far transfer. Psychol. Bull. 128, 612–637. doi: 10.1037/0033-2909.128.4.612.
3. Bart, W. M. (2014). On the effect of chess training on scholastic achievement. Front. Psychol. 5:762. doi: 10.3389/fpsyg.2014.00762.
4. Bilalić, m., & Mcleod, p. (2006). How Intellectual Is Chess? – A Reply To Howard. Journal Of Biosocial Science, 38(3), https://doi.org/10.1017/s0021932005001185.
5. Burgoyne, A. P., Sala, G., Gobet, F., Macnamara, B. N., Campitelli, G., and Hambrick, D. Z. (2016). The relationship between cognitive ability and chess skill: a comprehensive meta-analysis. Intelligence 59, 72–83. doi: 10.1016/j.intell.2016.08.002.
6. D., Kirk, I. J., and Waldie, K. E. (2016). Seven pervasive statistical flaws in cognitive training interventions. Front. Hum. Neurosci. 10:153. doi: 10.3389/fnhum.2016.00153
7. Deary, I. J., Strand, S., Smith, P., and Fernandes, C. (2007). Intelligence and educational achievement. Intelligence 35, 13–21. doi: 10.1016/j.intell.2006.02.001.
8. Donovan, M. S., Bransford, J. D., and Pellegrino, J. W. (1999). How People Learn: Bridging Research and Practice. Washington, DC: National Academies Press.
9. Forrest, D., Davidson, I., Shucksmith, J., & Glendinning, T. (2005). Aberdeen, Scotland Aberdeen City Council University of Aberdeen, 2005. Chess Development in Aberdeen's Primary Schools: A Study of Literacy and Social Capital. [online] Aberdeen. Available at: <https://www.webarchive.org.uk/wayback/archive/20150219081941/http://www.gov.scot/Publications/2005/03/20801> [Accessed 8 November 2021].
10. Gliga, F., & Flesnerb, P. (2014). Cognitive Benefits of Chess Training in Novice Children. Procedia - Social And Behavioral Sciences, 116. Retrieved 9 November 2021.
11. Gobet, F. (2016). Understanding Expertise: A Multi-Disciplinary Approach. London: Palgrave/Macmillan.

12. Gobet, F., and Campitelli, G. (2006). "Educational benefits of chess instruction. A critical review," in Chess and Education. Selected Essays from the Koltanowski Conference ed T. Redman (Dallas, TX: University of Texas at Dallas).
13. Gumede, K., and Rosholm, Michael. (2015). Your Move: The Effect of Chess on Mathematics Test Scores. Discussion Paper.
14. Hanushek, E. A., Peterson, P. E., and Woessmann, L. (2012). Achievement Growth: International and US State Trends in Student Performance. Harvard's Program on Education Policy and Governance.
15. Jaeggi, S. M., Buschkuehl, M., Jonides, J., and Shah, P. (2011). Short- and long-term benefits of cognitive training. Proc. Natl. Acad. Sci. U.S.A. 108, 10081–10086. doi: 10.1073/pnas.1103228108.
16. Jerrim, J., Macmillan, L., Micklewright, J., Sawtell, M., and Wiggins, M. (2016). Chess in Schools. Evaluation Report and Executive Summary. Education Endownment Foundation. Available online at: https:// educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_ Reports/EEF_Project_Report_Chess_in_Schools.pdf.
17. Melby-Lervåg, M., Redick, T. S., and Hulme, C. (2016). Working memory training does not improve performance on measures of intelligence or other measures of far-transfer: evidence from a meta-analytic review. Perspect. Psychol. Sci. 11, 512–534. doi: 10.1177/1745691616635612.
18. Pells, R. (2016). Playing Chess does not Make Children Clever, Study Finds. Available online at: http://www.independent.co.uk/news/education/education-news/ playing-chess-does-not-make-children-cleverer-study-finds-a7134176.html.
19. Peng, P., Namkung, J., Barnes, M., and Sun, C. Y. (2016). A meta-analysis of mathematics and working memory: moderating effects of working memory domain, type of mathematics skill, and sample characteristics. J. Educ. Psychol. 108, 455–473. doi: 10.1037/edu0000079.
20. Poston, D., & Vandenkieboom, K. (2019). The Effect of Chess on Standardized Test Score Gains. SAGE Open, 9(3), https://doi.org/10.1177/2158244019870787.
21. Redman, T. (2006). Chess and education. Chess Program at the University of Texas at Dalla]s.
22. Richland, L. E., Stigler, J. W., and Holyoak, K. J. (2012). Teaching the conceptual structure of mathematics. Educ. Psychol. 47, 189–203. doi: 10.1080/00461520.2012.667065.
23. Root, A. W. (2008). Science, Math, Checkmate. 32 Chess Activities for Inquiry and Problem Solving. Westport, CT: Teacher Ideas Press.
24. Sala, G., and Gobet, F. (2016). Do the benefits of chess instruction transfer to academic and cognitive skills? A meta-analysis. Educ. Res. Rev. 18, 46–57. doi: 10.1016/j.edurev.2016.02.002.
25. Sala, G., Burgoyne, A. P., Macnamara, B. N., Hambrick, D. Z, Campitelli, G., and Gobet, F. (in press). Checking the "Academic Selection" argument. Chess players

outperform non-chess players in cognitive skills related to intelligence: a meta-analysis. Intelligence. doi: 10.1016/j.intell.2017.01.013.
26. Sala, G., Foley, J., & Gobet, F. (2017). The Effects of Chess Instruction on Pupils' Cognitive and Academic Skills: State of the Art and Theoretical Challenges. Frontiers In Psychology, 8. https://doi.org/10.3389/fpsyg.2017.00238.
27. Sala, G., Gobet, F., Trinchero, R., and Ventura, S. (2016). "Does chess instruction enhance mathematical ability in children? A three group design to control for placebo effects," in Proceedings of the 38th Annual Meeting of the Cognitive Science Society. (Philadelphia, PA).
28. Sala, G., Gorini, A., and Pravettoni, G. (2015). Mathematical problem solving abilities and chess. SAGE Open 5, 1–9. doi: 10.1177/21582440155 96050.
29. Scholz, M., Niesch, H., Steffen, O., Ernst, B., Loeffler, M., Witruk, E., et al. (2008). Impact of chess training on mathematics performance and concentration ability of children with learning disabilities. Int. J. Spec. Educ. 23, 138–148.
30. Thorndike, E. L., and Woodworth, R. S. (1901). The influence of improvement in one mental function upon the efficiency of other functions. (I). Psychol. Rev. 8, 247–261. doi: 10.1037/h0074898.
31. Trinchero, R., and Sala, G. (2016). Chess training and mathematical problem solving: the role of teaching heuristics in transfer of learning. Eur. J. Math. Sci. Technol. Educ. 12, 655–668. doi: 10.12973/Eurasia.2016.1255a.

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УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

HOW CHESS CAN BE A COGNITIVE ENHANCEMENT TOOL?

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ABSTRACT

The article reports the main results of the Castle research Project 2014-2017 and defines ways for a chess training aimed to develop cognitive and academic skills. The main research hypotheses state that a dedicated protocol of Chess training (psychomotricity on giant chessboard and desktop chess training) improves logical-mathematical skills in 8-11 years old children, metacognitive skills in 5-11 years old children, psychomotor skills in 5-7 years old children. Protocols are designed to develop in children habits of mind that help them in systematic reflection in academic or real-life situations. The research was performed on 50 classes of primary school in Italy and Spain and follows a pre-post experimental design with control group. More than 5,000 observation has been collected about mathematic abilities, metacognitive abilities, psychomotor abilities. Results highlights that for a successful use of chess as a tool for cognitive enhancement it is necessary to focus on "how to teach the game" rather than on the game itself. Future research have to focus on the construction of targeted activities - supported by chess - closely related to the skills and contents subject to enhancement. Proper activities can build and progressively consolidate in children broader "ways of thinking" to be applied in academic and real-life situations.

KEYWORDS: Chess in schools, Cognitive enhancement, Metacognitive teaching, Chess for cognitive enhancement.

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INTRODUCTION

Can chess training help to improve cognitive, meta-cognitive and psychomotor skills in young children? The CASTLE (acronym for "Chess curriculum to Advance Students' Thinking and Learning skills in primary Education") project is a research project funded by the Erasmus+

European Program, realized from 2014 to 2017 in Italy and Spain with an initial partnership of Alfiere Bianco (White Bishop) in Italy, Deutsche Schulschachstiftung (the German school chess foundation) in Germany, Club Ajedrez 64 Villalba in Spain, together with the research group of Experimental Pedagogy at the Department of Philosophy and Education at the University of Turin (DFE-UniTo). In the monitoring of results were also involved the Regional School Office for Piedmont and the Regional School Office of Madrid. The project aims to produce chess training protocols for children from 5 to 11 years, and the research, here outlined, aims to control whether the chess activities can foster the development of cognitive and metacognitive skills. The main research hypotheses state that: (a) a dedicated protocol of Chess training improves logical-mathematical skills in 8-11 years old children; (b) a dedicated protocol of Chess training improves metacognitive skills in 5-11 years old children; (c) a dedicated protocol of psychomotor activities on giant chessboard improves psychomotor skills in 5-7 years old children.

The research follows an experimental pre-post design with control group. A narrative diary was compiled by teachers and instructors to document ongoing strengths and critical points of the activities.

LITERATURE REVIEW

The question of chess as cognitive enhancement tool is largely debated (Scholz et al., 2008; Sala, Gorini, Pravettoni, 2015; Sala et al., 2016; Burgoyne et al., 2016; Sala, Foley, Gobet, 2017). A meta-analysis about chess as a tool to improve performance in mathematics (Sala & Gobet, 2016) shows that exposure to chess instruction of primary and middle school students is - in the short term - associated with positive results in mathematics performance, but several current experimental designs show lacks in considerate: (a) the potential placebo effects of chess instruction, (b) the cognitive mechanisms underlying the transfer from chess to mathematics skills, and (c) the appropriate type and duration of the teaching for this transfer to occur.

Research questions have been focused on the possibilities of *far transfer* (Laker, 1990) between chess skills and academic skills. Far transfer refers to both the ability to use what was learned in one setting to a different one as well as the ability to solve new problems (Perkins & Salomon, 1988). Two main explanations have been adduced to support the hypothesis that skills acquired with chess can transfer to other domains. The first hypothesis states that chess requires decision-making skills and high-level processes (i.e. to acquire, select, represent, retain information and to use it to guide behavior) similar to those used in mathematics and reading (Margulies, 1992). The second hypothesis states that being chess a

demanding task involving focused attention and problem solving, playing chess should strengthen these cognitive abilities and thus be beneficial for children's school performance (Bart, 2014). From the theoretical point of view both these hypotheses show many limits (Sala & Gobet, 2016).

An important finding (Sala, Foley, Gobet, 2017) outlines that the exposure to unstructured chess activities (i.e. free game with peers) seems not to provide any particular benefit. At the opposite, a set of chess activities specifically designed to train cognitive/academic skills may be more effective. Based on these results, the right research problem should be not whether chess practice improves or not cognitive/academic skills but *which type of chess training* is effective to enhance these skills. The key element is not the game itself but the didactic approach used by chess instructor. Used in particular manner, the game offers to instructor several possibilities to aid the pupils to practice a large set of skills and attitudes. In this process, the game is nothing more than a support tool for a targeted didactic action that specifically aims to develop metacognitive skills and appropriate *habits of mind* (Costa & Kallick, 2013) in pupils. Using chess situations, the instructor can lead the pupil to systematically reflect on his/her own behaviors, choices, attitudes, and can aid him/her to develop more general habits and strategies to face several problem in school and in real life.

METHODOLOGY

The experimental activities consist in session of psychomotricity on floor chessboard for 5-7 years old children and desktop chess training for 8-11 years old children.

Psychomotricity sessions use a floor giant chessboard to perform activities designed to make children progressively aware of their sensory-motor skills, through the play and the activation of their cognitive resources to solve simple problems (*cognitive activation*, Burge, Lenkeit, Sizmur, 2015). This motor experience takes place in a privileged and protected space, the chessboard, and becomes for children a “magical” experience, a bridge between reality and imagination, mixing game and awareness to know oneself and build interactions with others in a fair, responsible and cooperative way. Children learn to take care and control of the body, of its expressive possibilities and of relationship through movement, and become aware of their perceptions and physical self. The activities aim to gradually develop in the child:

(a) The ability to read, understand and interpret messages from one's own body, from that of the other and respect them both.

(b) The ability to express oneself and communicate through it in order to improve its perceptual capacities.

(c) The ability to orientate in space and time, to know different rhythms and experience them.

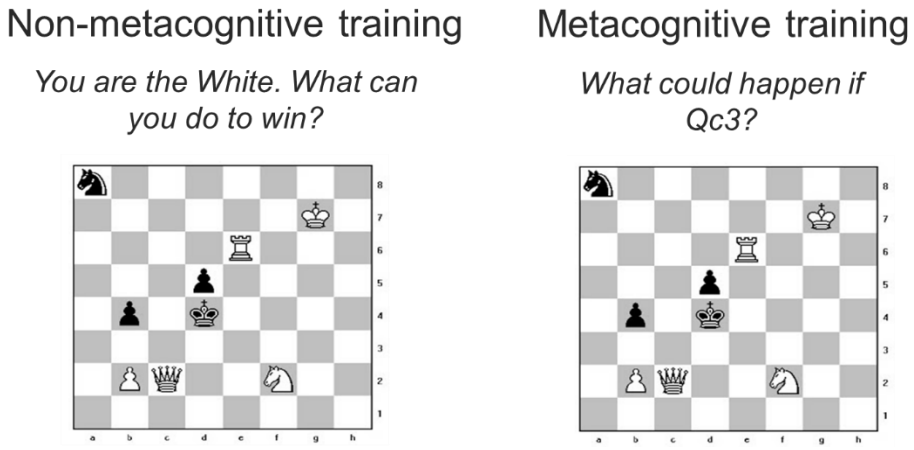
(d) The ability to read spatial coordinates.

Psychomotor activities are designed to have an impact on children spatial orientation, motor coordination, expression of feelings with body language, ability to perform a delivery on floor chessboard, ability to count forward-backward, ability to use terms to indicate space position, ability to provide information for following a path on floor chessboard.

Desktop chess training use metacognitive approach to foster the systematic reflection of the pupil on his/her own behavior in chessboard situation. The instructor proposes sessions with several mini-games in which the aim is not to "teach the right move" but to induce pupils to grasp the key-details, to define lines of action, to reflect on proper own action and change it if necessary.

Figure 1 shows an example of metacognitive and non-metacognitive approach in chess training. In non-metacognitive training, the instructor asks simply to the pupil to formulate a move to win. In metacognitive training, the instructor asks to the pupil to consider all possible threats and unforeseen events as well as the opportunities that the move opens, even if it is not the best possible move.

Fig. 1 – Metacognitive and non-metacognitive training



Examples of stimulus questions used by instructor are: (a) What do you want to achieve now? What should you do first? (b) What could happen if …? (c) Verbalize the reasoning that led you to do this move… (d) Choose a move and consider the consequences. What are actual threats to this piece? (e) How many moves would be necessary to … ? What could your opponent do in these moves? (f) What are possible alternative ways to …? (g) What are the similarities between this situation and other problems you have already faced? (h) What worked well in your action? What could you have done better? Can you apply this to other situations? (i) As you have seen in chess training, how you could solve this mathematical problem: …?

The more general purpose of the training is to develop in the student a reflective habitus of attitude and behavior to be reproduced in other situations of school and daily life.

The research sample is made up of 50 classes of primary school in Italy and Spain, not randomized (accidental sampling). The research follows a pre-post experimental design with control group and has collected more than 5,000 observations (in three years) with three instruments:

(a) Observation grid of psychomotor abilities for children 5-7 years old. Grids are compiled by an external member of research group and by the teacher of the class.

(b) Mathematical skills test for children 8-11 years old (three versions for grade 3, grade 4 and grade 5) with items extrapolated from surveys IEA-TIMSS and OECD-PISA.

(c) Metacognitive skills test (Panaoura, Philippou, 2007). The test is designed to measure metacognitive skills in mathematics with item like "When I encounter a difficulty that confuses me in my attempt to solve a problem I try again", "After I finish my work I know how well I performed on it" (possible answers: 1=never, 2= seldom, 3=sometimes, 4=often, 5=always).

At the end of the desktop chess activities, the pupils do also a test on chess skills.

Data analysis was performed with comparison of percentage gain between experimental group and control group.

DISCUSSION

For the psychomotricity activities, main results are depicted in Table 1. In several abilities experimental group perform significantly better than control group, but the data analysis shows only a large difference in expressing feelings with body language (46% of pre-post gain vs. 22% of control group), counting forward-backward (27% of pre-post gain vs.

14% of control group) and using terms to indicate space position (43% of pre-post gain vs. 15% of control group).

Table 1 - Main results for the psychomotricity activities

Ability	*Chess-trained improving*	*NOT Chess-trained improving*
Spatial orientation	26%	23%
Motor coordination	35%	29%
Express feeling with body language	**46%**	22%
Performing a delivery on floor chessboard	40%	33%
Counting forward-backward	**27%**	14%
Use terms to indicate space position	**43%**	15%
Provide information for following a path	45%	27%

For the desktop chess activities, main results are depicted in Table 2. In several abilities experimental group perform significantly better than control group, but the data analysis shows only a large difference in performing hypothetical reasoning on single-digit subtraction (28% of pre-post gain vs. 14% of control group), performing logical reasoning on available space in a sheet (26% of pre-post gain vs. 14% of control group) and choosing the best rail route (34% of pre-post gain vs. 16% of control group).

Table 2 - Main results for the psychomotricity activities

Ability	*Chess-trained improving*	*NOT Chess-trained improving*
Hypothetical reasoning on single-digit subtraction	**28%**	14%
Calculate distances, division	18%	13%
Calculate quantities, division	28%	20%
Logical reasoning on available space in a sheet	**26%**	14%
Choose the best rail route	**34%**	16%

With refer to metacognitive ability test (Table 3) the broader difference is in finding alternative way to solve a problem (33% of pre-post gain vs. 1% of control group).

Table 3 - Main results for the psychomotricity activities

Ability	*Chess-trained improving*	*NOT Chess-trained improving*
Realize that you have not understood a topic	30%	20%
Find alternative way to solve a problem	**33%**	1%

These results are substantially consistent with what is expressed in the meta-analysis of Sala & Gobet (2016): the improvements in some skills and attitudes are visible, but only in relation to the elements touched by the chess instructor during the intervention. There is no automatic transfer between chess skills, mathematical skills, metacognitive skills.

CONCLUSIONS

The literature review and the research results leads us to conclude that in order to successfully use chess as a tool for cognitive enhancement it is necessary to focus on "how to teach the game" rather than on the game itself. As noted in previous research (Trinchero & Sala, 2016), the instructor approach makes the difference.

It is important to design targeted training activities, aimed at improving specific skills. These activities should be conceived to build and progressively consolidate "ways of thinking" that the students could bring into academic and real-life tasks, adequately supported by the instructor.

It is also important the training of chess instructors. This is the key element that can lead to an effective use of chess as a cognitive enhancement tool. Research shows that chess can be a "tool to think" only with a precise didactical protocol and properly trained instructors.

Ultimately it is important to develop more accurate measurement protocols to intercept less evident changes promoted by the training protocols. Some existing tests seems not fully adequate to effectively detect the real effects of the training.

REFERENCES

1. Bart, W. (2014). On the Effect of Chess Training on Scholastic Achievement. *Frontiers in psychology*. 5. 762. 10.3389/fpsyg.2014.00762.
2. Burge, B., Lenkeit, J., Sizmur, J. (2015). *PISA in Practice - Cognitive Activation in Maths: How to Use it in the Classroom*. Slough: NFER.
3. Burgoyne, A. P., Sala, G., Gobet, F., Macnamara, B.N., Campitelli, G., Hambrick, D.Z. (2016). The relationship between cognitive ability and chess skill: A comprehensive meta-analysis. Intelligence; DOI: 10.1016/j.intell.2016.08.002
4. Costa, A.L.L., Kallick, B. (2013). *Dispositions: Reframing teaching and learning*. Thousand Oaks, CA: Corwin.
5. Laker, D. R. (1990). Dual dimensionality of training transfer. *Human Resource Development Quarterly*, 1(3), 209-224.
6. Margulies, S. (1992) *The Effect of Chess on Reading Scores: District Nine Chess Program, Second Year Report*. The American Chess Foundation, New York.

7. Panaoura, R., Philippou, G. (2007). The developmental change of young pupils' metacognitive ability in mathematics in relation to their cognitive abilities. Cognitive Development. *Cognitive Develop*. 22. 149-164. 10.1016/j.cogdev.2006.08.004.

8. Perkins, D.N., Solomon, G. (1988). Teaching for transfer. *Educational Leadership*, 46(1), 22-32.

9. Sala, G., and Gobet, F. (2016). Do the benefits of chess instruction transfer to academic and cognitive skills? A meta-analysis. Educ. Res. Rev. 18, 46–57. doi: 10.1016/j.edurev.2016.02.002

10. Sala, G., Gobet, F., Trinchero, R., Ventura, S. (2016). "Does chess instruction enhance mathematical ability in children? A three group design to control for placebo effects," in Proceedings of the 38 th Annual Meeting of the Cognitive Science Society. (Philadelphia, PA).

11. Sala, G., Gorini, A., Pravettoni, G. (2015). *Mathematical problem solving abilities and chess*. SAGE Open 5, 1-9. https://doi.org/ 10.1177/2158244015596050.

12. Sala, G., Foley, J.P., Gobet, F. (2017). The effects of chess instruction on pupils' cognitive and academic skills: State of the art and theoretical challenges. *Frontiers in Psychology*, 8, Article 238.

13. Scholz, M., Niesch, H., Steffen, O., Ernst, B., Loeffler, M., Witruk, E. (2008). Impact of chess training on mathematics performance and concentration ability of children with learning disabilities. *Int. J. Spec. Educ*. 23, 138-148.

14. Trinchero, R., Sala, G. (2016). Chess training and mathematical problem solving: the role of teaching heuristics in transfer of learning. *Eur. J. Math. Sci. Technol. Educ*. 12, 655-668. https://doi.org/ 10.12973/Eurasia.2016.1255a.

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УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

SOCIO-PSYCHOLOGICAL ANALYSIS OF THE INFLUENCE OF TEACHERS' AND PARENTS' CHARACTERISTICS ON CHESS KNOWLEDGE

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As teachers and parents have direct responsibility for students' academic achievements, they are considered to be the most important school factors to influence on their educational results. And it's natural to assume that different characteristics of both – teachers and parents may affect on educational outcomes, such as their age, gender, educational grade, experience etc. In this paper we present the social-psychological mechanisms of interconnection of students' school chess achievements and factors that affect them. For the study we have used the data received from teachers and parents during Republican Research of Chess Knowledge Assessment.

Key words: Stakeholders, school-based factors, chess achievement, social-psychological characteristics.

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Rationale for the relevance of the research.

There is no doubt that learners' educational outcomes are influenced by a variety of factors, including family life, community, diet, involvement in various extracurricular activities etc. It goes without saying that teachers and parents are significant actors in this context.

Since teachers are directly responsible for learner's academic achievement, they are the most important school-building factor influencing education. And we can assume that the educational progress can be influenced by the different characteristics of teachers: gender, age, educational level, experience, etc[1].

The problem of the influence of different characteristics of learners' parents on the achievement of learning outcomes is the subject of this educational research. Factors of parental influence on learner's academic achievement are studied from two main perspectives: 1) parents' academic ability, and 2) socio-economic status, which can make a significant difference to pupil's educational opportunities [2, p.88].

Relying on various studies in this area, as well as taking into account the fact that the influence of teachers and parents in Armenian education, especially in primary education, is incomparably greater than other levels of education, also bearing in mind that various challenges are often raised by parents in connection with the teaching of the subject of chess, the collection of research-based and reliable data is important for the continuous improvement of the process of training and retraining of chess teachers. In the framework of this nationwide survey conducted in 2021, we have addressed these issues.

The aim of the research is to reveal the socio-psychological mechanisms of the correlation between chess achievements and the factors influencing them.

Research hypothesis. It is assumed that the knowledge of the subject of chess in elementary school is influenced by a number of socio-psychological characteristics of chess teachers and parents of pupil.

Research questions. The following questions arise from the purpose of the research:

1. What qualities of chess teachers affect chess knowledge and semester grades?
2. What is the interaction between the social-psychological characteristics of the pupils' parents and their chess success at school?

Research methods: In order to find the impact of many factors on chess education in Armenia, empirical research has been conducted. During the research, the following methods and tools of quantitative and qualitative research have been applied: questionnaire, test, practical research.

Questionnaires were prepared for the beneficiaries - pupils, teachers, parents - which included questions about the child's chess experience, parents' attitude towards the chess subject, the teacher's effectiveness in teaching chess. Psychologists, chess players, teachers took part in compiling the questionnaires, who clarified and discussed each task to get a definite version.

In addition to the above mentioned, a test on the chess knowledge was compiled, the purpose of which was to determine the level of knowledge acquired by pupils during the three years of learning the chess subject.

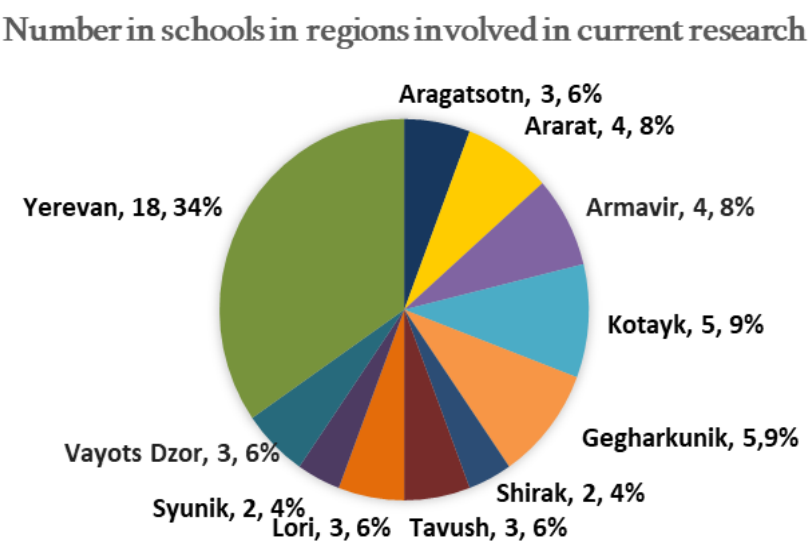
It is noteworthy that the teachers' questionnaire was addressed to the chess teachers who taught chess to the 4th graders of the previous academic year.

The questions mentioned in the questionnaires were formulated in such a way that there was no possibility of double answers, all the questions required a definite answer, which allowed to get a real picture during the results' analysis.

The survey questionnaires were maximally adapted to the pupils so that both the questionnaires for them and the parents' questionnaires were placed in individual brochures, thus facilitating both the pupils' and parents' completion of the questionnaires and the data entry process.

The survey was conducted by random sampling with the participation of all regions of the Republic of Armenia, including the capital Yerevan. There were 42 selected schools.

Figure 1 *Number in schools in regions involved in current research*



The figure 1 shows the number of regional schools included in the research, moreover, in the 3rd column are presented the additional schools offered by the intern-students of the Faculty of Educational Psychology and Sociology of the Kha. Abovyan Armenian State Pedagogical University. The number of such schools is 10.

Therefore, as a result, about 500 pupils from 50 schools, 500 parents, 50 teachers participated in the republican research.

Criteria for forming a chess related test

a) The test includes tasks that contain knowledge from all sections of the content component of the subject: 1. Chessboard, 2. Pieces, 3. Check, mate, and Stalemate, 4. Tactics, 5. Strategy,
   6. Endgames
b) The following chess skills and the expected final results of the chess subject were tested in the test: 1. Create mate positions, 2. Create tactical patterns, 3. Assess the situation, compare the facts, emphasize the main from the secondary, make a decision, 4. Create an algorithm, plan the stages, present the order of implementation of the process, 5. Search, find, implement alternative solutions, 6. Predict the opponent's idea, prevent it, 7. Understand the requirement of the problem, seek and find the solution, 8. Recall previously received information, apply knowledge in practice.

The analysis of the test results showed that primary school pupils find it difficult to solve tasks that contain predictive and preventive actions. Predictability and prevention skills in chess shape the study of the following topics:

2nd grade program.

1. "Defense".

3th grade program.

1. "Defense of Mate", 2. "Avoiding the Stalemate", 3. “Pawn finals”, 4. Realization of material advantage.

4th grade program.

1. Strategy. Plan, 2. Strategy. Ongoing prevention plan, 3. Final games: Rook against pawn, knight against pawn, Queen against pawn.

In fact, it can be deduced that the ability to predict and prevent is not gradually developed in the elementary school pupil through the subject of chess, the principle of graduality (from simple to complex) is not observed. The topics that shape these skills are not gradually integrated into the various topics, which is a serious omission in terms of content and method.

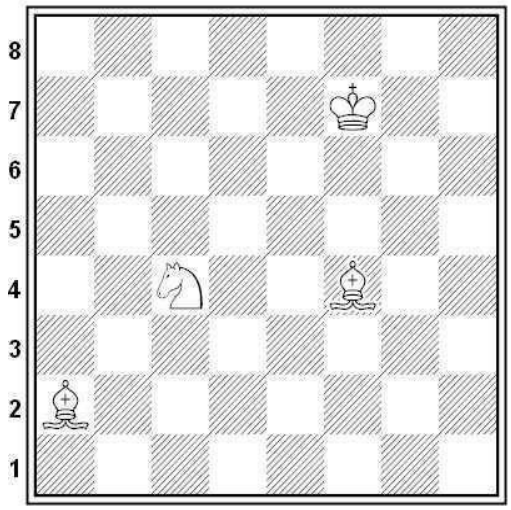


Chart N1- Paint the pieces so that you get a double attack- "fork"

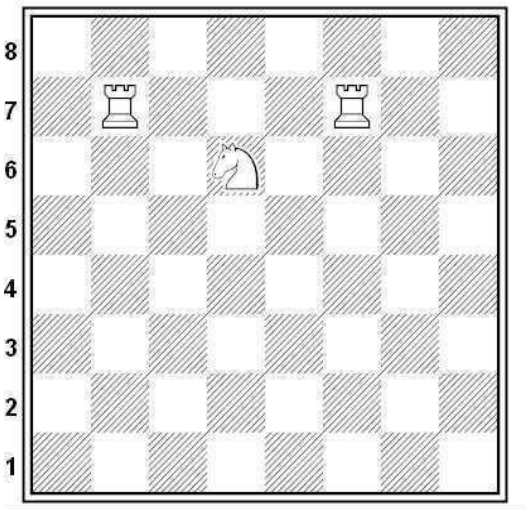


Chart N2- Paint the pieces so that there is a "pin"

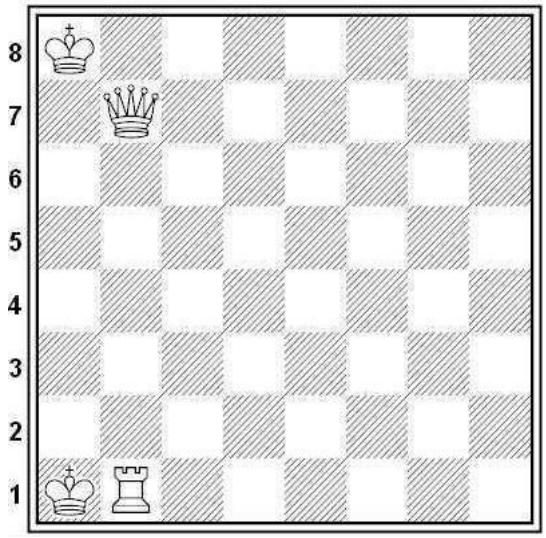


Chart N3 - Paint the pieces so that you have "checkmate"

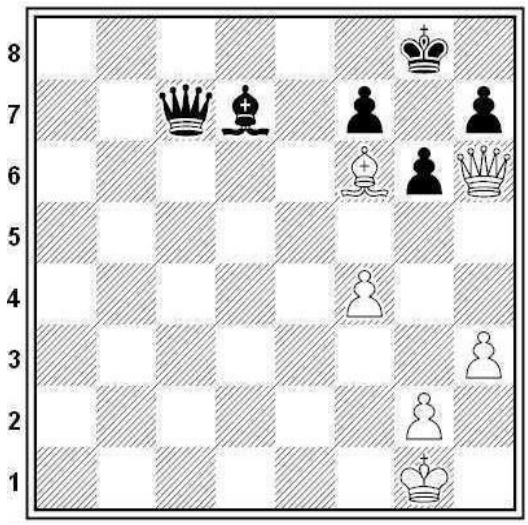


Chart N4 - The blacks start, take the best steps and register here

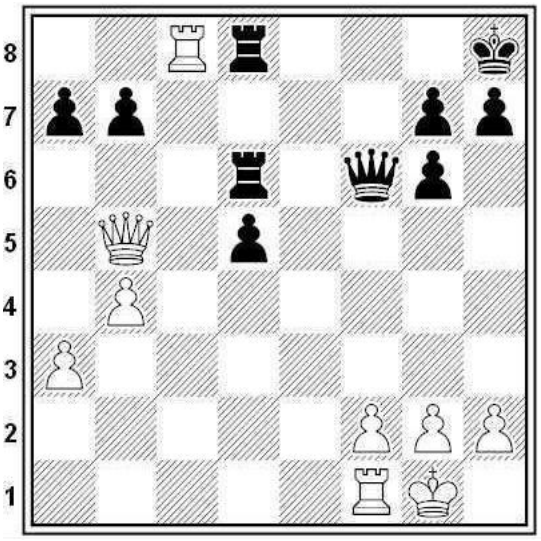


Chart N5- The next step is for "White's": Win!

Write the answer here.

1._____

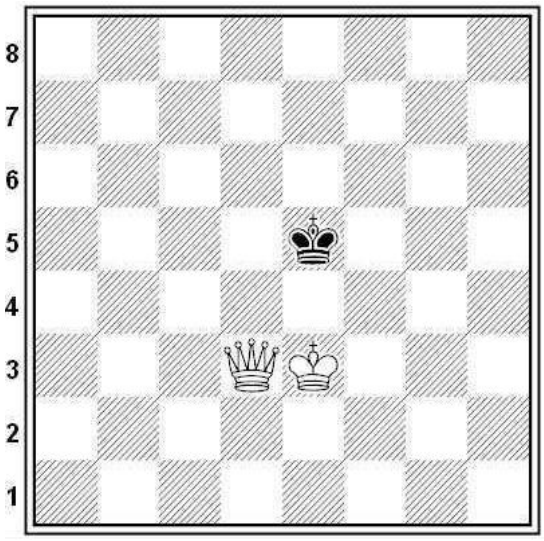


Chart N-6- Circle the correct answer

To win in this position, the "whites'" must:

a) Give checks constantly and there will be a checkmate
b) Take the king to the g7 field and checkmate
c) the "whites'" Queen and King must take the black King to the edge then checkmate
d) Sacrifice the Queen

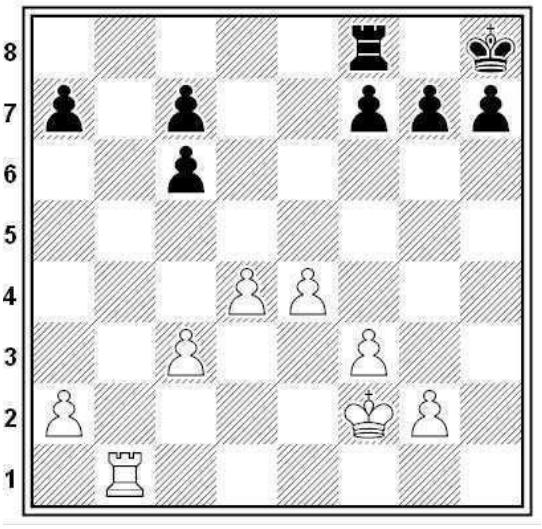


Chart N7- The turn is "Whites'"

Circle the correct answer.

Whose position is the best?

a) The whites'
b) The blacks'
c) Both positions are equal

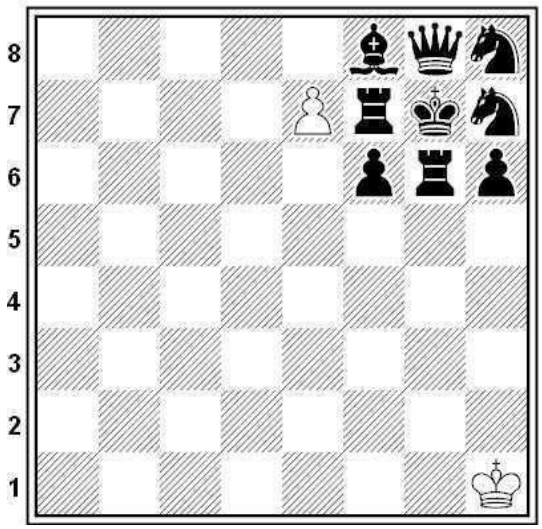


Chart N8- The turn is "Whites'"

Circle the correct answer.

Whose position is the best?

a) The whites'
b) The blacks'
c) Both positions are equal

Chart N1 tests the learner's knowledge of the knight step, double attack, the knowledge of the "fork" and the ability to create it. The learner applies the double attack model and creates a similar structure.

Chart N2 checks the knowledge of the bishop step and the "pin". The second chart has one piece more than the first. The learner applies the pin model and creates a similar structure.

Chart N3 tests the concepts of check, checkmate, "control", as well as knowledge of the steps of the rook, queen and king, the ability to create a checkmate position.

Chart N4 checks the learner's attention, whether he / she sees the threat of the checkmate, also checks the learner 's ability to predict (predict), and whether he / she is able to find protection from the given threat (prevention). This diagram is solved with an intermediate check, and it is necessary to calculate 2 steps.

Chart N5 tests the learner's alternative thinking, as there are dozens of possible continuations in the position: e.g. Rd8, Rfc1, Qb7 etc. but you have to make an alternative step out of the molds, an impossible one at first sight.1. 1.Qe8+ sacrificing the Queen Re8 2.Re8#

Chart N6 checks whether the learner is imagining the plan and the implementation of the plan (algorithm).

Chart N7 checks whether the learner has sufficient knowledge of the following topics: open line, double pawn, active king, passive king, single pawn, double pawn, and whether the learner is able to combine facts and assess the situation. 50% of the pre-tested pupils (Abovyan N7 basic school) just counted the pieces and said that the position was equal. Only the other half of the pupils paid attention to the double pawns, the open line, the good white rook, and the king.

Chart N8 tests the learner's critical thinking. The learner, seeing the tangible advantage of black, does not rush to record the fact, but by questioning, deepens the analysis of the fact and comprehensively perceives it. The learner not only evaluates, but also finds the best continuation by the whites, and only then gives a final evaluation.

Thus, let's look at the analysis of the impact of the characteristics of parents and teachers on the knowledge of pupils.

Parents' attention to the child's preparation for the lesson was assessed by the following provisions: Pupils:

- Learn lessons with parents
- Talk to parents about class work
- Parents help with chess tasks
- Parents check homework
- Parents are busy, thus they are preparing for classes alone.

The distributions of the variables expressing the level of parental attention are given in Figure 2.

Our goal is to find out the influence of parents' level of attention on the chess test score.

Figure 2 Parents level of attention towards pupils´ homework

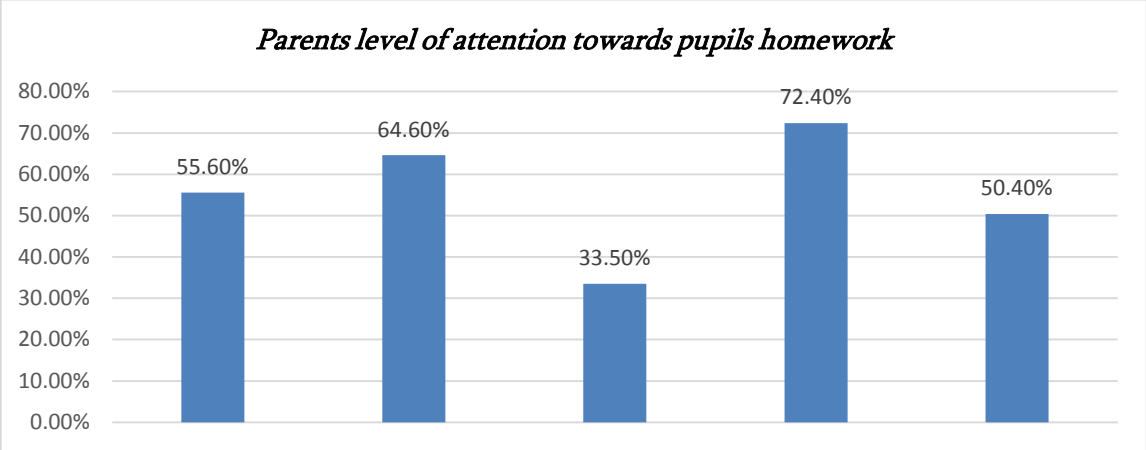


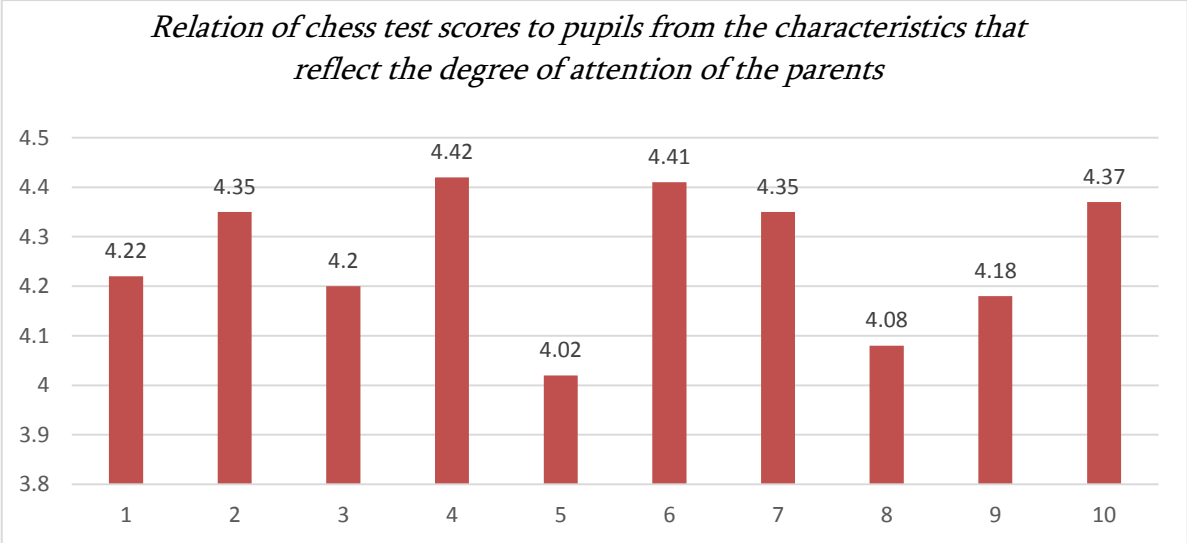
Figure 3 shows the five provisions that reflect the degree of parental attention in case of Yes or No answers based on the chess test scores .

The t-test did not reveal statistically significant differences between the "Yes" and "No" answers to each of the chess test scores.

However, it was on the verge of statistical certainty that the effect of the "Parents help with chess homework" clause (grade point average "-0.39", significance level - 0 .071), but not in the expected direction, the chess test scores of other pupils whose parents helped them complete their chess tasks were lower than those whose parents did not.

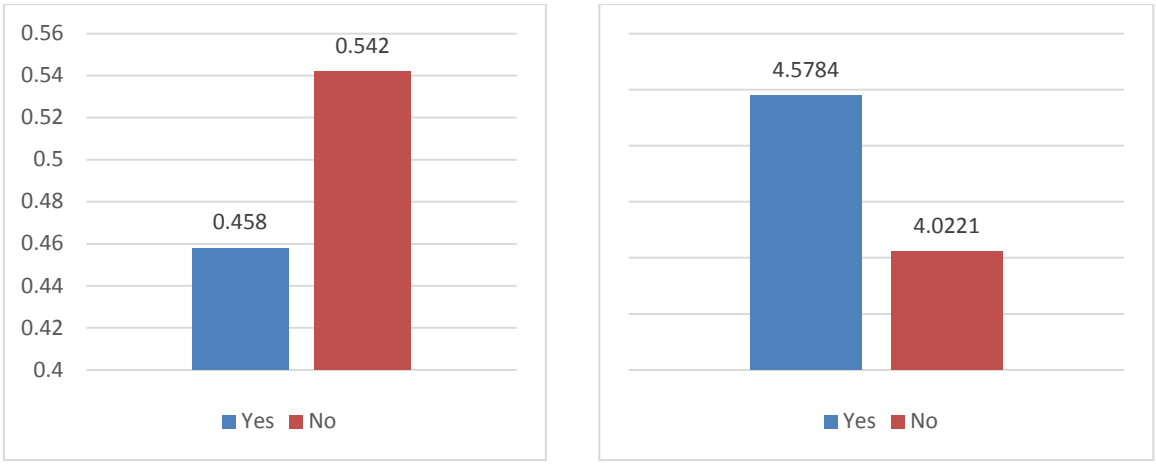
We tend to explain this pattern by the fact that in many cases learners acquire chess knowledge on their own. Our observations have shown that often children's knowledge is more sound and professional than their parents ', which on the one hand leads to a misunderstanding of the parents' own help, and on the other hand increases the probability of their inadequate help. The problem should probably be analyzed from the socio-psychological point of view of the communication between the generations.

Figure 3 Relation of chess test scores to pupils from the characteristics that reflect the degree of attention of the parents



Below are the diagrams showing the answers to the question "Did you try to teach chess to your child before teaching chess at school?"

Figure 4 "Did you try to teach chess to your child before teaching chess at school?"



The t-test showed that when a parent tries to teach a child to play chess before the child goes to school, it statistically raises the score of chess knowledge: t (476) = 2.755, p = 0.006.
We think that on the one hand it is conditioned by the growth of positive tendencies towards the subject, and on the other hand it may also be conditioned by the presence of certain preconceptions, psychological adaptation to the subject and other factors.

Figure 5 How much time do you spend playing chess with your child per day?

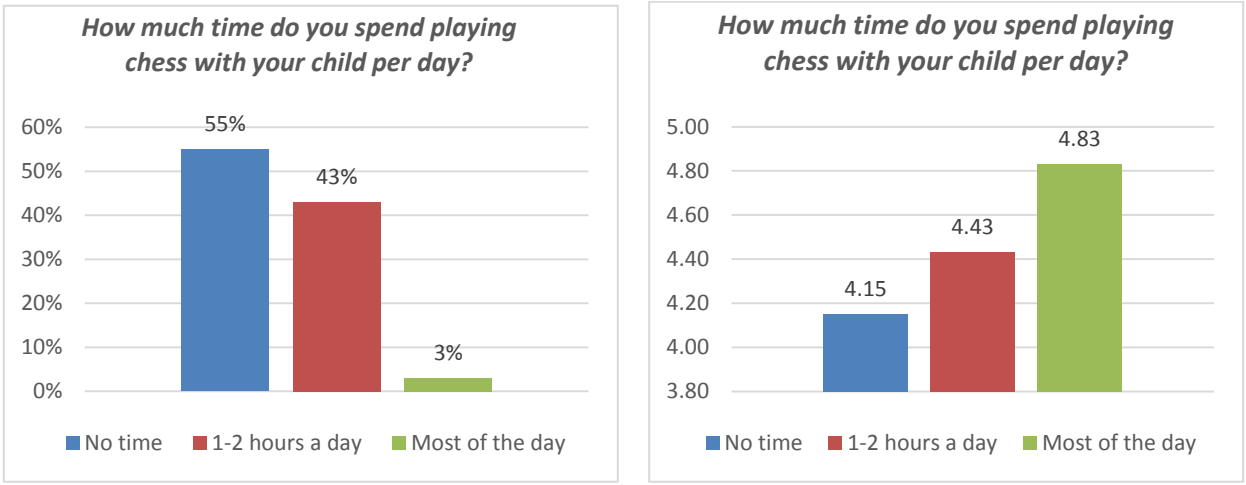
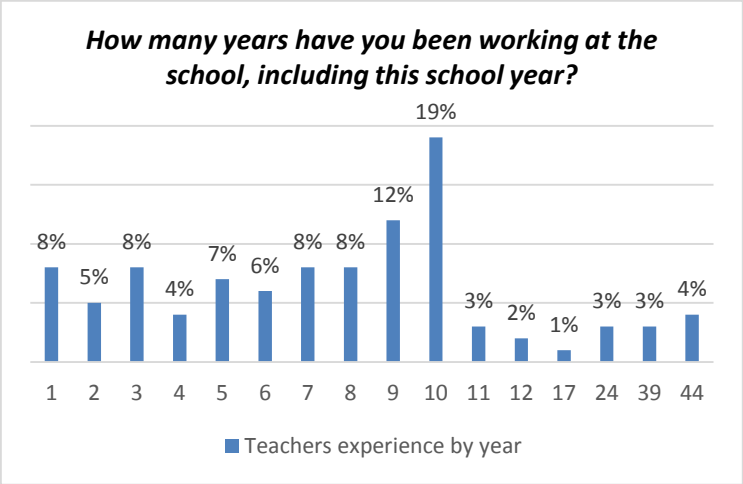


Figure 5 shows that an increase in time spent playing chess with a child increases the average value of a chess knowledge grade.
Knowing or not knowing whether the child asked by the parent to play chess does not affect the child's chess knowledge assessment.
Let us now turn to the interaction between the teacher's teaching experience and the learner's chess knowledge.

Figure 6 How many years have you been working at the school, including this school year?



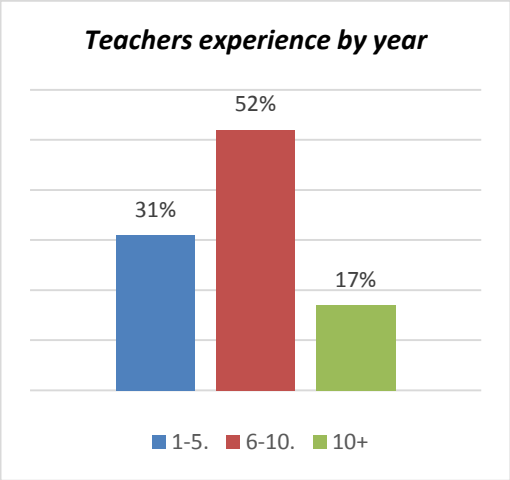
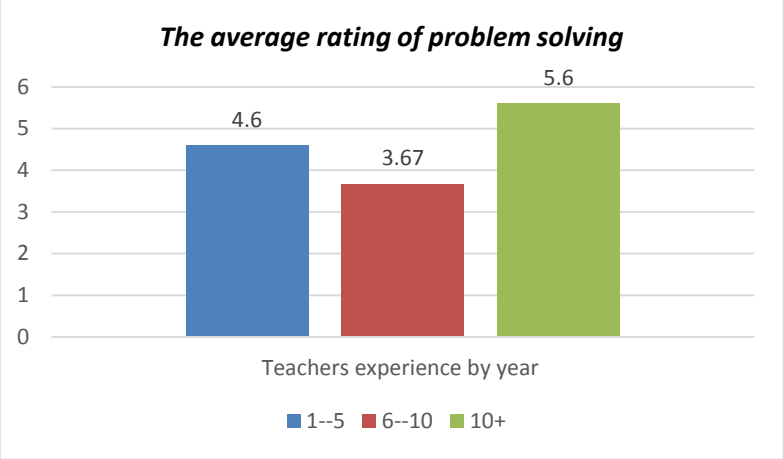


Figure 7 The average rating of problem solving



The testing showed that in the groups of teachers formed by seniority: 1-5 years, 6-10 years and 11 years and older, the average scores of the pupils' test differed statistically significantly (Table 1 and Table 2):

- One-dimensional dispersion analysis showed that there was a statistically significant difference between at least two of these three groups: (F (2, 475) = [28.086], p = 0.000
- Tukey's HSD test showed that .
- Between groups with 1-5 and 6-10 years of experience (p = 0.000, 95% CI = [0.4234, 1.4447])
- Between groups with 1-5 years and 10 years or more experience (p = 0.000, 95% CI = [-1.6879, -0.3144])
- With 6-10 years and 11 or more years of experience (p = 0.00, 95% CI = [-2.5720, -1.2984]) The highest value is among the pupils of teachers with 10 and more years of

experience, the second among the pupils of teachers with 1-5 years of experience and the third among the pupils of teachers with 6-10 years of experience.

ANOVA					
The number of correctly solved problems with counted assessments					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	247.406	2	123.703	28.086	0.000
Within Groups	2,092.106	475	4.404		
Total	2,339.512	477			

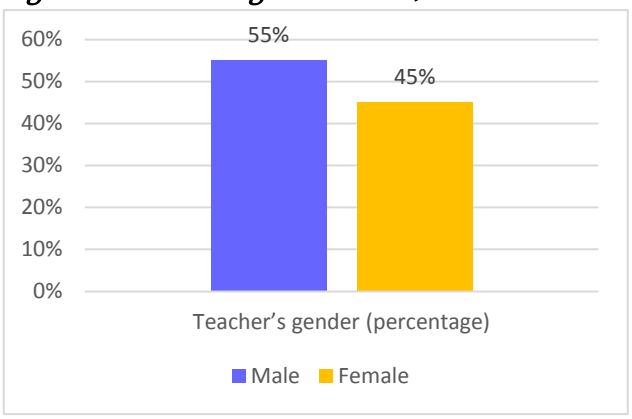
Table 1 The number of correctly solved problems with counted assessments (ANOVA)

MULTIPLE COMPARISONS						
Dependent Variable: The number of correctly solved problems with counted assessments						
Tukey HSD						
(I) Teaching experience	(J) Teaching experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1-5	6-10	0.93404*	0.21720	**0.000**	0.4234	1.4447
	11+	-1.00115*	0.29208	**0.002**	-1.6879	-0.3144
6-10	1-5	-0.93404*	0.21720	**0.000**	-1.4447	-0.4234
	11+	-1.93520*	0.27087	**0.000**	-2.5720	-1.2984
11+	1-5	1.00115*	0.29208	**0.002**	0.3144	1.6879
	6-10	1.93520*	0.27087	**0.000**	1.2984	2.5720
*. The mean difference is significant at the 0.05 level.						

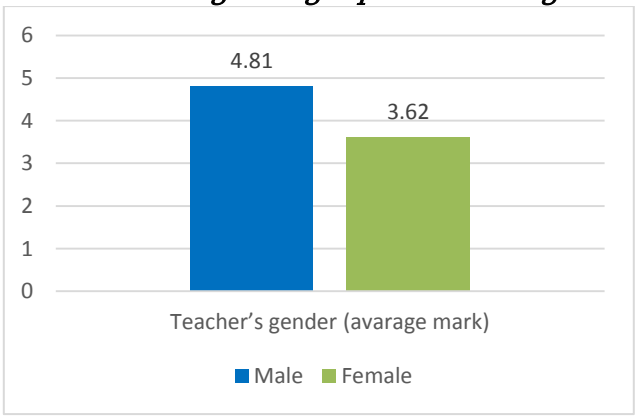
*Table 2 The number of correctly solved problems with counted assessments (*MULTIPLE COMPARISONS)

The gender of the teacher also contains some interesting characteristics from the point of view of chess knowledge.

Figure 8 Teacher's gender- Male, Female

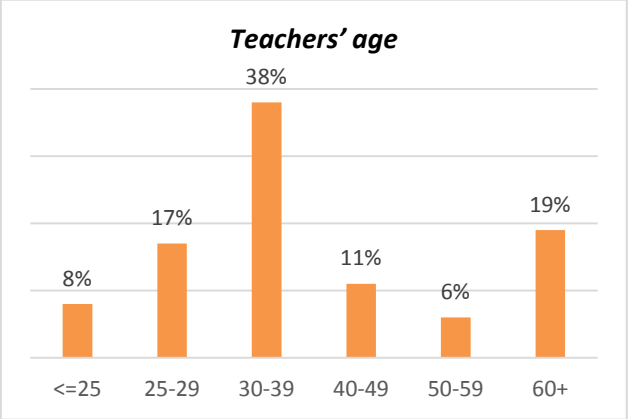


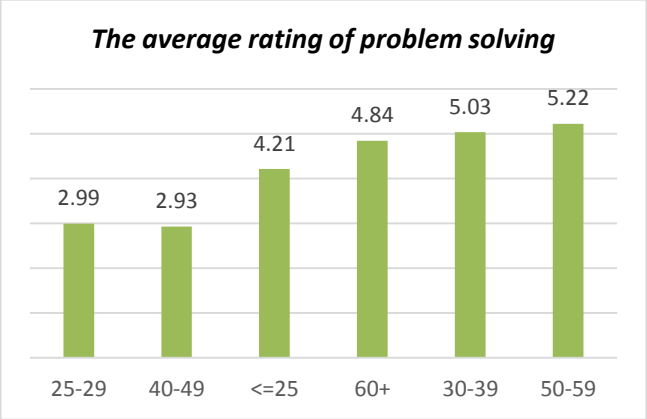
The average rating of problem solving



The T-test showed that the average value of pupils' chess knowledge scores was statistically dependent on the teacher's gender: The grades of male teacher students are statistically significantly higher than those of female teachers.
t (476) = 6.07, p = 0.000

Figure 9 Teachers' age *The average rating of problem solving*





From the point of view of teacher age characteristics, it is interesting to note that the testing showed that in the age groups of teachers, the average grades of pupils differ significantly.

The age groups can be grouped into two larger groups, in which the pupils' grades differ statistically significantly from each other, and within each group they do not. The first of them are the groups of teachers aged 25-29 and 40-49, and the second are the groups of 30-39, 50-59, 60+ and under 25.

REFERENCES

1. (Rockstroh, Angela H., "Teacher Characteristics on Student Achievement: An Examination of High Schools in Ohio" (2013). MPA/MPP Capstone Projects. 49. https://uknowledge.uky.edu/mpampp_etds/49):
2. (Smyth E., Whelan C., McCoy S., Quail A., Doyle E., Understanding Parental Influence on Educational Outcomes Among 9 Year Olds in Ireland: The Mediating Role of Resources, Attitudes and Children's Own Perspectives//Child Indicators Research, VL-3, 2009, pp.85-104, Doi: 10.1007/s12187-009-9051-9):

ԱՄՓՈՓԱԳԻՐ

ՇԱԽՄԱՏԱՅԻՆ ԳԻՏԵԼԻՔՆԵՐԻ ՎՐԱ ՈՒՍՈՒՑԻՉՆԵՐԻ ԵՎ ԾՆՈՂՆԵՐԻ ԲՆՈՒԹԱԳՐԵՐԻ ԱԶԴԵՑՈՒԹՅԱՆ ՍՈՑԻԱԼ-ՀՈԳԵԲԱՆԱԿԱՆ ՎԵՐԼՈՒԾՈՒԹՅՈՒՆ

ՍԱՐԳՍՅԱՆ Թ.Ա., ԳԵՎՈՐԳՅԱՆ Ս. Ռ., ՄՈՎՍԻՍՅԱՆ Ն.,Ն., ՄԱՆՈՒԿՅԱՆ Ս. Ա., ՍԱՐԳՍՅԱՆ Վ.Ժ., ԽԱՉԱՏՐՅԱՆ Է. Ա.

Քանի որ ուսուցիչներն ու ծնողներն ուղղակիորեն պատասխանատու են սովորողների ակադեմիական ձեռքբերումների համար, նրանք կրթության վրա ազդող դպրոցահեն ամենակարևոր գործոնն են համարվում: Եվ կարելի է ենթադրել, որ կրթական առաջընթացի վրա ներգործել կարող են ուսուցիչների և ծնողների ամենատարբեր բնութագրերը՝ սեռը, տարիքը, կրթական մակարդակը, փորձառությունը և այլն: Հոդվածում ներկայացված են շախմատային ձեռքբերումների և դրանց վրա ազդող գործոնների փոխկապվածության սոցիալ-հոգեբանական մեխանիզմները: Հոդվածի համար հիմք են հանդիսացել Շախմատային գիտելիքների գնահատում համահանրապետական հետազոտության արդյունքում ուսուցիչներից և ծնողներից ստացված տվյալները:

Հիմնաբառեր. շահագրգիռ կողմեր, դպրոցահեն գործոններ, շախմատային նվաճումներ, սոցիալ-հոգեբանական բնութագրեր:

РЕЗЮМЕ

СОЦИАЛЬНО-ПСИХОЛОГИЧЕСКИЙ АНАЛИЗ ВЛИЯНИЯ ХАРАКТЕРИСТИК УЧИТЕЛЕЙ И РОДИТЕЛЕЙ НА ШАХМАТНЫЕ ЗНАНИЯ

САРГСЯН Т. А., ГЕВОРГЯН С.Р., МОВСИСЯН Н.Н.,МАНУКЯН С. А., САРГСЯН В. Ж ., ХАЧАТРЯН Э. А.

Поскольку учителя и родители несут прямую ответственность за академические достижения учащихся, они считаются наиболее важными школьными факторами, влияющими на их учебные результаты. Естественно предположить, что разные характеристики учителей и родителей, такие как возраст, пол, уровень образования, опыт и т. д. могут влиять на результаты обучения. В статье представлены социально-психологические механизмы взаимосвязи шахматных достижений школьников и факторы, влияющие на них. Для исследования мы использовали данные, полученные от учителей и родителей в ходе республиканского исследования оценки знаний шахмат.

Ключевые слова: заинтересованные стороны, шахматные достижения, социально-психологические характеристики

Approved for publishing by expert of education Serob Khachatryan
14.12.2021

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УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО
ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

THE CONNECTION OF CHESS KNOWLEDGE WITH THE INDICATORS OF PROGRESS IN MATHEMATICS AND NATIVE LANGUAGE IN PRIMARY SCHOOLS

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In the paper are presented the social-psychological foundations and the attitudes of the stakeholders of "Republican Research of Chess Knowledge Assessment", that has been conducted by "Chess" Scientific Research Institute (CSRI) in 2021. The results of the analysis of collected data disclosed the connection of chess knowledge with primary school pupils progress in mathematics and native language.

Key words: Chess knowledge, social-psychological analysis, semi-annual grade, chess achievement, evaluation, proportional complication of chess tasks.

Submitted to the editor 25.11.2021

The urgency of the issue is conditioned by the fact that although chess has been introduced as a compulsory subject in the field of general education of the Republic of Armenia since 2011, the role and interaction of this subject with other subjects have not been revealed yet. From a practical point of view, years of conversations with chess, elementary school teachers, and schoolchildren's parents have shown that disagreements often arise over the subjects traditionally considered to be the main subjects: native tongue, mathematics, and chess grades. There were many complaints especially about low grades of the chess subject. Chess teachers, on the other hand, often associated these issues with the objectivity or impartiality of their assessment. It can be considered obvious that these disagreements often had objective reasons, as the subject was not yet sufficiently integrated into the subjects of secondary schools, many of the chess teachers did not have higher pedagogical education and experience, which directly or indirectly affected the assessment process. The importance of the issue raised by us is justified by the fact that, in the context of chess education, the main question was often to identify the factors influencing the subject of chess. Such a question is very important, but in our opinion, such an approach slightly ignores the need to solve systemic educational problems with other

subjects. Therefore, in this context, the influence of the knowledge and abilities developed within other general education subjects, or in other words, the interaction of different subjects, comes to the fore. The difficulties in resolving the issue were given that although national studies have been conducted regularly since 2015 [1, p. 39], [2, p. 9], they were initially test based.

The aim of the research is to reveal the connection between chess knowledge in elementary grades and indicators of progress in mathematics and mother tongue subjects.

The hypothesis of the research. It is assumed that the chess achievements of elementary school students, among other factors, are influenced by the achievements of students in the native language, mathematics.

Research questions. The following questions arise from the purpose of this study:

1) What are the connections and interactions between chess, native language and mathematics grades and chess achievement indicators?

2) To what extent do the chess achievements reflect the main indicators of the school curriculum, how complex is each task of the chess test?

3) To what extent do the semester grades of the chess subject correspond to the real chess knowledge and abilities?

The methodology and process of the research

Immediately after chess was introduced as a compulsory subject in Armenian schools, the Chess Research Institute of the Armenian State Pedagogical University (formerly the Center for Chess Educational Research) initiated and continued to regularly conduct national "Chess Knowledge Assessment" surveys. It aims to find out the level of chess knowledge and to reveal the impact of chess on the emotional and other spheres of primary school students, as well as the totality of the main and contextual factors influencing it. The survey included questionnaires for students, teachers and parents, which included questions about the child's chess experience, his / her parents 'attitude towards the subject of chess, and the teacher's effectiveness in teaching chess. Psychologists, chess players and teachers took part in compiling the questionnaires, who clarified and discussed each task in order to get a definite version. The survey was conducted by random sampling so that all regions of the Republic of Armenia, including the capital Yerevan, participated. The selected schools were 42 in advance, of which 3 schools from Aragatsotn region, 3 from Ararat region, 3 from Armavir region, 4 from Kotayk region, 3 from Gegharkunik region, 2 from Shirak region, 2 from Tavush region, 3 from Lori region 2 schools from Syunik region, 2 from Vayots Dzor region, 15 schools from the capital Yerevan. Within the frames of research internship, the students of the Kh. Abovyan Armenian State Pedagogical University joined the research, who had the opportunity to choose more than 10 schools and conduct research there. Totally, more than 500 students, more than 500 parents and more than 50 teachers from 52 schools participated in the national survey.

Students' learning styles, such as reflective and deep learning styles, appear more frequently during chess lessons in comparison with math and native language lessons.
Chess lessons provide necessary learning facilities for developing students' deep and reflective learning styles.

Summarizing the results, we can make the following conclusions: 1. There is a strong correlation between chess grades and pupils' reflective and deep styles of learning. Based on these results, we may infer that children are very "pragmatic" and they have to develop those skills which could be assessed better by teachers. Therefore, this fact can be indirectly interpreted as evidence of chess as a subject which promotes thinking and reflection. We can state that these students are more likely to set their own learning goals trying to understand the meaning of learning material. They are more motivated and likely to build their own learning path giving meaning to what they need to remember. 2. The fact that the directive and active learning strategies have been detected as the second and third correspondingly most frequently applied ones allows inferring that an active learning strategy has not been fully implemented yet by schoolteachers of chess. On the other hand, if we consider cognitive teaching strategy as a way of developing students' problem solving, decision making, and critical thinking skills, we can conclude that teachers are likely to share these ideas having implemented it. 3. The correlation links with high significance allow the conclusion that deep and reflective styles are also correlated. This can be interpreted as additional empirical evidence of conceptual meaning and closeness of these categories. 4. Although the research has not found any significant correlations between teaching strategies and learning styles, the detailed analysis revealed that reflective (0.23) and deep (0.24) styles are considered as better ways of learning, are more connected with cognitive teaching strategy, and less with directive strategy (0.21). It is important to emphasize that in several studies conducted in previous years, the authors were interested in the issues of interaction and interdependence of mathematics, native language, and chess subjects. In one of these researches, the authors analyzed the textbooks and teacher's manuals of the mentioned three subjects, identifying the qualities and capabilities that the content of those subjects is aimed at developing, as well as the proportion they are formed (the influence factor of each subject) [3, p. 9].

The authors singled out the qualities and features that are reflected in the content of the textbooks of the 2nd, 3rd and 4th grade native language, mathematics and chess subjects, and analyzed the proportions of the influence of these three subjects on their formation.
As part of our nationwide research, a chess knowledge test was developed covering 8 tasks, in which, in addition to chess knowledge, revealed the following cognitive qualities: prediction, prevention, alternative thinking, algorithmic thinking, the ability to compare and assess the situation, critical thinking, hence, we will emphasize the indicators of the impact of the three

subjects on these qualities and will combine them with the quantitative data obtained as a result of our research.

Thus, the abilities of prediction and prevention are manifested in the qualities of "Reading the thoughts and feelings of the other person", "Limiting the mobility of the opponent", "Predicting". Therefore, the development of prediction and prevention capabilities by subjects and grades (see V. Karapetyan, chart 1, 2, 3) has the following proportion.[1*]

Chess: 24. 4%, Native language: 9.4%, Mathematics: 8.3%

The content aimed at shaping alternative thinking is expressed as follows:

Chess: 3.2%, Native language: 2.7%, Mathematics: 4%

The task of algorithmic thinking is largely related to the ability to plan, expressed as follows:

Chess: 4.1%, Native language: 4.4%, Mathematics: 4.2%

The ability to compare and assess the situation by subjects is developed in the following proportions (the qualities of "Consideration of efforts and resources", "Drawing conclusions", "Making comparisons" are included):

Chess: 21.1%, Native language: 11.3%, Mathematics: 19.3%

Critical thinking is seen in the abilities to "Compare" and "See cause-and-effect relationships", which are expressed in the following proportions:

Chess: 6.2%, Native language: 21%, Mathematics: 12.3%

The combination of the results of these two studies allows us to record that these three subjects taught in elementary school have a certain proportion of influence on the development of different cognitive qualities. It also provides an opportunity to interpret in more depth the results obtained by combining the data of the chess knowledge test with the data of semester grades of the native language and mathematics subjects.

The results of the research.

As we can see from Table 1, learners in native language, chess, and math find that they get the most excellent grades.

Grades	Chess	Native Language	Mathematics
Excellent	74.1%	69.8%	65.7%
Good	24.4%	28.9%	31.0%
Sufficent	1.5%	1.3%	3.3%
Total.	100.0%	100.0%	100.0%

Table 1 . "What grades do you mainly get from these subjects?"

[1*] The content share aimed at building the given capacities in% is presented in the textbooks of the 2nd, 3rd and 4th grades.

It should be noted that, in fact, the real semester assessments generally reflected those tendencies.

Grading semester.	Chess	Native language	Mathematics
0	1.7%	1.0%	1.3%
1	1.0%	0.0%	0.0%
4	0.6%	0.0%	0.4%
5	0.4%	0.4%	1.7%
6	1.9%	2.5%	4.6%
7	7.5%	7.1%	9.2%
8	14.4%	22.4%	20.5%
9	65.5%	64.2%	56.3%
10	6.9%	2.3%	6.1%
Total.	100.0%	100.0%	100.0%

Table 2 . Pupil's semester grades

Among other questions, the parents were asked how satisfied they thought the chess lessons were in terms of knowledge exchange.

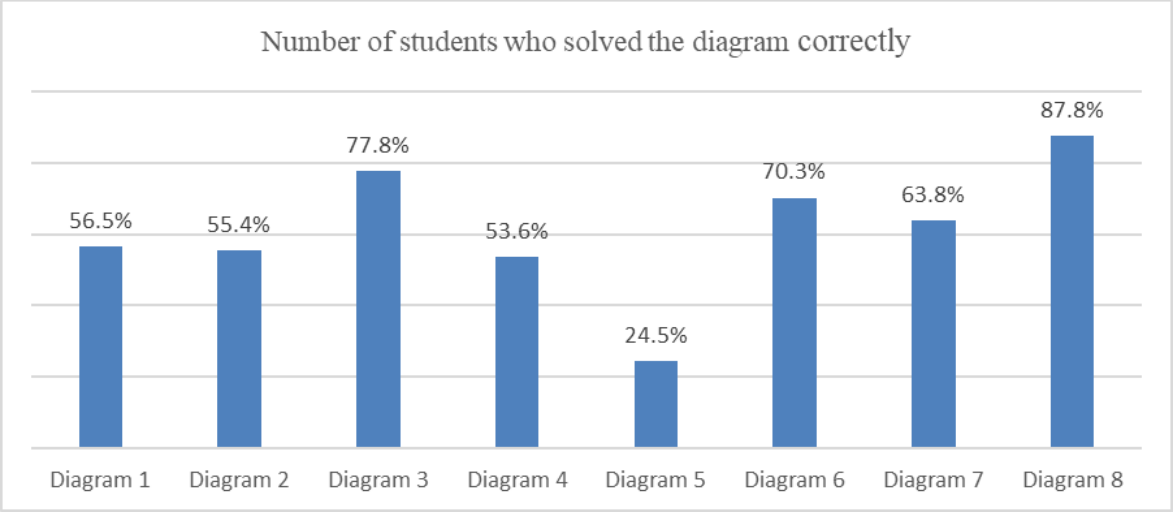
"Do you think chess lessons at school are enough to give children consistent knowledge?"												
	Aragat	Arar	Arm.	Gegh	Kot.	Lo.	Shi.	Syun	V Dz	Tav.	Yer.	Total
Yes, it is enough	30.8 %	57.4 %	41.5 %	49.0 %	43.7 %	44.0 %	57.1 %	63.6 %	70.0 %	50.0 %	43.0 %	**47.5 %**
Partly	53.8 %	37.0 %	47.2 %	45.1 %	47.9 %	52.0 %	17.9 %	36.4 %	30.0 %	50.0 %	44.4 %	**43.1 %**
No, it is not enough	15.%	3.7 %	7.5%	5.9%	5.6%	4.0%	10.%	0.0%	0.0%	0.0%	9.6%	**6.7%**
Total.	100.0 %	100. 0%	100. 0%	100. 0%	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	**100. 0%**

Table 3 . "Do you think chess lessons at school are enough to give children consistent knowledge?"

Through the data of the research, it is possible to evaluate the effectiveness of teaching the subject of chess and the factors influencing it. For that, the results of the chess tasks given to the students during the research were used.

During the research, the students were given 8 test diagrams, which are numbered from 1-8. The number of students who correctly solved the diagram with this number is given in Figure 1.

Figure 1. Number of students who solved the diagram correctly

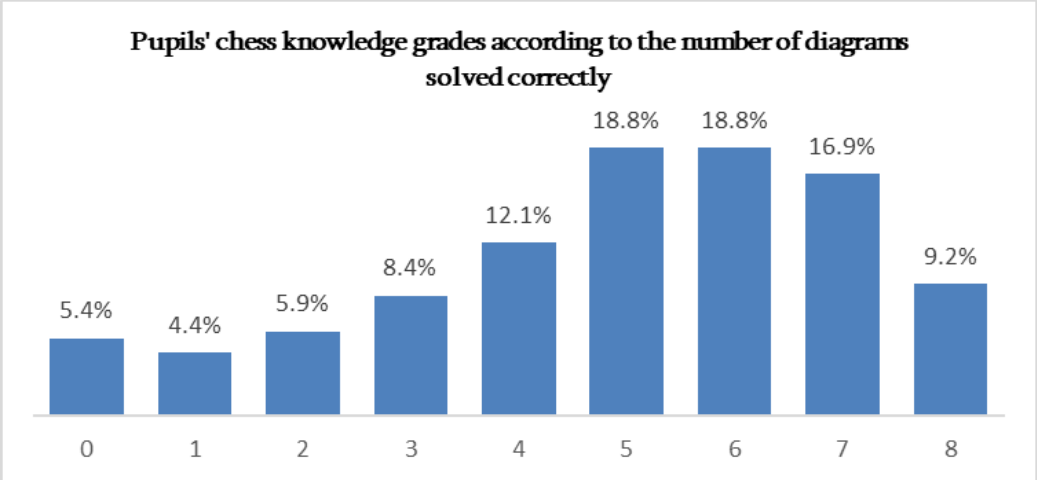


Based on the obtained data, two types of students' chess knowledge assessments were built.

Approach N1.

Suppose the "difficulty" of all problems is the same. In that case, we can consider that the number of correctly solved diagrams of the student approximates his chess knowledge well. The change range for this rating will be [0; 8], where 0 means that the student has not solved any of the diagrams, and 8 means that the student has solved all 8 diagrams. The distribution of that score is given in Figure 2. Kolmogorov – Smirnov's test showed the obtained distribution is not a normal one, D (478) = 0.158, p = 0.000.

Figure 2.



However, the data in Diagram 3 show that the difficulties of the 8 diagrams are not equal.

It is possible that the assessment of a student's chess knowledge has formed taking into account the degree of difficulty of the diagrams he/she has solved.

Approach N2.

Let's name the percentage of students who solved the diagram correctly: probability of solving the diagram - *Pi*. Let's call the inverse of this probability the weight of the diagram- *Wi*. The higher the weight of the diagram, the more difficult it is to solve. Normalize the weights of the diagrams so that their sum is equal to 8 (Table 4 and Figure 3).

	The probability of solving ` P_i	The weight of the diagram ` $W_i = 1/P_i$	Normalized weight of the diagram ` $WN_i = (W_i / \sum W_i) * 8$
Diagram 1	0.878	1.139	0.611
Diagram 2	0.638	1.567	0.841
Diagram 3	0.730	1.370	0.735
Diagram 4	0.245	4.082	2.190
Diagram 5	0.536	1.866	1.001
Diagram 6	0.778	1.285	0.690
Diagram 7	0.554	1.805	0.968
Diagram 8	0.556	1.799	0.965
Total		-	**8**

Table 4 . Probability of solving diagrams, weights, and normalized weights

The distribution of the semester chess grade is given in Figure 4, and the average values of the chess test depending on the semester chess grades are given in Figure 5.
The minimum possible semester grade is 6.

Figure 3. Estimates of relative difficulty of chess charts (normalized weights)

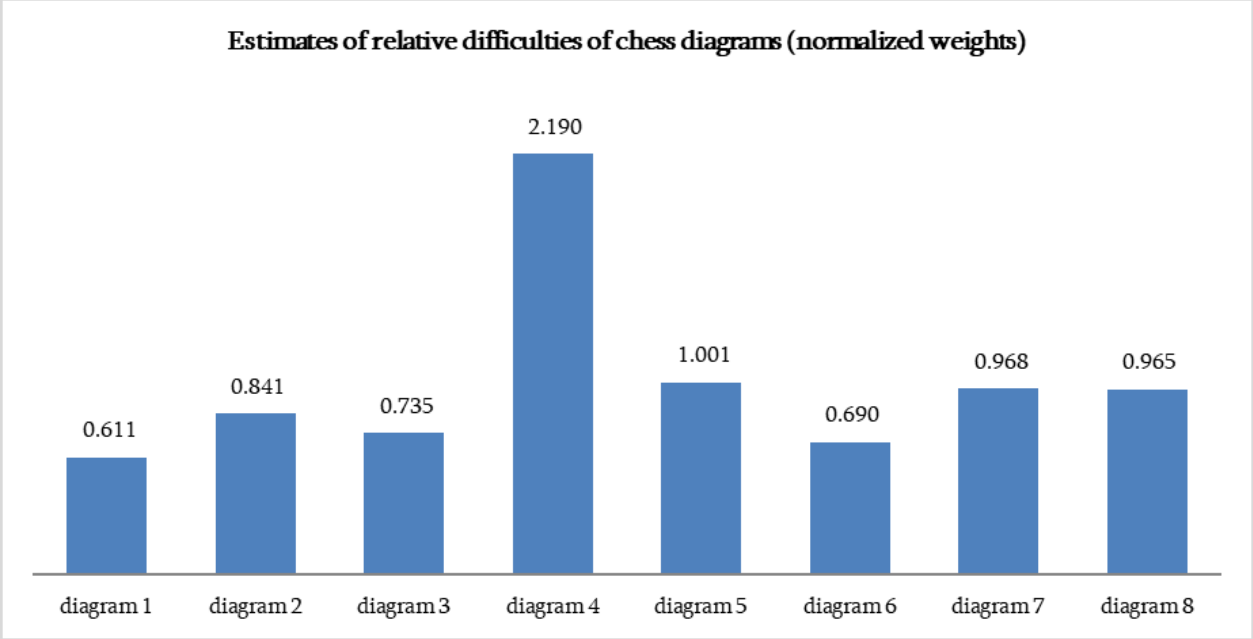


Figure 4. Average chess test scores

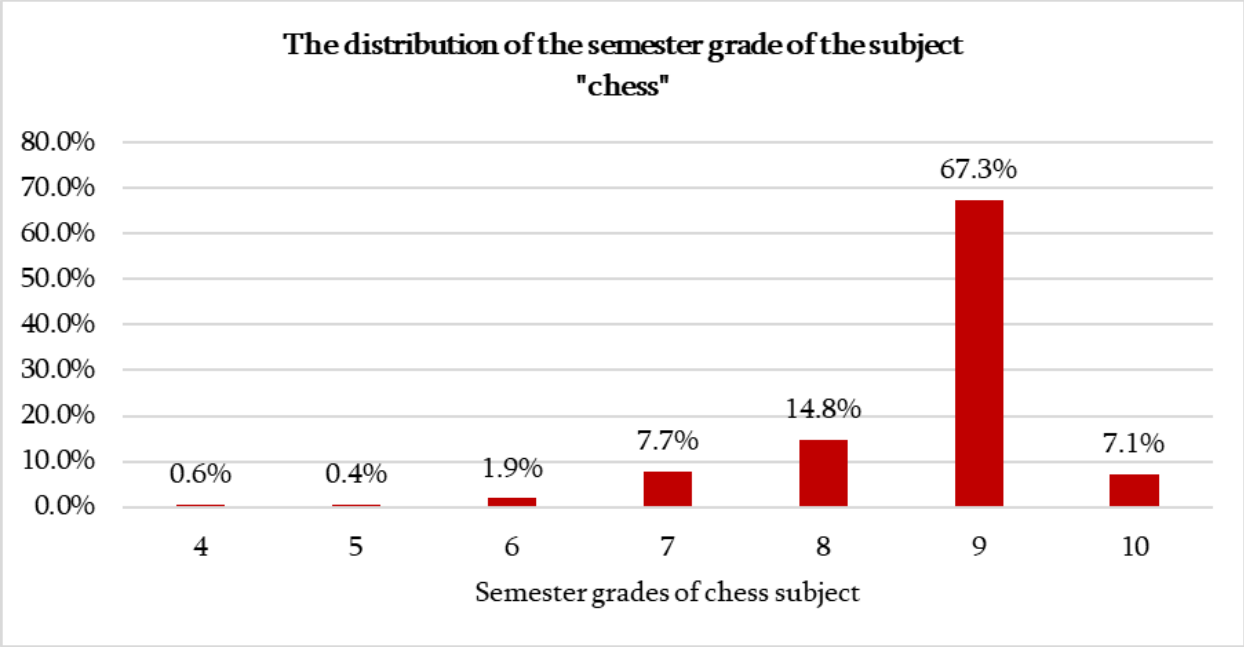
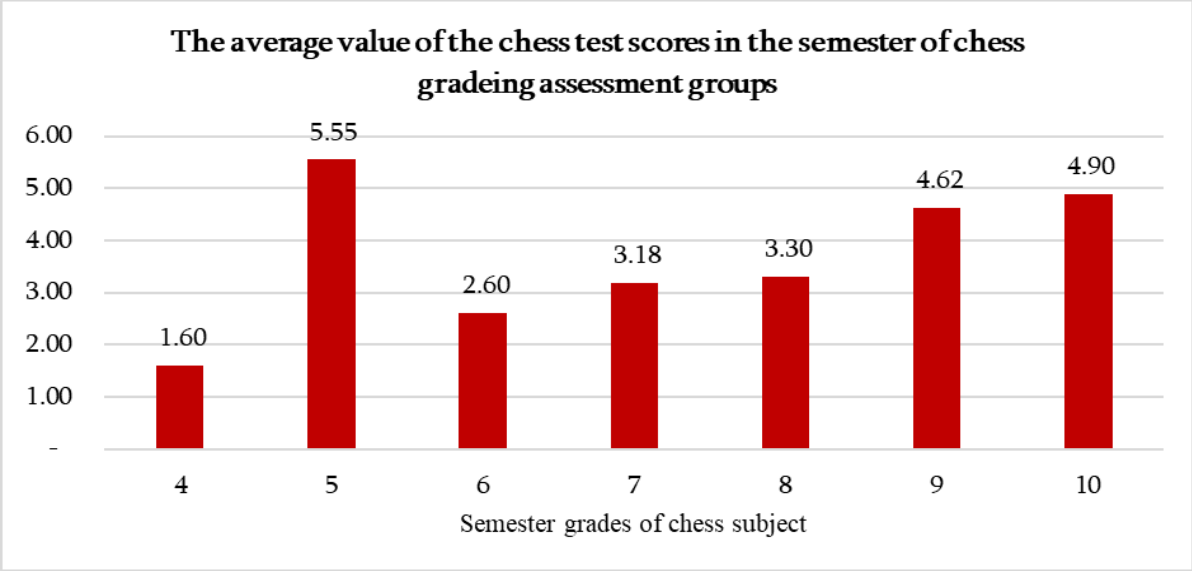


Figure 5.



The dispersion analysis showed that there were no statistically significant differences between the 6-8 level and 9-10 level groups of the semi-annual chess subject grades. However, there are statistically significant differences between levels 6-8 and levels 9-10.

In addition, there is a statistically reliable linear trend in 6-10 series of semester chess subject assessments.

Semester grades of the subject "native language".

The distribution of the semester grade score of a native language subject (Figure 6) is very similar to that of a semester grade score of a chess subject (Figure 8). However, the dependence

of the chess test scores is much more adequate than the semester scores of the native language. The linearly growing trend is visible here.

Figure 6.

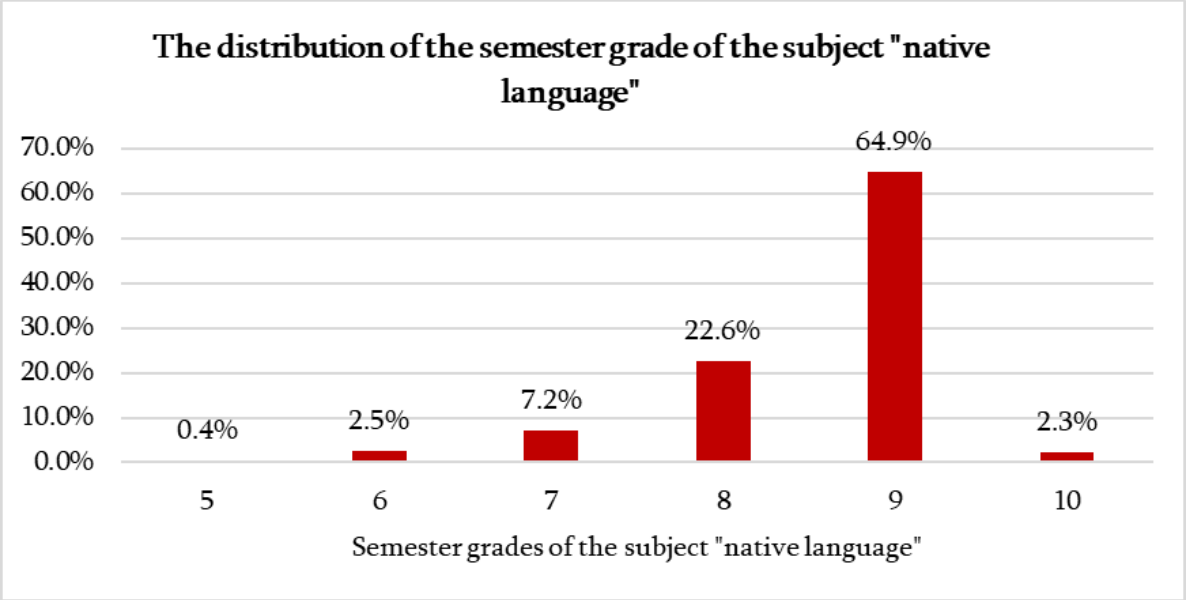
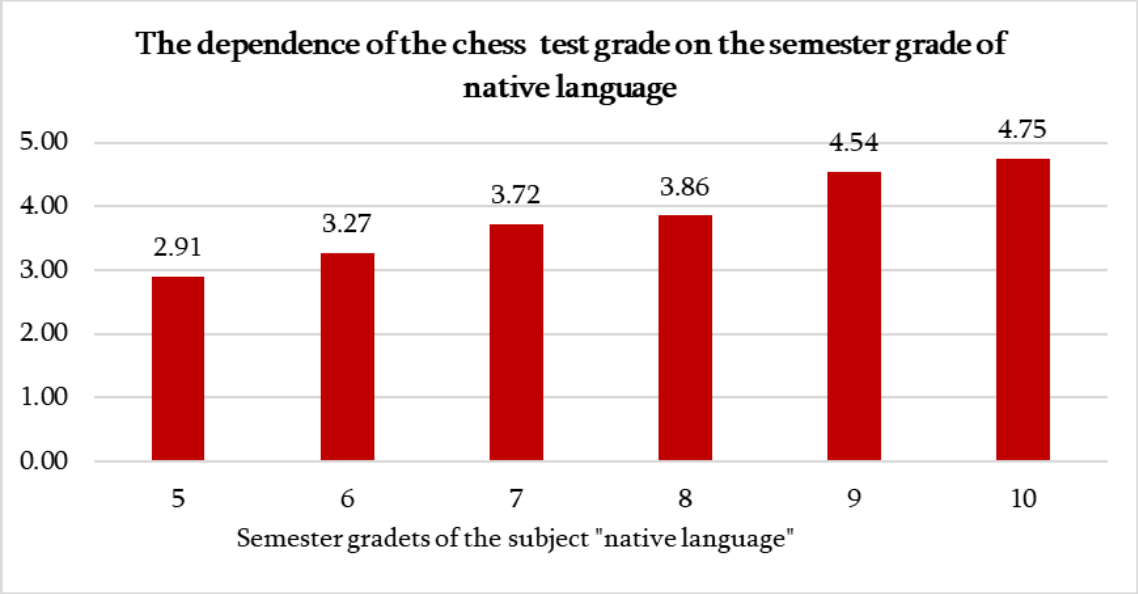


Figure 7.



Nevertheless, it is necessary to reveal statistically significant differences between the "trend" and the different grades of the "native language" subject in the chess test grades.

The dispersion analysis showed that there was no statistically significant difference (even between levels 10 and 5) for any pair of semi-annual mother tongue assessments, but the linear trend was statistically significant.

That is, the higher the half-year grade of the mother tongue, the higher the increase in the grade of the chess tests.

We think the reason is related to the teaching style and methods. Most teachers test students' current knowledge, as well as expected outcomes, through an oral means of checking. And those learners who have developed speech and language ability, can easily answer questions, but it is also possible that other learners, hearing the correct answers, simply repeat them by heart. For example, questions like "what is a check?", "what is a mate?" The learner can say the rule but cannot find the right check or mate on the chessboard while solving the problem.

Semester grades of the subject "mathematics".

The distribution of semester grades in Mathematics is given in Figure 8. And the dependence of the chess test scores on the semester grades in Figure 9. From the data it can be seen that inadequate data in Figure 10 is available in the case of the 0-semester grade in mathematics. And the volumes of groups 1-5 are very small. Therefore, the dispersion analysis was performed for 6-10 groups.

Figure 8.

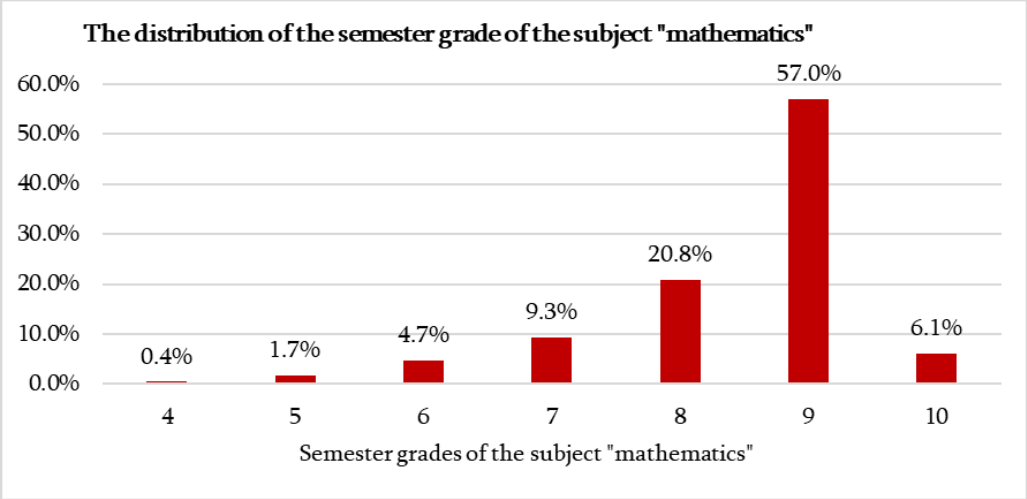
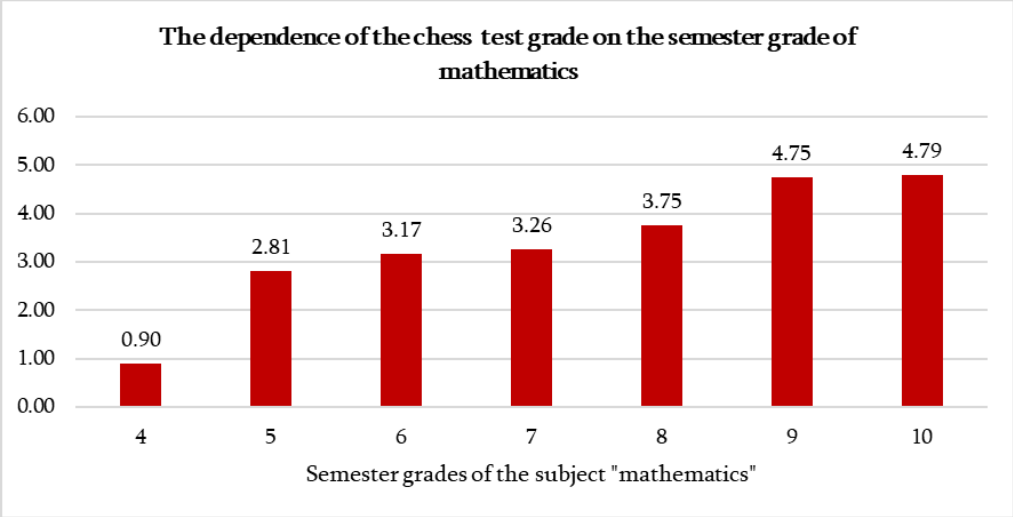


Figure 9.



The dispersion analysis showed that the score of the chess test in the group with 9 semester scores in mathematics is statistically different from the scores of the 6, 7 and 8 groups.

In addition, there is a linear trend: in parallel with the increase in the semester grades in mathematics, the grades in the chess test are increasing.

Socio-psychological analysis of the research results.

Thus, the socio-psychological analysis of the obtained results is advisable to carry out in the form of answers to the questions posed, which are aimed at the realization of the purpose of the research.

1. To the question "What are the connections and interactions between chess, native language and mathematics grades and chess achievement indicators", it can be stated that based on the available data, the semi-annual grades of "chess", native language and mathematics subjects express similar tendencies.

In particular, the grades of native language, mathematics and chess subjects were …, …, … percent, respectively. Referring to the connections between the grades of the native language and mathematics subjects and the indicators of chess achievements, let us state that along with the increase of semester grade of the native language, the increase of the grade of the chess test begins to be expressed. This may be due to the fact that students' general abilities are taken into account during the assessment, or it may be conditioned on the interaction of knowledge, as well as on both of these factors at the same time. Almost the same tendency is evident in the interaction of mathematics and chess test grades. It is also interesting the dependence of the chess test scores on semester grades of the chess subject, where the linear trend is generally maintained, but with the difference that quite high scores were obtained in the case of 5 points. We tend to explain this by the fact that the distribution of tasks and topics according to the degree of complexity is not completely preserved in both the test and the program, which has already attracted the attention of the research institute during the development of new standards. Therefore, to the question "To what extent do the chess achievements reflect the main indicators of the school curriculum, what is the level of complexity of each task of the chess test?", it should be answered that in general the test has a high degree of suitability, but during the development of its tasks there is a problem to improve the condition of proportional complication of tasks.

Considering the students' chess knowledge grades according to the number of diagrams correctly solved and the mismatch of the distribution of chess semester grades, we assume that the differences of students' educational levels are generally taken into account in school progress consideration, but there is some upward trend in grades, which may be due to the complexity of the subject on the one hand, and the need to ensure compliance with the grades of other subjects in elementary school on the other hand.

REFERENCES

1. Karapetyan V., Melkonyan N., Tanajyan K., Gevorgyan N., “Shakhmat mijararkayakan bnuyti usumnasirutyun dasagrqeri bovandakayin verlutsutyan himan vra”. Shakhmat. Gitutyun ev krtutyun, gitametodakan amsagir, Yerevan, 2019, N1, 42-56.
2. Mirzakhanyan R., Gevorgyan S., Sargsyan V., Daveyan H. “Analysis of the Efficiency of Teaching Chess in Schools”, Sociology Study, January 2017, Vol. 7, No. 1, 36-42
3. Sargsyan Vahan, Gevorgyan Srbuhi, Gevorgyan Lilit, “SOCIO-PSYCHOLOGICAL ANALYSIS OF FACTORS INFLUENCING CHESS EDUCATION” , Main Issues of Pedagogy and Psychology, VOL. 20 NO. 2 (2021), 7-18

ԱՄՓՈՓԱԳԻՐ

ՏԱՐՐԱԿԱՆ ԴՊՐՈՑՈՒՄ ՇԱԽՄԱՏԱՅԻՆ ԳԻՏԵԼԻՔՆԵՐԻ ԿԱՊԸ ՄԱԹԵՄԱՏԻԿԱ ԵՎ ՄԱՅՐԵՆԻ ԼԵԶՈՒ ԱՌԱՐԿԱՆԵՐԻ ԱՌԱՋԱԴԻՄՈՒԹՅԱՆ ՑՈՒՑԱՆԻՇՆԵՐԻ ՀԵՏ

ՍԱՐԳՍՅԱՆ Վ., Ժ., ՄԱՆՈՒԿՅԱՆ Ս.Ա., ՍԱՐԳՍՅԱՆ Թ., Ա., ԳԵՎՈՐԳՅԱՆ Լ., Լ.

Հոդվածում ներկայացված են «Շախմատ» գիտահետազոտական ինստիտուտի կողմից իրականացված «Շախմատային գիտելիքների գնահատում» համահանրապետական հետազոտության սոցիալ-հոգեբանական հիմքերը, շահագրգիռ կողմերի դիրքորոշումներ: Հետազոտության արդյունքում աշակերտներից ստացած տվյալների վերլուծության հիման վրա բացահայտվել է շախմատային գիտելիքների կապը տարրական դպրոցի մաթեմատիկա և մայրենի առարկաների առաջադիմության հետ:

Հիմնաբառեր: Շախմատային գիտելիք, սոցիալ-հոգեբանական վերլուծություն, կիսամյակային գնահատական, շախմատային ձեռքբերում, գնահատում, շախմատային խնդիրների համաչափ բարդացում:

РЕЗЮМЕ

СВЯЗЬ ШАХМАТНЫХ ЗНАНИЙ С ПРЕДМЕТАМИ МАТЕМАТИКИ И РОДНОГО ЯЗЫКА В НАЧАЛЬНОЙ ШКОЛЕ

САРГСЯН В, Ж ., МАНУКЯН С. А., САРГСЯН Т. А ., ГЕВОРГЯН Л. Л.

В статье представлены социально-психологические основы общенационального исследования «Оценка знаний о шахматах», проведенного НИИ «Шахматы», позиции заинтересованных сторон. На основе анализа данных, полученных от учеников, выявлена связь шахматных знаний с успеваемостью начальной школы по математике и родным предметам.

Ключевые слова: Шахматные знание, социально-психологический анализ, полугодовая оценка, шахматные достижения, оценование, пропорциональное усложнение шахматных задач.

Approved for publishing by expert of education Serob Khachartyan

14.12. 2021

Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ
ԳԻՏԱԿԱՆ ՏԵՂԵԿԱԳԻՐ
УЧЕНЫЕ ЗАПИСКИ АРМЯНСКОГО ГОСУДАРСТВЕННОГО
ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

PHILOSOPHY OF CHESS EDUCATION: THE ARMENIAN EXPERIENCE

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The article shows the experience and features of the introduction and development of the chess subject in the Republic of Armenia. The article is based on the analysis of materials, documents, and data obtained from expert interviews, observations of the educational environment. The experience of introducing chess is a new phenomenon in the education system of the Republic of Armenia, which has a tradition of about ten years. Such programs and projects are aimed at modernizing education, an index of accessibility, improving the quality of education. The Armenian model of including chess as an educational subject has a conceptual significance for the educational system, it is aimed at solving the following educational problems: It should be mentioned that Armenian chess education in the field of general education is currently at the stage of development, the stable foundations, and principles of which are firmly laid and pursue certain goals. We can say that the introduction of chess has required a wide range of human, cultural, and social potential.

Key words: chess education, critical thinking, problem -solving, social values, primary school.

Submitted to the editor 25.11.2021

The issue of ensuring and improving the quality of education requires continuous work, consistency with reforms, especially nowadays. Today the effectiveness and quality of educational reform depends not only on a comprehensive and detailed study of the new programs and projects being introduced, but also on the demands of different stakeholders in the education sector, the educational environment, the period, and the relevance of a particular society. This issue is more sensitive in the field of general education when it comes to ensuring the quality of education in primary school, the implementation of educational reform projects and programs.

In the field of general education in the Republic of Armenia, the processes of ensuring the quality of education and reform policy have continued. Such programs and projects are aimed at modernizing education, accessibility index, improving the quality of education. In this

context, state standards of general education of the Republic of Armenia have been developed, new curriculums and new educational subject groups have been approved.

In 2011 chess entered the basic secondary schools, completing the list of subjects of the 2nd, 3rd and 4th grades in the primary school. The aim of the article is to show the experience and peculiarities of the introduction of the Chess subject in the Republic of Armenia.

Based on the points mentioned above, the following issues have been raised in the work:

- ✓ To find out the human, cultural, social potential of the Chess curriculum
- ✓ To dentify the obstacles encountered during the introduction and operation of the curriculum and ways to overcome them
- ✓ To analyze the impact, results and effectiveness of chess education in the learning process
- ✓ To assess the potential of chess as an educational subject in the context of socio-cultural conditions in Armenia

Methodology. The article is based on the analysis of materials, documents and data obtained from expert interviews, observations of the educational environment.

Information on the peculiarities of the organization of chess education, environmental factors was collected through observations, which was significant for the contextual analysis of chess education. The study of the key components of chess in education - textbooks, methodological manuals for teachers, procedural criteria, training modules - was carried out by the method of document analysis, and the technique of secondary data analysis was used. Expert interviews were conducted with 10 experts in order to analyze chess education in depth, to evaluate its effectiveness and perspectives. The participants of the interviews are chess education experts and leading specialists, who were selected in accordance with the following criteria:

- ✓ Participation in "Chess in School" projects and programs
- ✓ Experience of scientific-research work in the field of chess education
- ✓ Existence of scientific works on the philosophy and policy of education.

It should be noted that the experts are from different gender, age and professional groups. The wide range of professionalism and employment has made it possible to bring out the views of experts in the fields of sociology, psychology, pedagogy and education, as well as those in charge of education in state bodies on the issues and problems raised.

The introduction of chess in the field of general education

The experience of introducing chess is a new phenomenon in the educational system of the Republic of Armenia, has a tradition of about ten years. It was introduced in accordance with the procedures of other general education subjects, passing through several stages. The peculiarity of the introduction in the first stage was related to the professional teaching potential. The introduction of chess in the daily life of the primary school student pursues the solution of a number of problems, which are aimed at the implementation of the strategy of reforming the educational system of the Republic of Armenia. The Armenian model of including chess as an educational subject has a conceptual significance for the educational system, it is aimed at solving the following educational problems:

- ✓ To educate a harmoniously developed and socially responsible person

- ✓ To introduce and develop new teaching methods and methodological techniques, which will create an opportunity to stimulate educational motivation and increase the level of students' involvement in the educational process.
- ✓ To shape and develop common basic learning and thinking skills and abilities
- ✓ To contribute to the discovery and development of students' special abilities and talents.

In a number of international studies, the Armenian model of introducing the subject of Chess is considered successful. Particularly in FIDE-EDU IN SCHOOLS SURVEY report it is characterized by the features of state support, high control and coordination]. Within the framework of the Armenian model, special attention is paid to the connections and interdisciplinary influences of Chess and other subjects.

Analyzing the expert data, it can be argued that the primary principle of the introduction of chess education is the formation of chess thinking, the second principle is to increase the efficiency of learning other subjects of general education through chess thinking. The next principle is to ensure the harmonious development of the person, which is manifested in the development of intelligence and emotional intellect. By the way this is also stated by the experts.

"Chess is a subject that constantly sets goals in different changing situations, overcomes obstacles, has emotional feelings, controls those emotional feelings, and ultimately now we have a lot of research showing that emotional intelligence of a student studying chess is pretty high. " (Expert –psychologist 55y.)

It is clear from the analysis of research materials that chess is not only a game, but also has a great potential for general education. Chess contains both scientific, aesthetic and sports elements, which are the main aspects of general education.

"You know, for example, basketball can also develop the skill you mentioned, or checkers, there are different board games, why chess? Look, for example, if we make football or basketball a compulsory subject in general education, first we do not have that infrastructure. One of the advantages of chess is that it does not want a lot of resources, and a country like Armenia that cannot build 1400 basketball or football fields in every school. In other words, we have to make this calculation that chess is very convenient for countries that do not have great financial resources." (Expert of education -50y.)

Speaking of resources, it should be noted that the achievements of the Armenian chess culture, the public predisposition to chess, as well as the intellectual potential, the presence of a large number of chess players, their popularity can be considered for the introduction of the subject of chess. As a result of the latter, the perception of chess as a value and national strength was formed.

Speaking of resources, it should be noted that the achievements of the Armenian chess culture, the public predisposition to chess, as well as the intellectual potential, the presence of a large number of chess players, their popularity can be considered for the introduction of the subject of chess. As a result of the latter, the perception of chess as a value and national strength was formed.

However, the introduction of chess as a subject in general education has been accompanied by certain obstacles and risks. According to the data received, among the obstacles

was the public concern about the workload of students, the fact that chess with its complexity and science pretended to be among the main subjects of general education. The next most difficult obstacle to overcome is the attitude of the parents due to the low level of chess knowledge and awareness. According to the survey, although the majority of students (88%) were enthusiastic about chess, parents still had concerns and reservations. These fears were partially justified and were related to the ambiguity of the pedagogical principles of the chess field, the incompleteness of the methodological guidelines, and the lack of pedagogical knowledge of the chess players in the initial period. Taking into account the above-mentioned obstacles, a number of works have been carried out by different structures. The role of the Chess Academy of Armenia, the Academy of Sciences of the Republic of Armenia (formerly the Ministry of Education and Science), the Chess Research Institute and the ASPU was especially emphasized by the experts. These institutions have trained chess teachers to develop pedagogical knowledge and skills.

According to the experts, the main goal of the training concept of teachers teaching the subject "Chess" is to develop and develop the communication skills of teachers teaching chess, to ensure their methodological armament, the development of pedagogical-psychological skills.

"The concept of training is divided into two parts, the first is the chess section, where the methodologists with years of experience are responsible, and at the same time pedagogical psychologists are responsible for the pedagogical-psychological aspect." (Expert of Developmental psychology -60y.)

Particularly important during the trainings was the emphasis on the role of chess in the development of students' mental and thinking abilities.

The role of chess education in the development of knowledge and skills.

The fact that chess is an intellectual game is discussed in the existing chess literature. In addition to the above, in order to understand the role of chess in education, it is necessary to reflect on the connection between the development of thinking during learning and chess [1, p. 36-42]. Human thinking develops when it works in two basic modes, concentration-dispersion, which must be replaced on a regular basis. This process is fully expressed in the framework of chess thinking. According to one of the experts: **If we go back to the chess game, we will see that when a chess player thinks about his step, he is focused, when he makes a move, he disperses a little and it is proved that if the brain works like that, like focusing and dispersing again and again, the results get even better.**

In other words, chess develops learners' thinking skills and thinking types. In particular, experts highlight the possibility of developing divergent / alternative thinking through chess. Chess education allows the learner to see multiple solutions to the problem, to choose the effective option in that multiplicity [2, p. 22-29]. The development of divergent thinking is closely linked to the creative mind. Creativity is defined as the ability to look at and solve a problem from a particular perspective. It is a creative process that allows you to discover connections, overcome new challenges and look for unusual, original, new solutions [3, p. 5-7]. Teaching chess contributes to the flexibility of the standards of creative thinking, the development of original qualities and heuristic abilities. The next criterion of creative thinking

is imagination, the development of which we can promote through chess education. Chess requires the ability to visualize [4, p. 64], that is, to develop visual perception, to develop the necessary image individually or as a whole. Visualization is the ability to help a person create ideas before any situation, to try to visualize the situation in great detail before reaching it.

The basic and classic chess ability is the calculation, which, according to experts, is obviously developed through chess thinking.

"Before deciding on the next step, you must not touch the pieces, that is, when you touch any piece you have to step on it, it means that the student is obliged to think in detail and calculate all the consequences that his action may bring." (Expert – teacher-trainer -35y.)

The results of a number of studies show that the process of chess education promotes criticall skills, the ability to predict, plan, and compare, and develops algorithmic-logical thinking [5, p. 105-118].

Expert data also speaks of other qualities that are developed when teaching chess: **"Children who succeed in chess, be it in the form of numbers, be it in terms of solving purely chess problems (we are talking about educational chess), here their reflex is much higher, the ability to weigh." (Expert –psychologist-researcher 40y.)**

In parallel with the above-mentioned thinking skills, the influence of chess education is evident in the development of qualities of social values, which is possible from the point of view of mutual understanding and harmony. According to the interviews, chess is a space game, that is, it is so harmoniously formed that almost all spheres of life are included in chess. Chess education has a wide range of opportunities, potential and impact on the harmonious development of a person. Harmonious development, in turn, is related to the recording of a person's maturity, the real conditions of which are created through chess thinking. According to the expert, a person is considered mature, or an individual who is able to make a choice, to be responsible for his own decision and choice.

In this context, chess is very comprehensive. The learner makes the decision on the execution of the step, evaluating the most purposeful and effective one in the variety of steps, after which he / she is going to accept the step and the responsibility for his / her own decisions. And, if necessary, take action and steps to improve and correct those consequences. This shows that chess education provides an opportunity for the learner to develop social responsibility and a number of important qualities in public relations. Secondary analyzes of research materials and existing studies on chess education show that chess education contributes to the development of a number of social values: tolerance, honesty, cooperation, and purposefulness among learners [6, p.36-37].

According to the experimental data, the potential for the development of discipline as a key quality through chess is mostly invaluable.

"I can say that chess teaches discipline, because often we do not like rules, we like self-activity, but chess is one of those games that has clear rules, and through chess, we can also teach children that there are rules in both chess and life." ***(Expert of education -50y.)***

Conclusions

Summarizing the above, it can be concluded that Armenian chess education in the field of general education is currently at the stage of development, the stable foundations and principles of which are firmly laid and pursue certain goals. We can say that the introduction of chess has required a wide range of human, cultural and social potential. Chess education in Armenia has a high viability due to the existing professional potential, as well as the existence of a mechanism for sustainable transfer of pedagogical knowledge and the general interest of the public. Despite all this, there are a number of obstacles that have not yet been overcome; they require comprehensive solutions and attention. The fact that there is a field of cooperation on the introduction and development of the chess fable and a common vision among government agencies, education experts and chess specialists, becomes a purposeful basis for the development of chess education prospects. In addition, a research-based policy is being developed in the context of the processes accompanying the introduction of chess education, which is possible for the implementation of new projects and programs aimed at improving chess education.

REFERENCE

1. Ruben Mirzakhanyan, Srbuhi Gevorgyan, Vahan Sargsyan, Hayk Daveyan - Analysis of the Efficiency of Teaching Chess in Schools, Sociology Study, 2017, VOL7, N1, 36-42.
2. Gevorgyan S., Karapetyan V., Sargsyan T., Movsisyan N., Kostanyan E., (2019), Divergent mtacoghutyan orinachap drsevorumnery shakhmatayin karoghutyunneri bacahaytman gorcyntacum, Yerevan Copy print, 2019, ej 22-29
3. Ola W. A. Gafour, Walid A. S. Gafour, Creative Thinking skills – A Review article,p. 5-7.
4. Лев Выготский: Воображение и творчество в детском возрасте Подробнее, Издательство: Перспектива, 2020 г. Ст 64.
5. Heghine Khachatryan, Serob Khachatryan, Naira Movsisyan - ELEMENTS OF CRITICAL THINKING IN THE SCHOOL STANDARDS OF "CHESS" SUBJECT International Journal Scientia Paedagogica Experimentalis (SPE), 2021, LVIII, 1, 105-118, ISBN 0582-2351.
6. Kristine TANAJYAN, Nelli MELKONYAN, Sirarpi MOVSISYAN, Chess as a social value, Main Issues of Pedagogy and Psychology vole 1, Yerevan 2021, p. 36-37.

ԱՄՓՈՓԱԳԻՐ

ՇԱԽՄԱՏԱՅԻՆ ԿՐԹՈՒԹՅԱՆ ՓԻԼԻՍՈՓԱՅՈՒԹՅՈՒՆԸ. ՀԱՅԿԱԿԱՆ ՓՈՐՁ

ՏԱՆԱՋՅԱՆ Ք. Ա., ՏԱՆԱՋՅԱՆ Լ. Ա.

Հոդվածի նպատակն է ցույց տալ Շախմատ ուսումնական առարկայի ներդրման փորձն ու առանձնահատկությունները ՀՀ-ում: Շախմատի ներդրման փորձը ՀՀ կրթական համակարգում նոր երևույթ է, ունի շուրջ տաս տարվա ավանդույթ: Նման ծրագրերն ու նախագծերը միտված են կրթության արդիականացմանը, մատչելիության ցուցանիշի, կրթության որակի բարձարցման արդյունավետությանը: Հոդվածը հիմնված է

փորձագիտական հարցարույցներից, կրթական միջավայրի դիտարկումներից ստացված նյութերի, փաստաթղթերի և երկրորդային տվյալների վերլուծության վրա:

Հայաստանյան շախմատային կրթությունը հանրակրթության ոլորտում ներկայումս գտնվում է բուն զարգացման փուլում, որի կայուն հիմքերն ու սկզբունքները այլևս անխախտորեն դրված են և հետապնդում են որոշակիացված նպատակներ: Կարող ենք ասել, որ շախմատ ուսումնական առարկայի ներդրումը պահանջել է մարդկային, մշակութային, սոցիալական ներուժի լայն ներառում:

Բանալի բառեր՝ շախմատային կրթություն, քննադատական մտածողություն, խնդիրների լուծում, սոցիալական արժեքներ, սկզբնական դպրոց:

РЕЗЮМЕ

ФИЛОСОФИЯ ШАХМАТНОГО ОБРАЗОВАНИЯ: АРМЯНСКИЙ ОПЫТ

ТАНАДЖЯН К. А., ТАНАДЖЯН Л. А.

Статья показывает опыт и особенности внедрения и развития шахматной дисциплины в Республике Армения. Статья основана на анализе материалов, документов и данных, полученных в ходе опросов экспертов, наблюдений образовательной среды. Опыт введения шахмат является новым явлением в системе образования Республики Армения, которая имеет традицию около десяти лет. Такие программы и проекты направлены на модернизацию образования, индекс доступности, повышение качества образования. Армянская модель включения шахмат в качестве образовательного предмета имеет концептуальное значение для системы образования и направлена на решение следующих образовательных проблем: Следует отметить, что армянское шахматное образование в области общего образования в настоящее время находится на стадии развития, прочные основы и принципы которого прочно заложены и преследуют определенные цели. Мы можем сказать, что введение шахмат потребовало широкого спектра человеческого, культурного и социального потенциала.

Ключевые слова: шахматное образование, критическое мышление, решение проблем, социальные ценности, начальная школа.

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Խ.ԱԲՈՎՅԱՆԻ ԱՆՎԱՆ ՀԱՅԿԱԿԱՆ ՊԵՏԱԿԱՆ ՄԱՆԿԱՎԱՐԺԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆԻ
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ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

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A NEW PERSPECTIVE OF TEACHING CHESS TO KIDS

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Abstract

Chess and football have progressed tremendously over the last 20 years and the quality and complexity of them have never been higher. The beneficial influence of chess on the human cognitive skills and character are continually demonstrated by studies and more and more people try to guide their children to practice this sport.

While teaching chess to some 10-12 year old football players, we noticed their interest in studying chess, especially when certain concepts were correlated with the sport they already enjoyed and actively practiced, namely football.

A person who is learning chess can improve only by developing some abilities such as concentration, decision making, strategic evaluation etc. Taking into consideration the fact that these are the skills that one uses when playing football, it makes sense that playing chess should benefit anybody who plays football and vice versa.

Chess can become a more attractive and popular activity among children if it is related to the sport that is loved by everyone, football. Children should be taught to see the common concepts of these two sports, therefore recognizing that being a good player of one of them can lead to good performances in the other by transferring knowledge that can be applied in both games.

Keywords: football, chess, cognitive skills.

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Introduction

What is chess? It is a sport, a science, an art, but first of all, it is a game. Chess is an amusing game, but, at the same time, it is not very easy when one begins to practice at a higher level of performance.

The multiple benefits of this sport have been demonstrated over time by numerous studies and research. The development of logical thinking, critical thinking, memory, attention, and intelligence (Frank, 1974; Ferguson, 1995; Dauvergne, 2000; Brenda, 2003) are some of the reasons why parents should guide their children to practice this sport.

Often, however, even if parents want and insist that their children take chess classes, the children don't show any interest in it. There are some aspects that parents or teachers need to follow when they want to teach children how to play chess and according to them, the learning attempt may or not succeed (James, 2013). Sometimes children that are passionate about other sports or activities are not attracted to chess at all, no matter how good and/or creative their training regimen is. In these cases, but also in general, special methods and means might be used to make chess more attractive. From our point of view, this can be done by finding a passion that a child already has and trying to make a connection between it and learning. Now let's think: which is the most popular and loved sport among children, especially boys? The answer is: football.

Kitsis, a national chess master, speaks in one of his articles about the connection between these two sports, considering their common aspects, such as tactics and strategy (Kitsis, 1996).

Problem Statement

We could say that there are not many similarities or connections between chess and football, especially because one is an individual sport and the other is a team sport. However, I think that a little creativity using elements of football could lead to the creation of a chess teaching program that could make chess more popular among children and, implicitly, make children smarter.

In our opinion, if a child is a fan of one game, it is likely that he will enjoy the other because both games are based on similar concepts. Therefore, if the child likes playing or watching football, he can use the understanding he has of the game to play chess and, similarly, he can appreciate a good game of football through his understanding of chess as a sport.

While teaching chess, the "mind's sport", in an effort to increase the focused attention of 10-12 year old football players, we noticed a great interest in them to study chess. As well, certain concepts seemed much simpler to them when correlated with the sport they already enjoyed and actively practiced, namely football.

This junior chess teaching program is still in progress and we hope that, at the end of it, we can provide a concrete assessment of the benefits of chess on football performance. In addition to the basic elements of chess, emphasis is also placed on chess-related attention and memory exercises that are useful in helping children develop specific cognitive skills.

Research Questions

Our research questions are:

- What are the similarities between the two sports, chess and football, and how can they be used to make easier for children learn the basic elements of chess?
- Can cognitive skills acquired by playing chess help increase the performance in football?

Purpose of the Study

The first purpose of our study was to find out the common concepts of chess and football and to use them for creating new means of teaching chess to kids and the second one was to identify the skills acquired by playing chess that can lead to better performances in football.

Research Methods

The research methods used were the literature review, the observation method and the statistical-mathematical method.

The subjects of the research were 28 children aged 6 to 10 years, 19 boys and 9 girls. They were randomly divided into 2 groups of 14 children each and participated in 5 chess courses, each class having an hour. The first group was taught the basic elements of chess by classical teaching means and methods, and in the second group, the basic rules were presented in correlation with the principles of the football game.

After the 5 chess classes, the children were given an evaluation test to see which of the two chess teaching methods was more effective. The test consisted of 10 questions about the basic rules and the opening principles in chess.

Findings

Results for the evaluation test registered by the subjects

	Classical chess teaching means	Chess teaching means correlated with football elements
Mean	7.64	8.07
Standard Error	0.36	0.40
Median	7.50	8.00
Mode	7.00	8.00
Standard Deviation	1.34	1.49
Sample Variance	1.79	2.23
Kurtosis	-0.08	0.03
Skewness	-0.13	-0.79
Minimum	5.00	5.00
Maximum	10.00	10.00
Count	14.00	14.00
Confidence Level(95.0%)	0.77	0.86

The results of our research show that there is a difference between the two ways of teaching chess to kids in terms of the knowledge acquired by them. They seem to understand better the basic principles and rules of chess if we make connections to football.

Below, we will present some of the means used in chess teaching, for a better and quick understanding of this game, means that relate to the game of football.

First of all, we want to draw attention to the common aspects of the two sports, exemplifying how football knowledge can lead to easier comprehension of the more basic and important elements of chess.

A very important aspect of both sports is the teamwork element and no other sport places such great emphasis on harmony between players as football does. Likewise, in chess everything on the board is affected by each movement or action and one badly positioned piece can be ruinous.

Playing football and chess well is all about good positioning, creativity, and instinctive reactions and calculation. During a game, players often have more than one option when deciding what to do and a player must make a quick decision when choosing which option is best to pursue. As former Dutch international footballer, Arnold Muhren, said, football is a game you play ,,with your brains, not with your feet".

Chess and football are games that involve using space effectively and getting the timing right in order to break down an opponent's defence whilst preventing them from breaking down yours (Winner, 2001).

The principles of the chess opening:

- Dominating (occupying) the centre of the board
- Developing the pieces to the centre
- Safety of the king (castling)
- Creating connections between the pieces and their mobility
- Creating space
- Taking the initiative or counterattack
- Identifying the opponent's weak spots
- Attacking in the centre or on the flanks
- Penetrating and capturing the pieces (The chess world, 35 most important principles of chess, 2015)

The principles of the football game:

- Dominating the midfield
- Building connections between players (support) and their mobility
- Creating and using space
- Identifying and exploiting weaknesses
- Using the width of the field
- Improvisation and creativity (Strudwick, 2016)
- Taking the initiative

Considering the principles outlined above, we can find a way to teach the basics of the game of chess through the principles of football. The child must look at the chessboard in the same way he looks at a football field, where the football players are represented by the chess pieces. We begin by giving each piece a role as a striker, midfielder, or defender as follows: the pawns will initially be the defenders, the knights, bishops, and the queen will be the strikers and midfielders, the rooks will act as midfielders, and the king will be the goalkeeper.

The main coordinates of the chess board are to be explained as such: the board consists of eight ranks, eight files, and diagonals. The territory of each team is delimited by the middle line, known as the "border", similar to the middle line of the football field. The board is divided into queen's flank, king's flank and central files, similar to the football field which is structured in the left wing, the right wing and the centre axis. The small and large centre of the chess board are correspondent to the football field's centre.

The main challenge for children is in learning how to properly develop their pieces in the opening, many of them moving the wrong pieces initially and getting into a disadvantage from the beginning of the game. In football, players need to create connections between them and build tactical elements. Similarly, chess pieces must be developed in the centre of the board, with some of them acting as main attackers, while others act as support pieces. As American chess master, Jeremy Silman, said, ,,Never forget that your pieces should be working as a team! Nurture each and every one of them, make sure they complement each other "(Wells, 2008).

Development is the activation of multiple pieces in the opening. It is very tempting to try to get the advantage by a quick attack and continually bringing out pieces may seem a waste of attacking momentum. However, very few successful attacks can be launched without the proper development of the pieces. This is also true in football. Attackers cannot be left alone to create the attack; the midfielders and defenders must support them to enable more options as play continues.

After developing the pieces, the question arises: "where should I start the attack? On queen's flank, on king's flank, or in the centre?" In order to choose the right option, the chess player should analyse the various choices he has well, deciding where he has more chances to attack successfully. He must find or create weaknesses for the opponent and then exploit them; this is the key to winning. On the other hand, the player must also pay particular attention to the opponent's attack and be aware that if the opponent is unable to exploit a weak spot, there is no need to defend it.

Different types of chess openings, can be compared to football formations as well. There are offensive openings that rely heavily on attack and combinations and less on the creation of a reinforced defence, but there are also passive openings where the player has little chance of creating a decisive attack on the king. These passive openings , are more strategic than tactical.

In order to better understand the correlation between the two sports, concrete examples of played football matches and chess games of the grand masters will be used.

On the other hand, chess is a sport with multiple benefits and we think that if we can use football to help kids understand better chess, we can also make chess an instrument to improve football performances, because chess develops some cognitive skills which are essential in professional football.

Football players are required to make instantaneous and continuous decisions throughout the match, without having predetermined playing sequences at their disposal. The football field is an unpredictable area in which players are required to respond to cues from teammates, opponents, the ball, the playing surface, the environment, and coaches and referees. A high level of cognitive skill is required to enable players to fulfil their physical and technical potential. Skills such as game intelligence, anticipation, reaction time, decision making,

attention shifting, and pattern recognition are all relevant cognitive skills that must be used during a football match (Pruna & Bahdur, 2016).

Focusing in football is complex and quirks of the brain make it especially difficult. The brain naturally likes to focus on problems so players will be distracted by a wrong decision made by the referee or a mistake they have made during play, thus failing to concentrate on the things they do control. In order to acquire a better capacity for focusing on the actions they can control, it takes conscious daily effort on the player's part and, even then, there is no certainty that this skill will be mastered.

The ability to concentrate is one of the main skills of professional chess players. Concentration is the key to an athlete's ability to achieve maximum performance. For example, in the case of two athletes with equal skills, it is almost certain that the athlete with better focus on the task at hand will be the one who will triumph. Both internal and external disturbing factors are inevitable in the lives of athletes, but the best athletes learn to control their thoughts and focus on the present moment.

As Tobias Gopon says, the characteristics of a performance football player are divided into three categories: physiological, psychological and soccer-specific, and are represented by visual search strategies, decision-making and anticipation, motivational orientation, shooting, dribbling, aerobic power and anaerobic power.

In football, decision-making is the process of thinking about a certain action, such as dribbling, passing, shooting and execution. In order to find out what a player's decision-making level is, he can be tested with problems that may arise during a match, having to make the right decision under both mental and physical pressure.

Anticipation implies an instinct about where a teammate or opponent will play the ball or where one of them will be placed. The ability to read the game and anticipate an opponent's intentions is an important feature of talented performers (Morris, 2000). Tests to measure a player's level of anticipation are similar to those used for decision-making (Williams, 2000).

Ruud Gullit, the former Dutch national player, once remarked that a 90-minute football match can often be decided within a moment. Every game will contain significant situations when the player defines the moment or the moment defines the player. A lapse of focus often determines that moment. Part of shaping the attitude of players when faced with a mentally tough performance is helping them become aware of, and prepared for, those defining moments (Beswick, 2010).

All of the above mentioned qualities of professional footballers are skills acquired through chess, as evidenced by recent research in the field.

Conclusion

Junior footballers that follow a chess training program can improve their cognitive skills, potentially leading to better performance and increased ability with regard to skills such as attention, decision-making, anticipation, and intelligence.

Simultaneously, chess can become a more attractive and popular activity among children if it is related to the sport that is loved by everyone, football. After teaching chess in two different ways, one with classical means and one by using football elements, we noticed that the

second one is more effective in acquiring knowledge by children. Children should be taught to see the common concepts of these two sports, therefore recognizing that being a good player of one of them can lead to good performances in the other by transferring knowledge that can be applied in both games.

REFERENCES

1. Beswick, B. (2010). *Focused for soccer*. Champaign, IL: Human Kinetics.
2. Brenda, D. (2003). Chess, anyone? Chess is an essential teaching tool.
    a. Retrieved from https://www.educationworld.com/a_curr/voice/voice031.shtml
3. Dauvergne, P. (2000). The case for chess as a tool to develop aour children's minds. Retrieved from https://www.chess.com/forum/view/general/the-case-for-chess-as-a-tool-to-develop-our-childrenrsquos-minds
4. Ferguson, R. (1995). Chess in education research summary. Paper presented at the Chess in Education "A Wise Move" Conference, New York, NY.
5. Frank, A. (1974). Chess and aptitudes. Unpublished doctoral dissertation, LaSalle University, Mandeville, LA.
6. James, R. (2013). *The right way to teach chess to kids,* London.
7. Kitsis, A. (1996). Chess: A Highly Beneficial Game, *Cleveland Chess Bulletin.*
8. Morris, T. (2000). Psychological Characteristics and Talent Identification in Soccer. *Journal of Sports Sciences, 18*(9), 715-732.
9. Pruna, R., & Bahdur, K. (2016). Cognition in Football. *Journal of Novel Physiotherapies, 6*(6), 316-320. doi:10.4172/2165-7025.1000316.
10. Strudwick, T. (2016). *Soccer Science.*
11. Retrieved from http://www.humankinetics.com/excerpts/excerpts/principles-of-attack
12. The chess world, 35 most important principles of chess. (2015).
13. Retrieved from https://www.scribd.com/doc/290614070/35-most-important-chess-principles-pdf
14. Wells, A. (2008). *Football & chess. Tactics; strategy; beauty*. London: Hardinge Simpole.
15. Williams, A. M. (2000). Perceptual Skill in Soccer: Implications for Talent Identification and Development. *Journal of Sports Sciences*, *18*(9), 737-750.
16. Winner, D. (2001). *Brilliant Orange: The neurotic genius of Dutch Football*. London: Bloomsbury.

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ПЕДАГОГИЧЕСКОГО УНИВЕРСИТЕТА ИМ. Х. АБОВЯНА

Հումանիտար գիտություններ №-3 (41) 2021 Гуманитарные науки

CHESS IN SCHOOLS

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School CNS Abcoude, Netherlands My experience is based upon teaching chess to children in primary and secundary schools as a volunteer in the age group from 7 up to 18 years old. From absolute beginners to aspiring tournament players in the regional and country school competitions. I am a FIDE School Instructor and Chess Teacher at the CNS school in The Netherlands, Abcoude.

Abstact

Chess is an educational tool with many possibilities for education. The game contributes to the cognitive, social, emotional and metacognitive development of children according to Karel van Delft, Youth chess trainer, Psychologist and Journalist. (www.chesstalent.com) This is partly due to intrinsic features of the game and partly due to chess teaching methods. The questions that are raised are, why are chess lessons taught in schools? What is the relationship between intelligence and chess? What is a good teaching method? Is chess useful because of its cognitive transference effects on other areas of learning or is it a great tool for developing social and emotional skills?

Chess is a metaphor for life. You analyse, make plans, make decisions and look for creative solutions (cognitive). You learn self management, collect, deal with challenges (emotionally). You discuss situations with others (socially). You learn to think through your behavior and situations. (metacognitive).

There is a distinction between playing games and solving propositions (diagrams). With games you have to think divergently. You have to come up with ideas yourself to achieve a good

result. Like with mini games. With diagrams you have to think convergently, find the right solution.

A distinction can be made between the various aspects of the game of chess, for example principles, tactics, strategy and for example the cognitive age of students, gender of students, transfer domains or areas where chess could possibly exert positive learning effects.

What I have noticed is that some effects require an incubation period and only occur after a minimal number of chess lessons. My experience is that the turnover point comes after 6 to 7 lessons.

I also have been able to personally observe the Hawthorne effect, where students in a chess class receive more personal attention and that motivates them in turn to learn and perform better in many fields and areas of life. I am a strong advocate to not only look at the traditional skills as learned in school , but also focus on the soft skills that help them further progress in their life.

Submitted to the editor 25.11.2021

Discovered learning

That chess is popular with children in primary schools has been demonstrated by various examples such as has been shown in practice at Leonardo schools in the Netherlands. Research indicates that chess offers opportunities to teach children to think systematically, analytically and creatively (metacognition: learning to think) and to motivate them for education. Chess also offers opportunities for the development of social (through cooperation) and emotional (through experiences of success) qualities. How a teacher teaches and asks questions plays a major role in this.

How do you teach[1].

An important question is how do you teach? In practice in my country it shows that many teachers use the "Step Method" from Rob Brunia and Cor van Wijgerden. It is a great method, but was designed when digital tools like we know today, were not readily available. If you only use lessons and exercises of the Step Method, it is a bottoms up approach. I like to combine various methods with the framework as taught by the FIDE as the basis to write the lesson plans. All lessons and assignments are shared on the digital platform "Padlet". I support the students remotely through digital tools through Chess Kids and Chess.com and they are invited to become part of a club. (Chess House Winstonia, https://padlet.com/wilbertkieboom/xn2nrlj83gvm2fvg) The club is important to stimulate passion for the game. I use the digital platforms to organize tournaments amongst students and provide experience to players of various levels. To stimulate the "Chess Image", I use pictures on the Club wall (Padlet) and show movies to create a nice ambiance and aura around chess. I

recommend showing movies like “Knights of the south Bronx” from 2005, which is a television film about a teacher who helps students at a tough inner city school to succeed by teaching them to play chess. It was directed by Allen Hughes. I particularly like this movie as it also lets the student breath various aspects of the game such as simul and competition. Many students also wanted to try competition after seeing this movie. I use many examples and games and involve and challenge students to come up with solutions. The advanced group I show “The Queen of Katwe” to demonstrate what perseverance is all about. The Queen of Katwe is a 2016 American biographical drama feauture film directed by Mira Nair and written by William Wheeler.

A point of attention in Chess in School is that the chess level of the children differs per class. The teacher however can divide the class into groups or teach at different levels simultaneously. It is important to let children discover a lot on their own. The method we use is to divide the students in two groups, beginners and more experienced. Each group first receives classical instruction and they are then asked to implement that in their games and exercises covering the particular topics that were covered in class. An internal competition is managed so to that the children play and practice with different students and are not always stuck with the same pairing. In addition it allows us to quickly distinguish the top talents. This was a specific request by the school so they could populate a school team.

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What I have noticed is that some effects require an incubation period and only occur after a minimal number of chess lessons. My experience is that the turnover point comes after 6 to 7 lessons.

I have also been able to observe the Hawthorne effect, where students in a chess class receive more personal attention and that motivates them in turn to learn and perform better. A highly motivated chess teacher may be able to make his students enjoy the game so much that they study the game and develop study skills, motivation and self-discipline along the way that are useful in other areas of life and learning.

Do you realize the difficulty of knowledge you offer to children. Observe closely how children react during a lesson. If their attention wanes, you're doing something wrong. There is a distinction between playing games and solving propositions (diagrams). With games you have to think divergently. You have to come up with ideas yourself to achieve a good result. Like with mini games. With diagrams you have to think convergently, find the right solution. As with tactical tasks in the Step-by-step plan. Of course, teaching themes through diagrams provides basic knowledge with which you can come up with ideas yourself.

Don't just explain information to children via a demo board or a digital board. Have them try putting it on their own chess board in pairs. They can then also channel their physical energy. Depending on the child, it can do things independently or with guidance.

Use a practical diagram generator such as demoboard online. (www.demoboard.online)

Keywords: Chess in schools, School Instructor, Teacher Training, Children and Chess, Chess and Psychology, Performance, Hybrid and online learning,

School Chess Model[2].

On your lessons decide whether you take the workshop approach or structured approach. Determine the calendar, day and time with a weekly hour, in our case half hour instruction and exercise and the other half internal competition.

Determine your objectives:

1) Knowledge, insight and skills,
2) Attitude, fascination,
3) Teaching how to play and study chess themselves

Determine group size and level of the players, preferably homogeneous. This can be done through questions, tests with diagrams and by dividing them into groups. If it is a group with different levels, create sub groups.

Discuss order and school rules. Know the specifics about the students, i.e. are there children with ADHD, highly gifted, medicine use etc.

Decide on the setup of the class room. In our case we use tables of 4 students, which easily allows for sub groups.

Decide on your lesson methodology. I use the FIDE approach as I like it and I am educated by the FIDE and stick to their framework.

For specific examples, diagrams and exercises I use the Step Method which is targeted at primary school level and works well. Equally determine your lesson plan and ensure that you have the proper support material, digital board, workbooks, print material. Decide on what you are going to cover per lesson and prepare accordingly. The lesson plan will help you to structure this.

Ensure that you have an active role for the children and evaluate the lessons together with the children. Listen to ideas, engage their involvement and use it for self reflection as an instructor.

As to the internal competition, use a laptop to assist with the pairing, ranking lists ate. There is a free program called Sevilla for PC and I personally use SWIPS on the MAC. (www. Swips.eu)

Stimulate to play chess at home, on chess sites and to participate in tournaments. I have created an online club for my students where they can practice against each other. I also take them for our own external tournaments to teach them to play over the board (OTB). Organizing

a match against other schools and consider participation in the school competition if the drive is there.

Research shows.

Research by McLeod and Gobet has shown that intelligence plays a limited role in the processing of chess skills. Exercise plays a much bigger role. Grabner finds that intelligence accounts for only 12 percent of adult playing strength. Moreno shows how chess can play a role in the social and emotional guidance of young people.

Laszlo Polgar believes that talent is cultivated. Large-scale RCT of the impact of chess on educational attainment by Boruch and Romano (2011), detected a substantial effect for primary school children in Italy and to another recent study by Gumede and Rosholm (2015), which found a positive effect of chess on primary school children's achievement in Denmark (effect size 0.15).

REFERENCES

1. Van Delft, K (2021). Chess for Educators. New in Chess, Chapter 8, Chess Intelligence and teaching highly gifted children
2. Van Delft, K. (2014). Schoolschaken. Apeldoorn: KVDC.
3. Presentation Karel van Delft December 2014, Chess and Education Conference London www.chesstalent.com
4. A Research Agenda for Scholastic Chess Fernand Gobet Department of Psychological Sciences.

Table 1

CNS CHESS MODEL: CHECKLIST

1. Chess in Primary Schools: CNS ABCOUDE, Netherlands
2. Why: Chess would help to increase children's level of concentration, self-confidence and ability to think strategically. This would, in turn, lead to an improvement in their academic achievement.
3. Who: Recipients of the intervention. Year 6,7 and 8 (age 7 to 12)
4. What: Physical or informational materials used in the intervention. Chessboards, chess workbooks, chess software for whiteboard, hanging demonstration board, classroom tables/chairs.
5. What: Procedures, activities and/or processes used in the intervention. Pupils are taught chess, as part of the school curriculum, by a trained chess tutor using the Chess House Winstonia curriculum. The Winstonia curriculum contains detailed 1-hour lesson plans that include mini-games and worksheets.
6. Who: Intervention providers/implementers. The intervention was provided by the school itself, which has a long tradition in chess. There are chess games on the attic that date back to the early 50thies.
7. How: Mode of delivery. Face-to-face whole class and workgroups delivery to children. Practice in pairs.
8. Where: Location of the intervention. Within primary school CNS Abcoude.
9. When and how much: Duration and dosage of the intervention. During the 2021/22 academic year. Children are to receive 30 chess lessons of 1 hour spread over the academic year. At the end of the curriculum there is a school tournament involving other schools out of the area,
10. Tailoring: Adaptation of the intervention. The tutors were provided with the CSC curriculum as the foundation for lessons, but were allowed to adapt lesson plans to suit individual classes.

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USING CHESS TECHNOLOGY TO TEACH CHESS TO UNIVERSITY STUDENTS AND TO RESEARCH CHESS

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Abstract

The purpose of this article is to describe and illustrate the utility of chess technology is in teaching chess to university students and to investigate chess among chess engines and human chess players. This article has two sections. The first section describes and illustrates how chess technology can be used to teach chess to university undergraduates. The second section explains and illustrates how chess technology can be used to investigate chess among chess engines and human chess players. The first section provides numerous cases of chess-related websites such as chess.com, lichess.org, and chessgames.com that have been used and can be used in teaching chess to university students. The second section provides two examples of research as to how chess technology can be used in research on chess. One line of inquiry dealt with the extent to which the disparity in chess skill between two chess engines is related to the length of a chess game. A second line of inquiry dealt with the relationship among chess game blunders, parts of chess games that blunders occur, and levels of chess skills among the chess players that are chess engines. There are many chess engines at varying chess skill levels that are readily available on chess-related websites for research on chess. Chess technology has substantial utility in teaching chess to university students and in investigating chess as a field of study.

Keywords: Chess technology, chess engines, chess training, chess research, blunder analysis, university courses, chess-related websites, thinking skills

Submitted to the editor 08.12.2021

Using Chess Technology to Teach Chess to University Students and to Research Chess

The purpose of this article is to describe and illustrate the utility of chess technology is in teaching chess to university students and to investigate chess among chess engines and human chess players. Some definitions will clarify the meaning of the terms "chess technology" and "chess engines". Chess technology refers to the array of chess-related websites such as chess.com and lichess.org, chess-related apps such as Play Magnus available on an IPhone, and chess software such as Fritz 17 and Deep Shredder used by members of the international chess community.

An additional definition will be useful. A chess engine is chess software that can play a game of chess. Fritz 17, Deep Shredder, and Stockfish that is used in chess.com and lichess.org are examples of chess engines.

This article has two sections. The first section describes and illustrates how chess technology can be used to teach chess to university undergraduates. The second section explains and illustrates how chess technology can be used to investigate chess among chess engines and human chess players.

The Utility of Chess Technology in Teaching Chess to University Students

Bart (2021) reported on his experiences in using chess technology in teaching chess to university students. This section will review that report with additional commentary on how chess technology was used in teaching chess.

To explore the effects of chess instruction on university undergraduate students, 10 offerings of a Freshman Seminar entitled "Beginners' Chess and 21st Century Thinking Skills" were implemented and examined at the University of Minnesota, a large state university in the U.S.A. The motivation for the university course was the belief that chess training can facilitate the development of 21st Century thinking skills among undergraduate students. Many undergraduate students lack 21st Century thinking skills. Chess requires 21st Century thinking skills such as skills at creative thinking, critical thinking, decision making, planning, and problem solving.

Participants

The students enrolled in the Freshman Seminar were first-year and second-year undergraduate students. The students tended to have little or no knowledge of chess prior to the course. The Freshman Seminar had 10-20 students in each annual offering of the course that lasted 15 weeks. Thus, there were approximately 150 participants in the study.

Instruments

The university Student Ratings of Teaching (SRT) questionnaire was the instrument that served as the course evaluation questionnaire. This instrument was used to assess the quality of teaching in a course, not the quality of the course content. The SRT questionnaire included five items: (1) I have a deeper understanding of the subject matter as a result of this course; (2) My

interest in the subject matter was stimulated by this course; (3) Instructional technology employed in this course was effective; (4) The grading standards for this course were clear; and (5) I would recommend this course to other students. A 6-point Likert-style was used for student responses. The options were as follows: 1 = not applicable, 2 = strongly disagree, 3 = Disagree, 4 = Somewhat disagree, 5 = Agree, 6 = Strongly agree.

A secondary instrument was the final reflection paper that the students prepared and in which they indicated what they liked about the course and what ways, if any, the course helped to improve their thinking skills.

Procedure: The course made extensive use of chess-related websites available on the Internet such as chess.com, lichess.org, and chessgames.com. The instruction involved the projection of a chess-related website projected onto a large classroom screen with the use of an instructor's computer connected to a projector that projected the computer-based image onto the screen. The chessboards available on chess.com and lichess.org were especially useful in the class instruction, as they were clear to the students and permitted the movement of pieces on the chessboard. The instructor of chess was able to illustrate many concepts and ideas in chess such as castling and checkmate withthe use of those web-based images. The board editor on lichess.org was used often to illustrate chess concepts (https://lichess.org/editor?fen=8%2F8%2F8%2F8%2F8%2F8%2F8%2F8+w+-+-+0+1.

After the students received a set of introductory lessons, students would play chess games with each other with the use of either the computers available near their seats or physical chess sets that they would bring to class. The students tended to play chess games with each other with the use of the computers located on the tables near their seats or against chess engines available either on chess.com or lichess.org.

The chess engines on those two websites, chess.com and lichess.org, range in difficulty from easy to very difficult. For example, there are eight chess engines available on lichess.org ranging from chess engine 1 being the easiest to chess engine 8 being the most difficult. Students were encouraged to play chess first against an easy chess engine such as chess engine 1 on lichess.org before proceeding to play against a more difficult artificial opponent such as chess engine 2 on lichess.org. Also, students were encouraged to defeat a chess engine twice, once with the White pieces and once with the Black pieces, before playing against a chess engine with a higher level of difficulty.

The course entailed 15 course lessons with each course lesson being 2.75 hours in length. There was one course lesson per week for 15 weeks. The early lessons made use of the United States Chess Federation website termed "New to Chess?" (www.uschess.org/index.php/New-to-Chess-/) that provides the basic rules of chess. The course involved instruction in chess on topics such as tactics and basic checkmates along with instruction on the cognitive psychological foundations of chess on topics such as critical thinking and problem solving.

After basic concepts in chess were taught, the instructor introduced students to basic chess openings such as the Ruy Lopez and classic chess games such as the 1858 Opera Game with Paul Morphy playing the White pieces with the use of the chessgames.com website (https://www.chessgames.com). Undergraduates tended to enjoy using computers and viewing chess-related websites freely available on the Internet.

The primary task in the course was that each student had to prepare a critical evaluation of two of their own chess games that included correct usage of proper algebraic notation for the chess moves. In addition to the critical evaluations of two of their personal chess games, the students also were asked to prepare final evaluation reports. The students were awarded course points for their completed final evaluation papers.

Results

An analysis of the SRT responses indicated that the students thoroughly enjoyed the course. The SRT rating score means tended to be in the high 5-6 range. In many of the final reflection papers for each offering, students attested that their thinking skills improved as a result of the course.

The students tended to be quite competitive. They wanted to play chess games with each other during class. They tended to get along and enjoyed the class environment. The instructor celebrated good moves made by students. The instructor indicated that all chess players inevitably lose games. The students accepted the emphasis on personal growth in chess rather than winning games at all cost.

The activity most enjoyed by the students was team competition. The students would be subdivided into two teams (e.g., an East team and a West team). The teams would play chess against each other with members of each team taking turns making a move. Members on a team were allowed to offer advice to the team member making the move.

The instructor would enter each move on the instructor's computer and project the game on a large classroom screen with use of the chess.com game board so that the entire class would be able to see the game. The instructor would serve as the impartial referee and would comment periodically on the game positions. The instructor set a time limit of 2 minutes for each move.

The students tended to become very excited during these team games. Active student engagement was a major characteristic of the course.

Conclusions and Recommendations

Five recommendations emanate from this inquiry. One, universities and colleges worldwide should provide chess training to students in their institutions. Many undergraduate students lack the reasoning skills fostered in chess instruction. The cognitive skills developed in chess would likely benefit undergraduates in their other university or college coursework. Among the cognitive skills that chess develops are skills at decision making, problem solving,

planning, critical thinking, and even creative thinking. Those cognitive skills are valued and useful in undergraduate educational settings and in professional life.

Two, chess instruction for university students should involve team competition. Undergraduates tended to be very competitive and social. An instructor of chess for undergraduates may have one group of students play chess against another group of students with students in both groups taking turns making moves. Students tend to enjoy such games as they learn how to work together. Chess instruction can help undergraduate students learn to work cooperatively to achieve certain goals. Such capacity to form teams to work cooperatively and harmoniously is another attribute highly valued in many professions.

Three, the chess instruction should make extensive usage of computer technology and computer-based websites. Chess instruction for chess beginners or chess novices is relatively uncommon, but, with the host of chess-related websites and computer-based technology, the time has come for chess instruction in collegiate and university settings in order to facilitate the development in undergraduate students of higher order 21st Century thinking skills such as skills at critical thinking, decision making, planning, and problem solving. Those higher order thinking skills are required in order to play chess at even an intermediate level of chess competency. Many undergraduate students lack those higher order thinking skills.

Four, there should be research on the mental health benefits of chess instruction. Undergraduates can be under stress in colleges and universities as they attempt to complete courses of instruction in a timely and successful manner. Learning and then playing chess can be a form of recreation and relaxation that can lead to a reduction in stress for the undergraduate students. Learning and playing chess can even be enjoyable to undergraduates that can then account for the widespread interest and motivation that many chess players have for playing chess.

Five, chess instruction for chess beginners or chess novices is relatively uncommon, but, with the host of chess-related websites and computer-based technology, the time has come for chess instruction in collegiate and university settings in order to facilitate the development in undergraduate students of higher order 21st Century thinking skills such as skills at critical thinking, decision making, planning, and problem solving. Those higher order thinking skills are required in order to play chess at even an intermediate level of chess competency. Many undergraduate students lack those higher order thinking skills.

Chess instruction is typically oriented toward school-aged children (e.g., Capablanca, 1994; Coakley, 2000; Sadler, 1999; Schloss, 2014; Seirawan, 2003; Stean, 2002; Weeramantry & Eusebi, 1993; Wilson, F. 1994). No books were available specifically for teaching chess to university undergraduate students. Also. no books were available specifically for undergraduate university students to learn chess. Using chess technology compensates for the paucity of pertinent books and pamphlets in teaching chess to university students.

In addition, chess instruction often relies on a human instructor using a large demonstration board with chess pieces that can be moved about by the instructor on squares on the large board. In such a case, students often have access to chess sets with chess pieces and chessboards with which they practice chess maneuvers. Also, students use the physical chess sets to play chess. Chess technology can compensate for the lack of chess knowledge among chess instructors available to teach chess to undergraduates.

In conclusion, chess instruction in colleges and universities has substantial potential to enhance and enrich the education of undergraduate students.

The Utility of Chess Technology in Research on Chess

Chess websites such as chess.com and lichess.org use chess engines such as Stockfish 13 or Stockfish 14. Chess.com employs an array of chess engines, ranging from chess engine 1 to chess engine 25. The chess engines 1-24 are weakened versions of Stockfish 14. lichess.org also employs an array of chess engines, ranging from chess engine 1 to chess engine 8. The chess engines 1-7 are also weakened versions of Stockfish 13. Play Magnus also employs an array of 29 chess engines, ranging from easy to very difficult.

All chess engines incorporate an evaluation function that is used to evaluate a chess position after a move. If an evaluation function = +1.00, then White is said to be ahead by one pawn. If an evaluation function = - 2.50, then Black is said to be ahead by 2.5 pawns. Many evaluation functions provide values in terms of a unit being one pawn. Stockfish 14 uses NNUE (Efficiently Updatable Neural Networks) to evaluate chess moves. NNUE is an advancement in the evaluation of chess moves and positions and is now available on chess.com.

Chess.com is an example of a chess website that makes an evaluation function available to evaluate moves by chess players. The evaluation function used in chess.com can classify moves in various categories: (1) excellent move, (2) good move, (3) inaccuracy, and (4) blunder.

With chess engines readily available on the Internet and evaluation functions freely used to evaluate player chess moves, two lines of inquiry are evident. One line of inquiry is research on chess among chess engines (i.e., artificial chess players). Another line of inquiry is research on the incidence and nature of blunders by games between chess engines (i.e., artificial chess players), between human chess players, or between human chess players and chess engines.

Research on chess engines tend to be research on powerful chess engines such as Stockfish 14 and AlphaZero with their estimated Elo ratings in excess of 3200 (e.g., Silver, et al., 2018). Rare is research on chess engines with much lower Elo ratings that would be in the Elo rating range of many human chess players. Research on chess engines with lower Elo ratings may likely have more applicability to the study of chess among human chess players than the research on powerful chess engines. Bart, Ritter, and Ritter (2021) provided an example of research on chess engines with lower Elo ratings.

Bart, Ritter, & Ritter (2021) completed a study of chess engines in which they inquired whether the length of a chess game as measured by the number of moves in a game is related to the disparity in chess skill between the artificial chess players. One chess engine was chess.com Level 10 with an estimated Elo rating of 2300 (https://www.chess.com/forum/view/general/approximate-ratings-of-chess-com-computer-levels). That chess engine played 18 games against each of five chess engines with their estimated Elo ratings: (1) Play Magnus Age 10 – 1700 Elo rating; (2) Play Magnus Age 9 – 1500 Elo rating; (3) Play Magnus Age 8 – 1200 Elo rating; (4) Play Magnus Age 7 – 1000 Elo rating; and (5) Play Magnus Age 6 – 800 Elo rating (https://www.reddit.com/r/chess/comments/2qcv95/what_is_the_strength_of_the_play_magnus_app_at/). Those Elo rating estimates were estimates listed on the Internet by chess enthusiasts and were not validated through a series of games with opponents with validated Elo ratings.

A statistical analysis of the lengths of the 90 games between chess engines was performed. That analysis determined that game length was significantly inversely related to the difference in chess skill between chess engines. In other words, if the difference in chess skill between chess engines is large, then the game length will tend to be small and if the difference in chess skill between chess engines is small, then the game length will tend to be large.

Regarding research using evaluation function scores, Bart and Vergin are now engaged in a study using chess engines available on lichess.org. In games pitting a chess engine with a very high chess skill against various chess engines with lower chess skills, they are investigating whether chess engines with very low chess skill tend to commit blunders earlier in games than chess engines with higher chess skill.

The move analysis available on both lichess.org and chess.com makes use of NNUE, an advanced evaluation function associated with Stockfish that includes the identification of a best move. However, Stockfish does not provide a qualitative explanation of why the move identified as the best move is actually the best move, so that a human could understand why the move identified as the best move by Stockfish is the best move.

Bart and Vergin are attempting to interpret qualitatively the blunders (e.g., hanging a piece) being committed by the chess engines. Such blunder analysis done on games involving human chess players could be very useful in identifying the nature of blunders committed by human chess players at various skill levels. Such blunder analysis could provide guidance as to the instruction that is needed for human chess players who commit blunders at various sections of the game: opening, middle game, or endgame.

In summary, chess technology including chess engines has utility in teaching chess to university students and utility in investigating chess among chess engines and human chess players.

Approved for publishing by PhD in Psychology, associate professor Vahan Sargsyan
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Памятные даты из Армянской истории шахматы /из коллекции Ашота Бабаханяна/