

Extra Section | Вне тематики

— PSYCHOLOGY OF EDUCATION | ПСИХОЛОГИЯ ОБРАЗОВАНИЯ —

Research and Experience of Teaching the Subject “Chess” in the Educational System of the Republic of Armenia

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In this article, are considered the achievements and problems of the innovative educational project “Chess” implemented by Armenian State Pedagogical University named after Khachatur Abovyan in secondary schools. The purpose of the study: to identify the mechanisms of research and pedagogical interaction, as well as to analyze and summarize the results of many years of research of psychological and pedagogical support of the educational course “Chess in elementary school”. The main research methods were the analysis and synthesis of the conducted studies, as well as the generalization of previously done empirical studies. Various empirical methods and methodological developments were applied: sociological survey, structured interview methods, focus group method, document content analysis, questionnaire method, testing, contextual questionnaires, projective drawing techniques, etc. The results of the research made it possible to correlate the educational results of the university subject “Theory and Practice of Teaching Chess” with the characteristics of qualifications in the specialty “Pedagogy” in the general educational standards for the subject “Chess”. Accordingly, the methodological component was revised, providing educational results in the subject, which made it possible to ensure the diversity and expediency of the chosen teaching methods. Research results were taken into account, indicating the need to integrate chess with mathematics and other subjects, since chess have high potential for the development of such cognitive processes and skills of the 21st century as: decision making, critical thinking, cooperation and creative thinking is high. We determined the main provisions of the correlations between the research and educational activities of the university and educational institutions and revealed, the mechanisms of this interaction.

Keywords: chess; professional education; research activities; psychological and pedagogical justification; advanced training.

Funding. The reported study was funded by Ministry of Education, Science, Culture and Sports Republic of Armenia, State Committee of Science, project № 10-5/I-1-2001/22.

Acknowledgements. The authors are grateful for assistance in data collection to L.L. Gevorgyan and E.A. Khachatryan.

For citation: Gevorgyan S.R., Ispiryan M.M., Sarkisyan V.Zh., Tadevosyan H.V. Research and Experience of Teaching the Subject “Chess” in the Educational System of the Republic of Armenia. *Psikhologicheskaya nauka i obrazovanie = Psychological Science and Education*, 2023. Vol. 28, no. 6, pp. 121—135. DOI: <https://doi.org/0.17759/pse.2023280612> (In Russ.).

Исследования и опыт преподавания предмета «шахматы» в системе образования Республики Армения

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Рассматриваются достижения и проблемы реализованного в общеобразовательных школах АГПУ имени Хачатура Абовяна инновационного учебного проекта «Шахматы». Эти результаты представлены в контексте проблемы обеспечения качества профессионального образования. Проведенное исследование было направлено на выявление механизмов научно-исследовательского и педагогического взаимодействия в процессе психолого-педагогического сопровождения образовательного учебного курса «Шахматы в начальной школе». Главной задачей работы было проанализировать и обобщить результаты многолетних исследований по этой теме. В качестве основных методов работы выступили анализ и синтез проведенных исследований, а также обобщение результатов ранее проделанных эмпирических исследований. Отмечается, что междисциплинар-

ный характер работы требовал применения разнообразных эмпирических методов и методических разработок, отвечающих поставленным целям и задачам: социологический опрос, методы структурированного интервью, метод фокус-групп, контент-анализ документов, метод опросников, тестирования, контекстуальные опросники, проективные рисуночные методики и т.д. Также отмечается, что материалы исследований позволили соотнести образовательные результаты университетского предмета «Теория и практика преподавания шахмат» с характеристиками квалификаций по специальности «Педагогика» в общеобразовательных стандартах по предмету «Шахматы». Соответственно, была пересмотрена методическая составляющая, обеспечивающая образовательные результаты по предмету, что позволило обеспечить многообразие и целесообразность выбранных методов обучения. Были учтены результаты исследований, свидетельствующие о необходимости интегрировать шахматы с математикой и другими предметами, так как высок потенциал шахмат для развития таких познавательных процессов и навыков 21-го века, как: принятие решений, критическое мышление, сотрудничество и креативное мышление. Определены основные положения взаимосвязи научно-исследовательской и учебной деятельности университета и общеобразовательных учреждений, выявлены механизмы этого взаимодействия.

Ключевые слова: шахматы; профессиональное образование; научно-исследовательская деятельность; психолого-педагогическое обоснование.

Финансирование. Исследование выполнено при финансовой поддержке Министерства образования, науки, культуры и спорта Республики Армения, Государственного комитета по науке (ГКН МОНКС РА) в рамках научного проекта № 10-5/1-1-2001/22.

Благодарности. Авторы благодарят за помощь в сборе данных для исследования Л. Геворгян, Э. Хачатрян.

Для цитаты: *Геворкян С.Р., Испирян М.М., Саркисян В.Ж., Тадевосян А.В.* Исследования и опыт преподавания предмета «шахматы» в системе образования Республики Армения // Психологическая наука и образование. 2023. Том 28. № 6. С. 121—135. DOI: <https://doi.org/10.17759/pse.2023280612>

INTRODUCTION

In the XXI century, in the context of ensuring the quality of vocational education, the problem of the relationship between research and educational activities of universities and educational institutions has become one of the most urgent. In recent years, in order to solve this problem, quite a lot of reforms have taken place in educational programs of the Republic of Armenia, which are aimed at developing innovative projects that promote the intellectual development of the youth of our country.

The most effective of the projects, in our opinion, is the "Chess" implemented educa-

tional subject for secondary schools. Being a new subject, it, in turn, opened a new page in the method of education of the Republic of Armenia.

In the chess education of the Republic of Armenia, all research and educational components are closely intertwined and integrated, but until sometime, formally, they concerned mainly the research of teaching chess in the field of secondary schools.

Unfortunately, a full-fledged attempt has not yet been made to combine the curriculum and research activities of universities. The active and effective mutual communication of teaching and scientific research, in our opin-

ion, will allow researchers of the Scientific Research Institute of Chess of the Armenian State Pedagogical University (hereinafter: CSRI ASPU) to ensure harmony in the work to improve the quality of general and university education.

The purpose of the study is to identify the mechanisms of research and pedagogical interaction, as well as to analyze and summarize the results of many years of research and the process of the psychological and pedagogical support for the “Chess in Elementary School” educational training course. To achieve this goal, it is necessary, first of all, to analyze and then compare the results of many years of research in the field of chess education and the experience of teaching the “Chess in Elementary School” course. Research in this area can be divided into the following stages:

1. In 2011—2017, the results of teaching chess in schools of the Republic of Armenia were analyzed. At this stage, socio-psychological and cognitive factors were mainly studied, showing the effectiveness of teaching chess without purposefully comparing their results with the practice of teaching chess at university [6; 18].

2. In 2017—2020, research in the field of chess education was conducted mainly in line with republican quantitative research [10; 16], among which it is possible to highlight republican research aimed at identifying chess knowledge and the relationship between teachers and parents. At this stage, the research results were mainly introduced into the practice of teacher retraining, as well as into the process of training future chess teachers.

3. 2020—2023, research [4; 5; 17; 19; 20; 21] in the field of chess education, was already mainly conducted in experimental and quasi-experimental conditions, and the research tasks were mainly related to the need to identify specific effective teaching methods, which were subsequently introduced into the practice of teaching and retraining teachers.

Since 2011, a chess training project has

been introduced into secondary schools of the Republic of Armenia as a compulsory academic subject. A lot of time has passed, and there are serious developments that today will allow us to talk about the accumulated significant experience in the field of research on the process and results of teaching chess as an innovative project for the school education system and university teaching.

Since 2012, the “Theory and practice of teaching chess” subject has also been included in the professional educational program of the “Pedagogy and Methods of Primary Education” Bachelor’s degree of the ASPU named after Khachatour Abovyan.

In 2018, the ASPU Scientific Research Institute of Chess was established, which includes an interdisciplinary research team dealing with the main areas of research in chess teaching: cognitive and psychological, educational and methodical, chess and methodical, as well as sociological and inclusive. The aim of the ASPU CSRI is to identify and use the potential of chess education to improve educational achievements and the quality of life of citizens of the XXI century.

The Institute systematically and quite effectively cooperates with many organizations that deal with the problems of chess education. In particular, in cooperation with the International Chess Federation (FIDE) and the European Chess Union (ECU) statistical data on educational chess in the world was collected and analyzed.

In 2022, the International Chess Federation (FIDE) approved the international teacher training/qualification program developed at CSRI. The course program includes many modern teaching methods adapted for the online training of chess teachers. The CSRI has become a partner in the process of evaluating the quality of training and certification of chess teachers [5].

The “Theory and Practice of Teaching Chess” academic subject is included in the “Pedagogy and Methods of Primary Education” bachelor’s degree program and is stud-

ied for two semesters: a total of 240 academic hours (8 credits).

It should be noted that we conducted a study at the initial stage (March—April 2022), according to the specification, curricula, subject descriptions and thematic weekly plans.

During the analysis of learning outcomes, special attention is paid to:

- formulation of the objectives of the professional training program;
- learning outcomes and their correspondence with the characteristics of national and sectoral qualifications frameworks (SQF), which will allow for systematic and level-structured teaching content;
- the use of teaching/learning methods and the evaluation of learning outcomes in the professional education program;
- compliance of the educational professional program with the learning outcomes;
- compliance with learning outcomes according to the subject descriptions of the planned results in the educational professional programs;
- the conformity of the used subject educational products (thematic content, teaching methods used and training tasks) to the learning outcomes;
- the mandatory presence in the specifications of the teacher’s/educator’s qualification of pedagogical knowledge, subject descriptions and their compliance with the results of the use of educational products (general education standards, connection with other subjects and programs taught in secondary schools).

Analytical discussions, seminars, round tables, etc. were held periodically on the listed “correspondences” and other issues noted above.

It should also be noted that the professional bachelor’s degree educational program for the department of Pedagogy and Methods of Primary Education is defined as the “Theory and Practice of Teaching Chess”.

In 2020, according to the results of research conducted by the ASPU CSRI, there

was a need to improve the theory and practice of teaching the subject of “Chess”, some components of the weekly topical breakdown, etc. Subsequently, in 2021, a draft Concept of teaching chess in primary schools of the Republic of Armenia was put into circulation. It should be noted that later the subject was included in the new draft of the State Standard of General Education [2]. It should be noted that the prerequisites for the above-mentioned innovations were previously conducted socio-psychological and educational studies of the ASPU CSRI.

The main research goal of the ASPU CSRI subsequently became the identification and use of ***the potential of chess education to improve educational achievements and the quality of life of citizens of the XXI century.***

It should be noted that in 2019, the educational standard of the “Chess” academic subject was revised based on a comparison of available and expected learning outcomes in primary school.

According to these results, the following fundamental amendments were made:

- the new version of the standard was compiled based on the principle of the dominance of the game component;
- complex topics were excluded from the program, and several chess tactics were added;
- according to the principle of consistency, the strategy section began to be presented in a spiral;
- attention is paid towards the organization of lessons-contests, which demonstrate previously obtained information in an exciting playful way;
- a project-based method of teaching chess was introduced [8].

RESEARCH METHODS

It should be noted that in this article, the main research methods were the analysis and synthesis of conducted studies, as well as the generalization of previously conducted

empirical studies. As part of our research, we studied the main goals and ideas noted in the concept and program, the expected and key measurable success indicators, the objective parameters of which make it clear how close we are to achieving the goal, as well as their compliance with the basic provisions of the concept and training programs on the subject of “Chess” for secondary schools. We paid special attention to weekly topical planning and subject description of the university course, where a description of teaching methods and learning tasks was given to all topics, which makes it possible to assess the degree of ensuring the effectiveness of training and working methods of teaching.

Taking into account the interdisciplinary approach in the CSRI, the staff of the Institute applied various empirical methods and methodological developments: the sociological survey, structured interview methods, the focus group method, the content analysis of documents, the questionnaire method, testing, contextual questionnaires, projective drawing techniques, etc. In the course of individual studies, the Egoscope complex was used — an innovative tool for psychological and psychophysiological diagnostics. The IBM SPSS program was used for the statistical analysis of the obtained results.

RESULTS

In the context of research on the impact of chess on cognitive development, as well as on the emotional and behavioral characteristics of schoolchildren, numerous studies have been published by the staff psychologists of the ASPU CSRI.

The interrelation of chess knowledge and other school subjects was studied and shown, it was proved that, thanks to the teaching of the “Chess” subject, it is possible to form and develop students’ thinking, logic, analytical ability, imaginative thinking, independent work skills and a sense of responsibility, as well as the ability to acquire personal qualities that are necessary for socialization into soci-

ety [10; 12; 18; 20]. Of particular importance were those studies aimed at identifying the influence of school chess on the development of students’ critical thinking [15; 17].

Investigating the interrelation of the “Chess” and “Mathematics” subjects and their influence on the divergent thinking of students, V.S. Karapetyan, S. Misakyan, Sh. Sargsyan conducted a comparative analysis of the stages of solving mathematical and chess problems. It was revealed that the actions included in these tasks are based on almost the same logic. In terms of correlations, their data are quite close to each other (the correlation coefficient is 0.9065). A 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 was 0.5353 [14].

The authors argue that the inclusion of tasks and exercises with chess pieces and the use of a chessboard in the educational process has great potential for the development of cognitive and logical actions, spatial thinking and the ability of elementary school students to act in their minds. The inclusion of the developed tasks in the educational process will also contribute to the formation of positive motivation among primary school students to learn chess and mathematics.

It should be noted that the research results partially coincide with the studies of R. Trincherо and G. Sala. According to them [25], chess is an effective tool for solving mathematical problems for primary school children, but only if the training includes the heuristic methods of these solutions. Heuristics helps novice chess players recognize and interpret game situations, shorten moves for analysis and make the right moves without overloading the players’ cognitive system.

Within the framework of the sociological research of chess education, it is important to note the research of K. Tanajyan, N. Melkonyan and S. Movsisyan, according to which chess is perceived by elementary school students as one of their favorite subjects.

Thus, 43% of respondents ranked chess among the top three favorite subjects, for 11% — chess was in the first place, for 5% — in the second, and for 27% — in the third. Sociological studies have also revealed that chess contributes to the formation and development of linguistic, logical and algorithmic thinking in children, foresight and influence on the situation, the assessment of the importance of education through the development of imagination and creativity. In addition, each chess problem is aimed at creating and developing a certain quality, i.e. moderation, active memory, cooperation, etc. [24].

Considering the problem of chess education in the context of the individual psychological characteristics of schoolchildren and the connection of chess education with other academic subjects, it was reliably revealed that “The diversification of chess teaching methods, the introduction of interactive teaching methods, as well as the psychological support for the chess learning process, taking into account the identified individual psychological characteristics of children, will significantly increase the effectiveness of chess teaching” [4, pp. 116—117].

It should be noted that in the context of inclusive education, there was cooperation with the FIDE Commission on Social Issues, with which the Endless Chess project was evaluated to identify the impact of autism spectrum

chess interventions (ASD) on children with disorders.

As a result, data was revealed on the positive impact of chess on children with ASD, as well as the fact that various behavioral manifestations have different effects on chess skills. As a result of learning chess, all behavioral indicators of children with ASCH, in particular, have improved significantly:

- the ability to ask and answer questions (figure 1);
- eye contact (figure 2);
- verbal communication and interpersonal relationships (figure 2).

However, it should be noted that the mechanisms by which these effects lead to the desired results have not yet been fully disclosed (Figure 1).

A peculiar challenge was the need to introduce sections into the program aimed at teaching chess to children with special educational needs.

Thus, we have managed not only to diversify the teaching methods for students, but also to improve the quality of student learning.

It should be noted that, as part of the research of ASPU CSRI, one of the most informative projects on chess education has become periodic nationwide research, in which students, teachers, experts and parents from all regions of the country take part. On the basis of the general education program, tests are used as tools to test knowledge of the

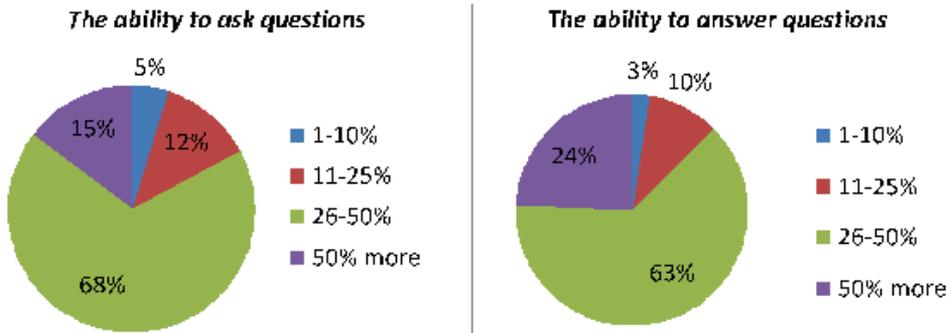


Figure 1. Expert assessments of the indicators and responses of children with AS engaged in chess to them

game of chess, socio-psychological contextual questionnaires are conducted, children's drawings, essays, discussions of student performance, etc. are analyzed. Since 2015, these studies have been conducted every two years [5, p. 11].

Based on this study, the staff of ASPU CSRI made key conclusions, identified numerous factors (family upbringing, the socio-economic status of the family, parents' attitudes to children's education, etc.) that affect the results of effective chess learning [10; 16; 19]. Thus, being a new academic subject included in the national school system, **chess has opened a new page in the methods of Armenian education.**

It should be noted that previously unpublished research results on the motivational factors of chess education indicate that, among the many motivational factors, only the factors of responsibility and valuable action have a significant positive impact on chess achievements. In other words, in teaching chess, the internal motivation of students is obviously crucial.

Analyzing the process of studying chess positions and check-mate situations, V. S. Karapetyan concluded: the algorithmic way of thinking greatly contributes to the development of systematic knowledge and skills, including in the study of the chess discipline [13, p. 52].

Based on the above-mentioned studies, the ASPU CSRI is conducting work aimed at **evaluating and revising textbooks and teaching aids, as well as training and re-training teachers and educators.**

Research practice, within the framework of various projects, has significantly expanded cooperation with international chess and educational organizations. A special direction in the work of ASPU CSRI can be noted, in particular, the organization of international scientific and practical conferences, at which the "Chess in the Education System of the Republic of Armenia" innovative project of Armenian developers was highly appreciated [3].

One of the most important activities of the Institute was also the analysis of the impact of the results of chess education on the development of skills in the 21st century. To this end, in cooperation with the Singapore-based "Logic mills" organization, the world's only computer gaming method "Mir me" was applied [23], aimed at assessing skills of the 21st century.

Preliminary research results [4] at a statistically significant level revealed the natural influence of chess skills on skills of the 21st century. The results obtained made it possible to expand the research goals by setting the tasks of analysis not only of the relationship of the above-mentioned variables, but also of such intermediate factors as teaching methods, learning style, etc.

As part of the assessment of the quality of education and for a comprehensive study of the relationship between research and educational practice in the field of chess education, an assessment of the teaching of the "Theory and Practice of Teaching Chess" course was undertaken. The study involved 178 students who studied in this subject.

The results of the study showed that the majority of students positively assess the acquired knowledge in terms of its possible application in the teaching process, as well as the methodological equipment of lessons. The content of the "Chess" subject, according to the students, meets the requirements for teaching at school. Relatively low scores, compared to other criteria, were obtained for the integration of the subject with other subjects.

At the same time, some students suggested making the course content more practice-oriented and giving students the opportunity to "play chess during lessons", others — to increase the number of hours for classes; to carry out a deeper study of all topics; to be more consistent in working with those students who are able to record great success in the studied the course.

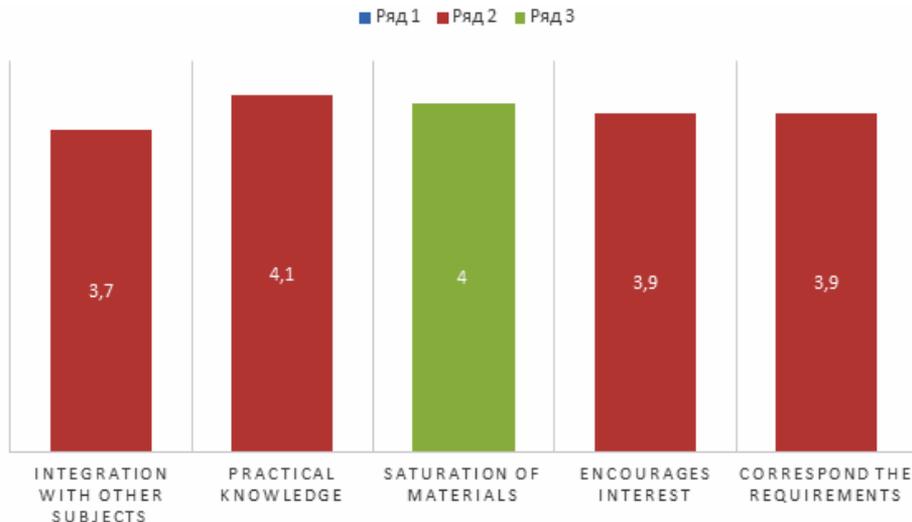


Figure 2. Average Student Ratings of the Parameters of the "Theory and Practice of Chess" University Course

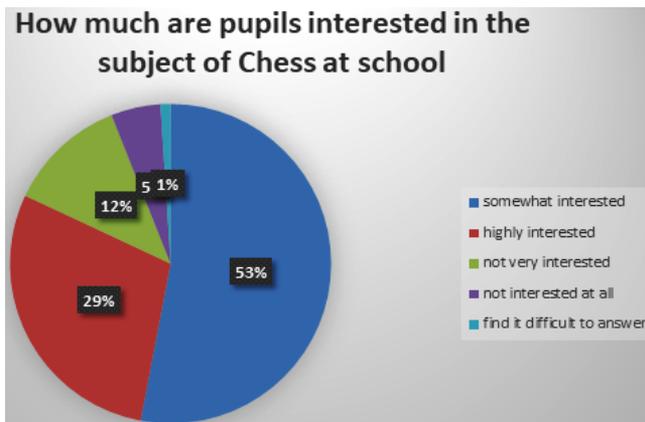


Figure 3.

DISCUSSION

Research in the field of chess education has shown that chess as a general education subject has great potential for the development of children: in particular, their cognitive, social development, for the development of certain specific skills such as problem-solving and decision-making, creativity, divergent and algorithmic thinking, mathematical knowledge

and skills, etc. But as numerous studies by outstanding researchers in the field of chess psychology and education show, the transfer or transfer of knowledge from one field of knowledge to another can be considered one of the most pressing problems of modern educational psychology [11].

The transfer of learning, in our case, is defined as the transfer of previously learned

reactions or knowledge to a new or changed situation or requirement. Transfer occurs when learning in one context or with one set of materials affects performance in another context or with other related materials. There are *positive, negative, lateral, vertical or hierarchical, sequential, specific and non-specific transfers* [22].

Thus, we can state that the competent management of this transfer is the task of the teacher. This is especially relevant in light of the trend of the integration of different disciplines, which undoubtedly takes place in modern education. Moreover, according to R. Trinchero's research, the transfer of learning is limited to the extent to which the two areas have common elements [25]. And this, in fact, implies that in order to effectively integrate chess with related subjects, it is necessary to clearly present the goals and methods of this integration and adapt the teaching process to this goal.

A completely different question arises if these subject areas have common prerequisites as cognitive or other, more general, abilities. A meta-analytical review conducted by G. Sala and F. Gobet indicates that the optimism about a long-distance transfer is not justified, although cognitive abilities correlate with subject-specific skills [9, p. 5]. In other words, transferring knowledge from chess to other non-adjacent disciplines is very difficult, if not impossible. It can also be assumed that the training includes the common elements necessary for teaching more or less non-specific knowledge, which, in turn, may negatively affect the students' chess knowledge. At the same time, our preliminary results show that chess knowledge leads to the development of 21st century skills, precisely at the required level of chess knowledge. Motivational factors are also an important factor, which, in turn, are determined by the optimal complexity of the tasks. Therefore, we suggest that there is an optimal level of chess knowledge, which, on the one hand, can positively influence the development of 21st century competen-

cies, by motivating students, and on the other hand, are not specific enough to transfer to other subjects and knowledge.

Longitudinal studies are interesting and necessary for a vertical transfer, which would give an unambiguous answer to the question: how much does chess education affect academic performance, motivation and other significant indicators of schooling.

Thus, O.V. Glukhova, S.V. Volikova, Yu.V. Zaretsky and V.K. Zaretsky concluded on the basis of 11 years of research that "When conducting a comparative study of the influence on the dynamics of the development of higher mental functions, as well as the ability to act in the mind of children engaged and not engaged in chess, the following pattern was revealed: indicators are higher in children who study chess using the "Chess for general development" technology... Despite the practical alignment of the development of cognitive functions by the ninth grade, the overall academic performance of children studying in the Chess for General Development technology is significantly higher than that of non-students using this technology" [1, p. 71].

Based on the results of the research and practice of teaching chess in schools of the Republic of Armenia, it became possible to revise and reformulate the purpose of the subject, as well as improve learning outcomes, bringing them in line with the goals of the "Pedagogy and Methods of Primary Education" professional bachelor's degree educational program. The close interrelation of scientific and educational work made it possible to correlate the learning outcomes of the "Theory and practice of teaching chess" university subject with the characteristics of qualifications in the "Pedagogy" specialization in general education standards for the "Chess" subject. Accordingly, the methodological component that provided learning outcomes in the subject was revised, which made it possible to ensure the diversity and expediency of the chosen teaching methods.

In the process of teaching the "Chess" subject, on the basis of research data, the need for the formation of the ability to test and evaluate the skills of primary school children came to the fore (which became a real challenge at the beginning of the introduction of the program in schools), as well as the formation of students' basic principles of didactics and skills of applying health regulations in the process of learning the "Chess" subject in elementary school. Accordingly, research results were taken into account, indicating the need to integrate chess with mathematics and other subjects, since chess has a high potential for developing such cognitive processes and skills of the 21st century as decision-making, critical thinking, collaboration and creative thinking.

Based on the problems identified in the ASPU CSRI, necessary steps were also taken to implement measures aimed at ensuring the personal growth of primary school children through the subject of "Chess".

All these activities have been included in the school curriculum, in new updated textbooks, as well as in the teacher retraining program.

CONCLUSIONS

1. Chess as an educational subject has significant potential for the overall development of children, both in terms of transferring knowledge and skills to individual subject areas, and for use in inclusive education. The development of this potential is significantly conditioned by a variety of such direct and contextual factors as teacher training, the individual psychological characteristics of students, the goals, methods and technologies of teaching, the optimal complexity of the subject, the cooperation between teachers and parents, etc.

2. Summarizing the example of effective experience in the interaction of research and teaching activities, we can conclude that our approach can be useful for other academic subjects and subject blocks of secondary

schools, as it will create the prerequisites for the successful interaction between a pedagogical university and schools in the 21st century.

3. Based on research practice and taking into account the empirical data obtained, active steps have been taken at ASPU CSRI to improve the quality of teaching the "Theory and Practice of Teaching Chess" university subject.

4. A detailed analysis of the implementation of research results in the field of chess education and in the training program for future teachers on the subject of "Chess" allowed us to identify a list of priority tasks for the effective development of chess education.

In particular:

a) ensuring the relevance and validity of the content of the subject from the point of view of introducing the results of research on chess education into the practice of teaching chess at a university;

b) ensuring compliance between the expected results of chess education at school, the requirements of new general education standards and the chess teaching program at the university;

c) the introduction of scientifically based and proven methods of teaching chess into the student's curriculum and teaching practice;

d) to what extent is the training program consistent with the programs and implemented in the system of training and retraining of chess teachers;

e) overcoming objective barriers in the process of determining and ensuring the necessary knowledge of future teachers, both in terms of the subject knowledge of chess, and in terms of the pedagogical knowledge and skills necessary for teaching chess in schools.

5. In order to qualitatively improve the content of teaching the "Theory and Practice of Teaching Chess" subject, we have proposed recommendations for **the formation of students' ability to implement effective individual and group forms of organizing the**

learning process in secondary schools, using the appropriate teaching methods provided for in the program of the “Chess” subject.

6. Taking into account **the possibilities of using project-based and game-based teaching methods, measures were identified to take into account the age of pri-**

mary school students, psychological and developmental forms of education and the methods of organizing the education of children with special educational needs. The need for a more targeted integration of chess teaching methods with other primary school subjects was also identified.

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Получена 22.11.2023

Received 22.11.2023

Принята в печать 20.12.2023

Accepted 20.12.2023