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USING CHESS POTENTIAL FOR IMPROVING WELFARE OF PEOPLE WITH LIMITED HEALTH CAPACITIES

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Abstract

The articles addresses the practical experience of the Russian State Social University researches in the field of designing a theoretical model and approbating a practical model of a game of chess as a means and mechanism of the process of actualizing the intellectual and activity potential of people with health impairments and disabilities. The aim of the study was to research the pedagogical and heuristic potential of chess training, sportive and recreational activities regarded as an innovative multifactorial tool in the complex system of rehabilitation of people with special needs in the Russian Federation. The researches managed to create an advanced inclusive learning environment using an Internet portal "Chess Planet", a software complex "Chess Lessons by Anatoly Karpov", an electronic database "Schematic Thinking"; to structure the levels of the students' information competence and to introduce the models of competitive activity used in adaptive chess sport, taking into account the sportive and medical classification of disabled people. There was given a formalized description along with a classification of chess information retrieval systems, educational and methodological complexes, electronic textbooks, databases and web game portals. Using the problem integrative field of the theory and practice of adaptive physical education, the opportunities to correct the pathologies of mental and intellectual development of different groups of students were found; it was made possible to reduce communication disruptions in properties and types of attention, memory and thinking.

Keywords: Chess, disabled person, information and communication technologies.

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1. Introduction

When comparing social, economic and emotional well-being of residents of different countries and regions, the United Nations (188 participating countries) considers the Human Development Index (HDI) as an integral indicator of the sum of the three indices: health and longevity, access to education and per capita gross domestic product. Russia, which in recent decades has been a developing country, ranks 50th with the HDI of 0.798 (Mikhaylova, 2016). The low human development index is due to the high relative and absolute rates of disability, as well as to the lack of a real equality of people with health problems in higher education. According to the 2017 data provided by the Federal State Statistics Service, 12.259 million people are disabled persons, and the relative rate of disability is 8.3% of the total population of the country. The number of disabled children has increased to 636, 024 people, of which more than 14% do not study anywhere and cannot lead an active lifestyle (Federal State Statistics Service, 2017). An increase in the relative rate of childhood disability in our country in 2009-2017 is about 20%, and the uptrend is stable. Despite the fact that education has become the determinant of the countries' economic development, productivity growth, reduction of inequality and ease of social tension in society, improvement of welfare and quality of life of individuals, the situation in Russia in terms of obtaining higher and secondary general and vocational education, for instance, for people with various hearing impairments is catastrophic. More than 300,000 people with various hearing impairments receive education in secondary schools. Of 900 higher education institutions in the Russian Federation, students with hearing impairment are admitted in 52 universities. At the moment, about 300 persons with hearing disabilities among 4.3 million students are taught in higher education institutions. A paradoxical situation came up – despite the fact that improving the quality of education for people with hearing disabilities is one of the main educational objectives in Russia, universities are not interested in admission of such entrants. As a result, at the working age many of them will not be employed. An upward trend in childhood disability can provide in the future an increase in the relative and absolute disability rate of the adult population of the country; in addition, downward trend in the employment of disabled adults will lead to increased social inequality in the society, growth of unemployment and poverty of this category of people. The global trend is the encouragement of socialization, rehabilitation, social adaptation, and the integration of disabled people into society through physical culture and sports, which contributes to the maximum possible development of their vitality and effective self-realization as socially significant members of society (Chess for kids, 2017). In this regard, the current trend in physical culture movement called adaptive physical education (APE), which focuses on cognition, having impact on and improving the health of people with disabilities, is growing in importance. Historically, the main areas of APE specialists' work have been associated with the development of physical and motor characteristics of people with limited health capacities (LHC) and disabilities (Evseev, 2014; Makhov, 2013). Unfortunately, these efforts did not give the desired results. Thus, according to the annual statistical report of the Ministry of Sports as of December 31, 2016, only 3% of people with disabilities are included into the system of fitness and sports activities (Ministry of Sports of the Russian Federation, 2017). According to the Ministry of Statistics, in 2016, the labor force participation rate was only 15.4%; the unemployment rate among disabled people aged 15-72 years old reached 18.3% (Federal State Statistics Service, 2017).

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A holistic interpretation of the situation in the field of education, employment and physical culture and sports leads to the need to find more effective ways of integrating people with LHC and disabilities into society. It was necessary to find such types and forms of the organization of social rehabilitation of people with LHC and disabilities which would allow achieving the full equality of opportunities in modern society.

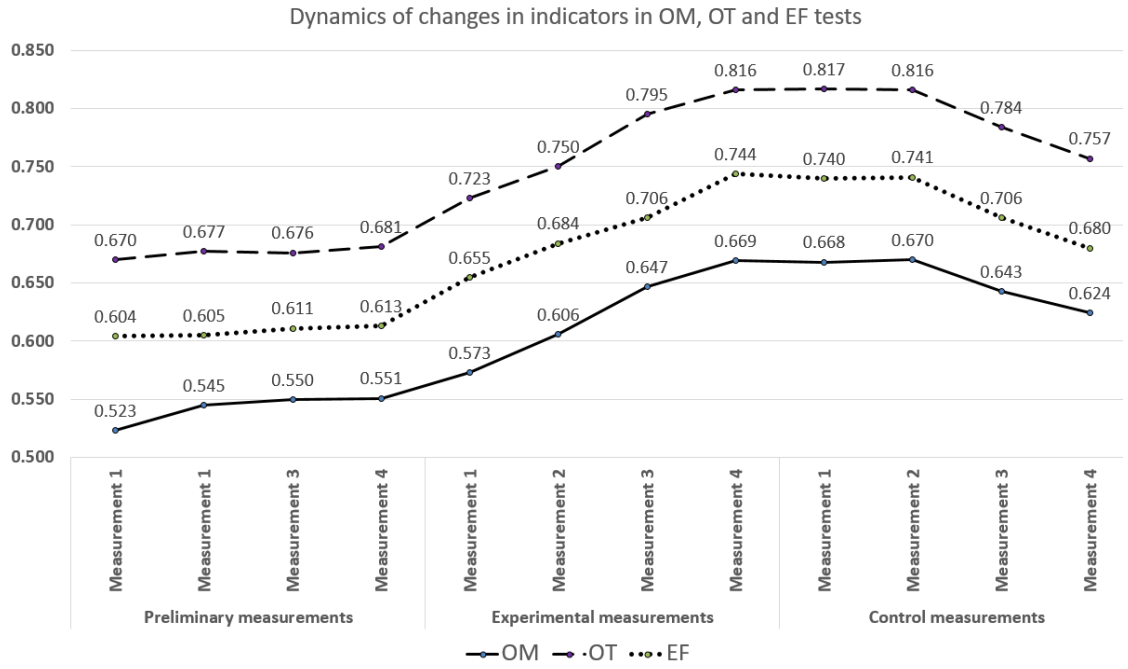

Figure 01. Dynamics of changes in indicators in OM, OT and EF tests

2. Problem Statement

For the social rehabilitation of people with LHC and disabilities, it is necessary to improve the intellectual and emotional-volitional sphere of an individual, where, along with the needs of motor activity, there is a need for psychophysical activity in actualizing one's intellectual potential (Safiullin & Alifirov, 2016). A complex scientific group (CSG) of the researchers from the Department of Theory and Methodology of Physical Culture and Sports of Russian State Social University (RSSU) suggested that the use of chess as a means and model of training, sport and recreation for people with LHC and disabilities can be a full-fledged specific type of adaptive physical education (Mikhaylova, Makhov, & Alifirov, 2015). Practical implementation of the pedagogical and heuristic potential of chess as a social rehabilitation technology can contribute to the all-round development of individuals as well as to the evolvement of highly organized thinking and deep internal culture (Chess.com, 2017, The Time of India, 2016). However, scientific and methodological and scientific and practical chess studies were mainly conducted on a cohort of people who do not have health problems; the systematization, structuring and comprehension of the experience of social rehabilitation of people with LHC and disabilities with the means of chess lacked completely. Therefore, since 2005, the CSG's scientific potential has been aimed at creating an advanced inclusive learning environment and a social rehabilitation technology of chess

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training, sport and recreation (RT). Currently, chess is one of the five most popular sports among people with health problems; 9% of the total number of disabled people participating in physical culture and sports activities practice these sports (Mikhaylova, 2016). The main content of chess as a sport is active thinking activity in the form of intellectual combat, the ability to use mental spatial patterns and schemes, cohesively involving components of science, art and abstract-logical game. Numerous domestic and foreign scientific studies have confirmed that chess lessons improve concentration, develop memory, intuition, analytical, logical and spatial thinking, imagination, creativity, communicative and organizational skills (Mikhaylova, 2016; Ryasantsev, 2009; Chess for kids, 2017; Chess.com, 2017; The Time of India, 2016, Chess news, 2017). In the process of training and sportive performances, such personal qualities as independence and responsibility are formed; willpower develops; respect for rivals and referees arises. Logical, profoundly calculated solutions, based on a chess model, can contribute to elaborating conceptual decisions in everyday life. Careful consideration of chess concepts allows us to understand the meaning and content of judgments in practical and spiritual activities. As it has been established by scientists, mental and physical activities affect each other and are interdependent: chess lessons lead to an increase in the rates of psychophysiological development of an individual (Gerasimova, 2001, Panush, 2001). Long-term adaptive changes in psychophysiological parameters (attention development, level of noise immunity, level of functional capabilities of the nervous system, activity of levels of cardiac rhythm neurovegetative regulation at rest and in tests with mental load) are associated with the influence of increased mental loads while playing chess (Ryasantsev, 2009). That is why the use of chess as a training model can become one of the innovative approaches to solving the problem of social adaptation and rehabilitation of disabled people in line with the priority orientation of the state policy in the field of education. It should be noted that chess is one of the most economical sports, this game is accessible to people of all social groups, and so, engaging in chess can stimulate social cohesion and contribute to achieving social integration and combating discrimination.

3. Research Questions

As a result of the retrospective analysis of the implementation of directives in various regions of the country, the CSG revealed significant deficiencies in applying modern scientific and methodological framework, equipment and software training tools for carrying out chess training. It was established that in many educational institutions specialists had insufficient level of special and general chess subject competencies. Teachers of the Department thoroughly studied the regularities, mechanisms and particular characteristics of the pedagogical process in terms of the individuality formation of people with LHC and disabilities in conditions of adaptive chess training and practicing this sport, in accordance with the government's Concept of the 2016-2020 Federal Targeted Program for the Development of Education. It was taken into account that the rapid development of infocommunication technologies contributes to the creation of innovative electronic and distance learning forms. It was assumed that the development of the theoretical concept and practical model of the RT would stimulate an increase in intelligence level of people with disabilities; the development on this basis of a set of practical recommendations will make it possible to form the activity competences in the process of rehabilitation of this group of people not declaratively, but actually. The social rehabilitation technology was tested on the Internet portal “Chess

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Planet" of the Russian Chess Federation, at the premises of the state budgetary institutions of Moscow – Territorial Social Service Centers "Alekseevsky" and "Yuzhnoportovy" (SBI TSSCs), and in special medical groups (SMG) of RSSU in real-life context of students' training in frames of the educational process in 2005-2017.

In accordance with the hypothesis, the following research tasks were set:

1. To define basic concepts; structure the principles, main methodological backgrounds, component composition, methods and organizational forms of chess as a full-fledged type of adaptive physical education.

2. To conduct a content analysis of the current state of domestic and foreign studies on the use of pedagogical resources of chess in the system of complex rehabilitation of people with LHC and disabilities.

3. To justify theoretically the composition and content of structural and functional components of the rehabilitation technology based on the use of adaptive chess training, sportive and recreational resources; to determine the main structural components of the professional activity of the specialist in the field of adaptive chess training, sport and recreation.

4. To create an advanced inclusive learning environment for adaptive chess training; to develop and implement didactic infocommunication educational resources in the pedagogical process on the basis of the Internet portal "Chess Planet", SBI TSSCs, and also in the SMG of RSSU.

5. To implement the social rehabilitation technology of adaptive chess training, sport and recreation locally and remotely; to test its didactic capacity in terms of an individuals' intellectual potential and significant skills development; to evaluate the effectiveness of chess lessons as a factor of improving the quality of life of people with LHC and disabilities, and to present a set of practical recommendations.

4. Purpose of the Study

The purpose of the study is to create and approbate the theoretical and practical model of a game of chess considered as a multifactor synthesis of adaptive chess training, sportive and recreational activities as an innovative tool for upgrading the system of inclusive education.

The object of the study is chess as a full-fledged specific type of adaptive physical education that satisfies an individual's needs for actualizing the intellectual and activity potential contributing to social rehabilitation and integration into society.

The subject of the study is theoretical, methodological and technological foundations of chess as a means and mechanism for the rehabilitation of people with LHC and disabilities in the context of training, sportive and recreational activities.

5. Research Methods

A theoretical study of the design of the rehabilitation technology of adaptive chess training, sport and recreation was carried out applying methods of theoretical cognition, along with implementing empirical methods; for processing pedagogical experiments data, methods of mathematical and statistical

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analysis were applied. To develop the theoretical and methodological and methodical foundations of the RT, a comparative analysis of distance and electronic, as well as traditional forms of sportive training, was carried out. The content of the educational material can be identical, however, the ways, forms, methods of teaching and monitoring the educational process are different. Earlier chess training was conducted with the use of traditional visual information media – chess books and inventory. In the present day context, learning can also be carried out using the audiovisual information technology in distant or electronic forms designed by the CSG. It was established that every personal computer with installed chess programs, Internet resources, electronic chess databases, educational and methodical complexes and textbooks serves as an artificial assistant coach (AA). AA, using a real and virtual environment, helps to conduct training in electronic interactive mode under the guidance of a coach, recording the results of each training exercise.

6. Findings

Infocommunication didactic and methodological tools, created by the CSG in the period of 2005-2015, ensured the successful design and testing of the RT (Mikhaylova, 2016). Consistently, infocommunication didactic instruments were created, which formed an advanced inclusive learning environment, including:

1. Game Internet portal “Chess Planet”, where for the first time distance training was conducted in online groups of disabled sportspeople and people with LHC [domain name - www.chessplanet.ru] (2005).

2. Training Internet portal “Chessy”. It features the author's methods of chess players training, educational and methodical articles, manuals and monographs [www.chessy.ru] (2006).

3. Electronic database “Schematic Thinking”. When analyzing more than 500 positions of world champions in chess, divergent thinking patterns were involved, which consisted in finding a set of solutions to the same problem in the starting chess position relying on the theory of the stage-by-stage formation of mental algorithms and concepts (Talyzina, 1984). While creating the database, the author used brainstorming methods and mind mapping techniques in the form of schematic systematization of thinking processes in a chess game (2008).

4. The program complex “Chess lessons by Anatoly Karpov”. This full-scale platform for the deployment of the e-learning system is designed to create training sessions in the local network of an educational institution, as well as sessions conducted on the Internet; it is a complex structured system of three interrelated programs: client-server, teacher interface and learner interface. The program complex “Chess lessons by Anatoly Karpov” refers to the MOOC segment (Massive Open Online Courses). It is typed as an intelligent MOOC, since it is possible to plan and modify the educational process on the basis of the platform, taking into account the profile and suggestions of the participants. It was this resource that created the opportunity for full-fledged e-learning (2014).

5. Application office program “Chess ranking”. This software is a multimedia educational resource (based on Visual VB) which works via the local network and is designed for the final knowledge assessment in the Microsoft PowerPoint environment. The test is premised on the basic chess skills, such

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as the simplest checkmates, checks and stalemates, the cost and moves of the figures, the chess board visualization, basic terms and definitions (2015).

Design and implementation of the RT were carried out in three stages: Adaptive chess sport, Adaptive chess recreation, and adaptive chess training. To obtain results and evaluate the application of the RT, a number of tests were performed in different combinations depending on the conceptual content of the stage, namely:

• chess tests to assess the development of professionally significant intellectual functions (operative memory (OM), operative thinking (OT), evaluation function (EF);

• chess tests to assess the development of proficiency (in chess opening, middlegame, endgame, strategy, tactics);

• psychological tests to determine the state of health, activity level and mood (the HAM test); to diagnose the level of subjective feelings of loneliness (test by D. Russell and M. Ferguson), the level of anxiety (The State-Trait Anxiety Inventory (STAI) by Charles D. Spielberger); to measure the quality of life (The Short Form-36 test).

6.1. Adaptive chess sport

At the first stage – "Adaptive chess sport" – a chess game portal "Chess Planet" was developed, where in 2005-2006 a set of 54 lectures was delivered in real time. In the process of distance training, all the main types of information services were used, namely: e-mail; teleconferences; data transfer (FTP servers); hypertext environments (www servers); Internet chess resources. Seventeen chess players with musculoskeletal disorders, seven chess players with visual impairments and four – with hearing impairments attended the lectures (Mikhaylova, Makhov, & Alifirov, 2015). During the training 8 chess and psychological tests were conducted. On the basis of the results obtained, a graph reflecting the dynamics of changes in the three indicators of the development of professionally significant intellectual functions (operative memory, operative thinking, evaluation function) of trained chess players in aggregate is presented in detail below (see Fig. 01). The test was conducted in 12 sections; chess training was not held at the starting and last four sections; the results obtained were considered as benchmarks against the experimental results revealed in the sections five – eight. In the course of the experiment, a generally uniform positive dynamics of the subjects' skill level in all three series of tests (operative memory, operative thinking and evaluation function) during the period of chess training (1-4 experimental measurements) was evidenced. This may be a testimony to the harmonious development of psychological and personal qualities, as well as to an increase in the level of proficiency in chess resulting from the application of the developed teaching methodology. It is necessary to note a high degree of correlation (dependence) of the results of all tests. The students began to take part in personal and team competitions on the Internet portal "Chess Planet"; they managed to improve their proficiency, acquire good computer skills, and enhance their English language skills. In 2008, a student named A. N. Komissarov became a world champion among blind and visually impaired chess players as a member of the Russian national team. A year later A.V. Gabrielyan, who also have visual impairments, has become an international chess grandmaster among male players. Three chess players graduated from Moscow

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Technical University of Communications and Informatics. Subsequently, 23 people were employed in areas related to IT.

6.2. Adaptive chess recreation

At the second stage of the study – "Adaptive Chess Recreation" – undertaken in 2008-2012, adaptive chess training with the application of standard teaching methods was tested at the premises of SBI TSSCs "Alekseevsky" and "Yuzhnoportovy" within the framework of the implementation of the "Accessible Height" program designed for social rehabilitation and integration of people with LHC and disabilities. The concept of the program was the organization of sportive recreation and chess training for people with LHC and disabilities, as well as for low-mobility groups of population, taking into account their interests in sports and health care activities. Weekly, according to the schedule, chess classes and sporting competitions were held among people supervised by social care services of the above mentioned centers. The training was conducted in a standard way, using books and special chess and playing equipment.

As part of the project, social and socio-pedagogical technologies were used, namely: the sports rehabilitation technology and the social support technology. Relying on the data obtained on the basis of the subjective feelings of loneliness test (D. Rassell and M. Ferguson test), the final graph of the change in the average indicator of the feelings of loneliness was drawn up (Fig. 02). At the stage of preliminary measurements (sections 1 – 4), when chess training was not available, the level of loneliness on the average was stable and fluctuated within the limits of mathematical error. During the next stage, when the experimental method of adaptive chess training was applied, there was a sharp decrease in the feelings of loneliness level in the group, which was more than 40% as compared to the final measurement of the experimental series of tests (sections 1-4). After termination of chess lessons (sections 1-4), there was a drop in the level of indicators, with negative dynamics, starting from the 3rd measurement of the control measurements. The process of adaptive chess training has broadened the boundaries of social experience and increased adaptive opportunities, thus contributing to successful socialization. Three users of SBI TSSCs social services continued their education in the Anatoly Karpov School of Chess at the premises of RSSU.

6.3. Adaptive chess training

At the third stage – "Adaptive Chess Training" – which was held at the premises of the International Center of Chess Education (ICCE) and the RSSU Chess House in 2012-2017, students with LHC and disabilities of all RSSU faculties and the RSSU College students began to study the fundamentals of adaptive chess sport. They were students with the second, third group of disability and people disabled since childhood. Students which got the appropriate advice from health authorities and medical expert boards of polyclinics at the place of their residence for physical training in special medical groups (SMG) also joined them. In 2012-2015, 997 students completed the training. Previously, such students studied the subject "physical culture" formally, preparing theoretical papers. However, the introduction of new federal state educational standards of the "three plus" generation required a different level of educational, informative and communicative competences in physical culture. First of all, this is

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the OK-8 competence – the ability to "use methods and means of physical culture to ensure implementing social and professional activities on a full scale" (Russian State Social University, 2015, p. 7). These changes served as a driver for creating in RSSU a new degree program "Physical Culture" in frames of "Inclusive Chess Training" specialization with the use of a set of educational health protection technologies (Safiullin, & Alifirov, 2016). Three circumstances contributed to this. First, chess sport does not require significant motor activity of an individual with disability and LHC. Secondly, it is the least expensive. Thirdly, it is the least traumatic. Sportive injury is extremely rare and accounts for 0.66% of injuries received per 1000 trainings or competitions, taking into account the total number of participants. Considering this, a special procedure for mastering the academic discipline "Physical Culture" was established at RSSU. The CSG carried out experimental adaptive chess training in frames of the innovative work program "Inclusive Chess Training" developed for students of special small medical groups in compliance with Federal State Education Standards (FSES) of the third generation based on the principles of health protection and adaptive physical education. In the 2015/16 school year, an attempt was made to assess the quality of life of the SMG students trained in chess by applying the SF-36 questionnaire (The Short Form-36). The results are presented in the form of 8 scales, namely: Physical Functioning (PF); Role-Physical Functioning (RP); Bodily Pain (BP); General Health (GH); Vitality (VT); Social Functioning (SF); Role-Emotional Functioning (RE); Mental Health (MH). The Short Form-36 allows assessing the subjective satisfaction of students with their psychophysiological state and social functioning. The maximum value for all scales (with no health restrictions and disorders) should be 100. The higher the scale indicator is, the better is the feeling of quality of life for this parameter.

During the experiment, data of two test sections were used (at the start of chess lessons and at the end of the 1st semester of training). In investigating the differences between the input and output experimental tests data, the Mann-Whitney U-test was applied. Differences were considered significant at $p < 0.05$. The correlation analysis (Spearman coefficient with significance level $p < 0.05$) for studying the interrelation of variables within each of the eight scales was carried out in MS EXCEL using a Corel program. The results of the survey on the input (before the beginning of the experiment) and the output (after its completion) samples are shown in Figure 03. As it can be seen from the presented figure, the subjective assessment of the quality of the health physical component by students with LHC and disabilities prior to the beginning of training was generally lower (PH 43.46 ± 7.2), including such indicators as General Health (SF GH – 44.76 ± 17.7) and Vitality (SF VT – 41.1 ± 22.09). Similar test results after the end of the experiment show that the self-assessment of the state of health has on average increased by 12%, which holds out a hope for a positive dynamics of the influence of chess training on the quality of life of students with LHC and disabilities.

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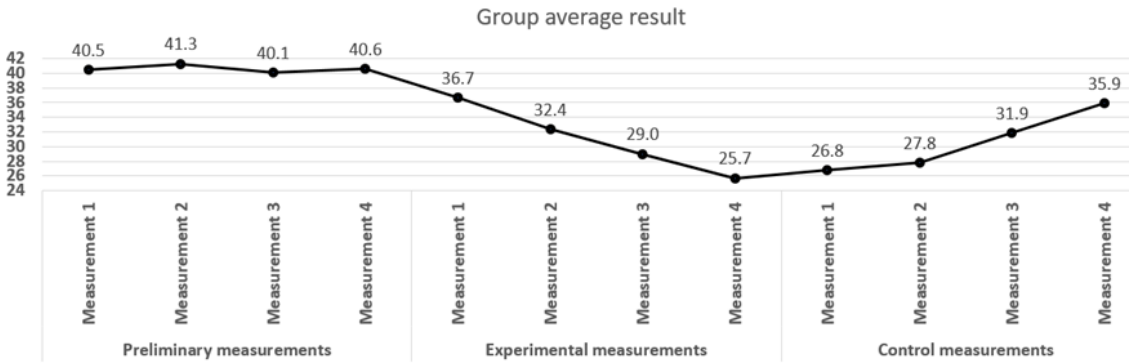

Figure 02. Feelings of loneliness test, dynamics of change in indicators

7. Conclusion

It is sufficient to point out the following revealed patterns of development and introduction of the rehabilitation technology of adaptive chess training, sport and recreation designed to achieve the social, economic and emotional well-being of people with LHC and disabilities:

1. The concept and theoretical model was created along with testing the practical model of the rehabilitation technology of adaptive chess training, sport and recreation in an active inclusive learning environment.

2. The possibility of using distance and electronic learning forms as the main ones has been revealed.

3. The study of basic principles of chess information training and foreign languages is a driver for people with LHC and disabilities to become socially significant members of society.

4. Chess recreation is an effective way to break the closed circle of communication; to get satisfaction of obtaining new information, knowledge, and skills.

5. The process of adaptive chess recreation expands the boundaries of social experience and increases adaptive opportunities, contributing to the successful socialization of people with health impairments.

6. The acquisition of chess knowledge, referee skills and achieving sport titles allows people with disabilities and LHC to become more competitive in the labor market.

7. Adaptive chess training develops personal qualities which are professionally significant for students, such as: logical thinking, visual and operative memory, attentional capacity.

8. The application of the rehabilitation technology of adaptive chess training, sport and recreation in respect of people with hearing impairments can become one of the main techniques when switching from a sign language to a verbal language.

Using the potential of chess education, sport and recreation, people with health impairments and disabilities can achieve not only physical, but full-fledged mental and social well-being. The development of the rehabilitation technology can complement the concept of education for people with LHC and disabilities, namely:

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1. The intellectual and activity potential of chess provides an opportunity to update psychotherapeutic training programs, supplementing them with game elements that contribute to the development of speech and intellect, and to raise the self-esteem of students with LHC and disabilities.

2. In the process of chess adaptive learning, psychophysical activity is normalized; a lifestyle that is more acceptable for the functioning of an individual in society is formed.

3. By combining the efforts of the world community states, scientists, practitioners and carriers of adaptive experience, it is necessary to invest funds in the further development of chess education and to improve the human resources potential.

4. All available means should be used to raise information awareness of the world community of the intellectual and activity potential of this rehabilitation technology.

Thus, it seems necessary to create a federal platform for the dissemination of the model and ideology of anticipatory adaptive chess training, sport and recreation at all levels of municipalities in terms of implementing a state social program of the Russian Federation aimed at people with LHC and disabilities. However, in order to use the potential of the chess rehabilitation technology in full, it is necessary to form an interdepartmental social partnership for creating rehabilitation space for people with special needs (Makhov, 2013).

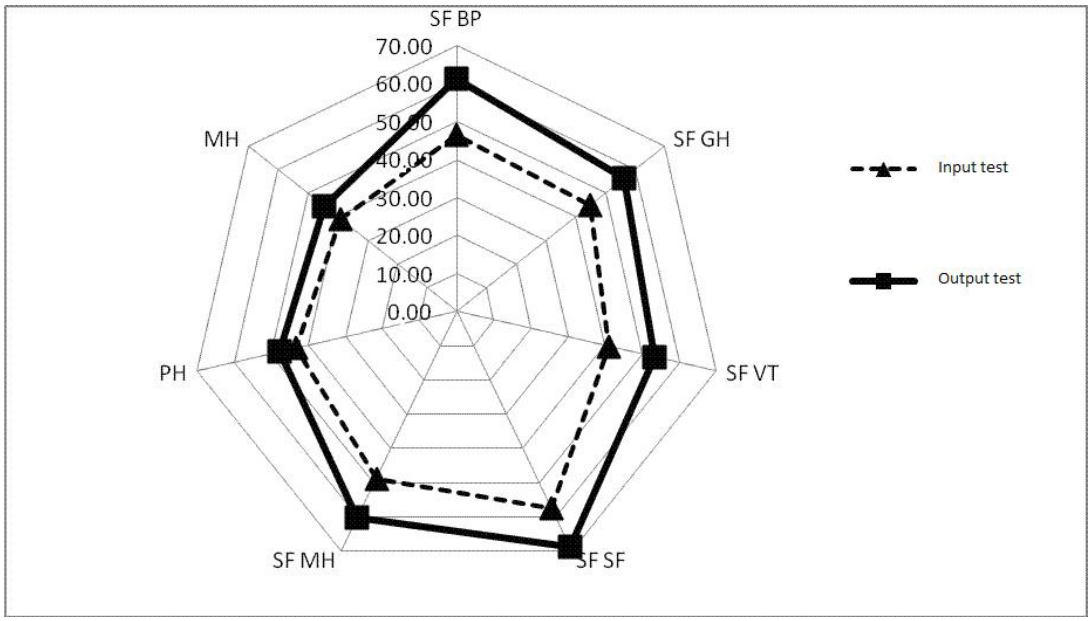

Figure 03. [Test indicators of the quality of life of the SMG students]

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