

# Influence of Multimedia Technologies to Learning Results of Children With a Physical Condition

Esmira Alisultanova  
esmira59@mail.ru

Natalya Moiseenko  
namoi@mail.ru

Aminat Bisultanova  
amibis@mail.ru

Grozny State Petroleum Technological University (named after Academician M. D. Millionshchikov), Grozny, 364051, Russian Federation

## Abstract

In article relevance of implementation of inclusive education in modern Russian society is considered, the overview of sources by inclusive education of children with limited opportunities is carried out, benefits and shortcomings of the integrated training, inclusion and benefits of implementation of the multimedia training games in inclusive education are described. Progress in all information technology fields is opened by new channels and opportunities for improvement of methods of teaching and training, training is offered to pupils by methods which it is simpler for understanding. These alternative methods of training are especially useful to children, with special needs.

Relevance of research is that the present stage of development of society is characterized by application of the multimedia means capable to provide new quality of human life. For successful training in children not only successfully studies, but also to interact in the educational environment with other most various children.

Keywords: education, technologies, multimedia, the interface, game form, software solutions, limited opportunities of health, inclusive education, training games, knowledge.

## 1 Introduction

In our perception of the world there were changes, thanks to prompt development of technologies - today the main perception of world around and actions occurs on the basis of computer devices. It is a lot of children who cannot master knowledge fully by traditional methods of training because they special - with weak sight, but are capable to hear better, or with problems in the movement, but have the high level of intelligence, and also children with development violations. At all these categories of the trained children physically challenged having health limitations (HL) it is aimed - to purchase competences and the corresponding qualifications. The multimedia of technology and inclusive education - guarantee of successful achievement of this purpose as this

---

*Copyright 2019 for this paper by its authors.*

*Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).*

In: Jože Rugelj, Maria Lapina (eds.): Proceedings of SLET-2019 – International Scientific Conference Innovative Approaches to the Application of Digital Technologies in Education and Research, Stavropol – Dombay, Russia, 20-23 May 2019, published at <http://ceur-ws.org>

type of wide extent of visualization of training aids develops and motivates the most different categories of children including especially gifted.

The multimedia is the computer didactic tool which, represents the maintenance of the training material in esthetically organized interactive form with use of two modalities (sound and visual), provides the effective flow of perceptual and mnemonic processes, allows to implement the basic didactic principles and promotes achievement of the pedagogical purposes training and development. The multimedia in combination with social networks and open educational resources makes education more available for the general population.

Foreign researchers, emphasizing need of reasonable visualization of the educational context, select the following forms: illustrations, logical images and visual analogies. Illustrations include photographic images, videos of different objects of reality. This visibility has high degree of compliance to the represented object and represents some kind of replacement of reality. The second selected category - logical images - includes such forms as diagrams, charts (information is transferred with use of indexes and characters). This category of clarity is characterized by the schemes and mental images coded in the image. Logical images work as the simplified representations illustrating difficult structures. Graphic analogs are based on creation of final analogy from the known information area to new combinations in absolutely new form.

Emergence of new views on possibilities of "special children", development of inclusive education, is recorded in the international legal acts defining the right of each child to education and also enshrined in the universal declaration of human rights (the UN, 1948) in which the inalienable right of each person to education is noted and that "education shall be directed to complete development of the human person and to increase in respect for human rights and fundamental freedoms. Education shall promote mutual understanding, tolerance and friendship between all people, racial and religious groups and shall promote organization activity of the United Nations on peacekeeping. Parents have the priority right in the choice of the type of education for the juvenile children" (article 26) [VDP1].

## 2 Problem Statement

Each child is unique and needs the individual approach to education for achievement of the intellectual, physical, social and emotional purposes. Patricia Fioriyello in the scientific work "4 huge problems in education today and how to solve them", says: "The traditional education system is the wrong system which shall be improved to help our future generations to get the proper education. We shall improve our education for future generations and not limit their opportunity because of our inability to solve problems". [Fio9].

Main goal of this research is forming of pedagogical tools of implementation of game form of education on the basis of software solutions. The structure of game technology of training contains several mini-games. The first section is the training in the account of children to ten, the second section is the connection of numbers and the third section is the studying of letters and syllables.

Tasks of this project:

- The analysis of features of training of children with HL;
- Theoretical justification of pedagogical technologies of maintenance of training of children with HL;
- The description of the created pedagogical complex of game forms of education on the basis of software solutions;
- Carrying out research of efficiency of application of game forms of education of children with HL.

## 3 Development Of The Technique

### 3.1 The Analysis Of Training Of Children With A Physical Condition With In The Territory Of The Chechen Republic

For implementation of the rights of children with limited opportunities of health on education in strategy of development of the Chechen Republic till 2020 the object is set: as much as possible to integrate children with HL on social and active Wednesday of society. For achievement of the goal by the Ministry of Education and Science of the Chechen Republic the corresponding work is carried out.

In the Subprogram "The development of education of children with limited opportunities of health and disabled children of the Chechen Republic of" the State program of the Chechen Republic "The development of education of the Chechen Republic for 2014-2020", the Chechen Republic approved by the government resolution

of December 19, 2013 No. 345, the number of actions for socialization and integration into society of children about HL and selection of financial resources for accomplishment of these tasks are provided.

For children with limited opportunities which temporarily or constantly cannot visit educational institutions for health reasons necessary conditions for receipt of the educational program for the individual program are created at home. One of effective components of the educational environment for children with limited opportunities is the system of remote learning with use of information and communication technologies. In 2009 SEI Center of Education for inclusion in active educational and social life of children with HL by means of application of information and communication technologies, technologies of remote learning is created. The regulations regulating providing computer and telecommunication equipment to disabled children, the ensuring access to the Internet establishing the possibility of transfer to free use of this equipment after the termination of educational institution for training continuation including professional are adopted.

For the purpose of the organization of quality education of children with HL in the Chechen Republic are created and the following special educational institutions function:

- SEI Special (Correctional) General Education Boarding School for Blind and Visually Impaired;
- SEI Special (Correctional) General Education Boarding School for Children with the Delay of Mental Development;
- SEI Special (Correctional) General Education Boarding School for Deaf and Hearing-impaired;
- SEI Center of Education;
- SEI "Special (correctional) school for children with limited opportunities of health".

Since 2014 SEI Special (Correctional) General Education Boarding School for Blind and Visually Impaired, SEI Special (Correctional) General Education Boarding School for Children with the Delay of Mental Development and SEI Special (Correctional) General Education Boarding School for Deaf and Hearing-impaired.

### **3.2 Examination Of Existing Data Exchange Protection Technologies**

Becomes the main objective of the state strategy of modernization of education in the 21st century achievement of the new quality of education answering to modern social and economic conditions of Russia and the main directions of its development. The new and growing requirements are imposed to the general culture and professional competence of the person, the general and professional education, capability not only to adapt to this world, but also to influence it, to make changes to different spheres of human life, to show independence, self-development, self-realization, initiative and creative activity (N. V. Bordovskaya [BNV2], A.P. Kulikova [KLN3], etc.) . Research associates of the Chechen institute of professional development of educators Yarychev N. U. and A. K. Sarakayeva. in the scientific work "Theoretical and methodological Basis of the Traditional Educational System at the People of the North Caucasus", write: "Education of younger generation - one of the main tasks of initial requirements of human society and the necessary condition for existence and development. Therefore it also arose together with origin of human society. The more successfully the younger generation will acquire accepted in the family and society of regulation of communication, the relations, work methods, the life of society will become more safe and stable". [Yary4]. Implementation methods of inclusive education are considered in article Z.G. Nigmatova [Nig5]. N. A. Liventseva [Liv6], also in the format of the state-of-the-art review, lights empirical researches on aspects of practical implementation of inclusive education, separating them into two directions - questions of effective training of teachers for work in inclusive classes and problems of adaptation of children with HL in group of peers. The reason of the conservative relation of pedagogical community to process of the inclusion of V.Y. [Iva7] of Ivanov and V. L. Ryskin [Rys8] call traditional aiming of the Russian education system at the result expressed by amount of the knowledge gained by the child and speed of their assimilation. S. K. Nartova-Bochaver and E.V. Samsonova, for the purpose of refining of programs of training of inclusive tutors, defined and investigated the "profile of professional competence" of the teacher including as personal components, and the activity characteristic.

### **3.3 Chart Of The Complex Of The games "We Learn To Consider And Read"**

Within research it is developed the multimedia training games "We Learn to Consider and Read". Let's consider the skeleton diagram of the training game in the module of the project implemented in software environment of Ramus including elements:

- description of rules of the game,
- the interface decision on the basis of programming module,
- the scheme of interaction of the pupil with the teacher on receipt of educational result

In Fig. 1. the context chart of forming of the complex of the games "We Learn to Consider and Read" is submitted to the IDEF0 technologies.

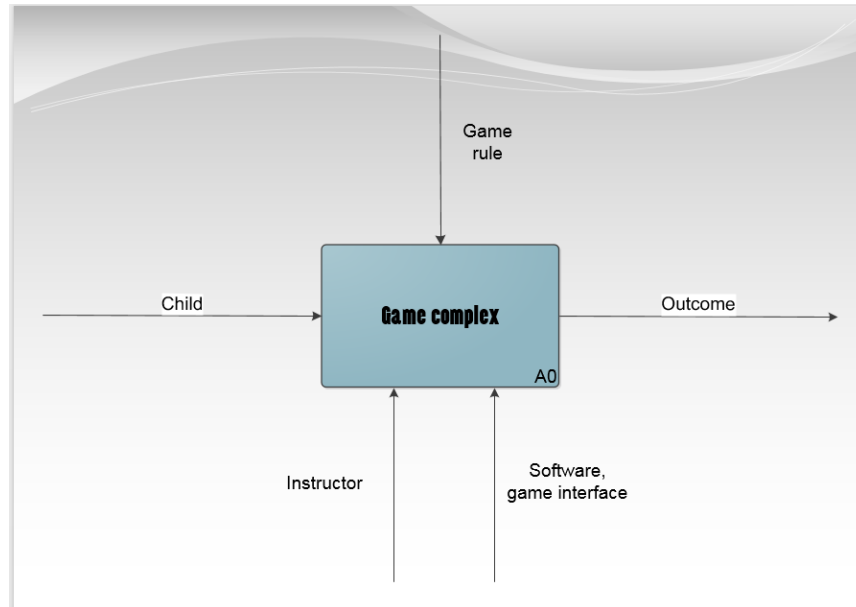


Figure 1: Context chart of the complex of the games "We Learn to Consider and Read"

At the same time subprocesses of passing of educational multimedia game form in technology of training:

- the choice trained game types depending on specifics of restrictions of physical capacities of the child;
- accomplishment of procedure of playing the game in the interface solution of programming module for the HL type defined above;
- forming of skills and abilities when fixing of the passable material in multimedia - the format.

In Fig. 2 the chart implemented in the training game of subprocesses with prioritized responsible persons is submitted.

The game form of carrying out the lesson "We Learn to Consider and Read" was prepared and developed by means of the following software:

- Adobe Flash CC;
- Adobe Photoshop CC;
- Audacity.

At implementation of game technology of training the scripting Adobe Flash CC Action Script language was used. Action Script is the object-oriented programming language, one of dialects of ECMA Script which adds interactivity, data processing and many other things to contents of Flash-applications. ActionScript is performed by the virtual computer (ActionScript Virtual Machine) which is Flash Player component. ActionScript is compiled in byte code which joins in the SWF file.

In the course of creation the task to create the interface, clear and convenient for the child, to create adequate types of graphics and the movement (animation) in the game lesson was set. The pedagogical system of forming

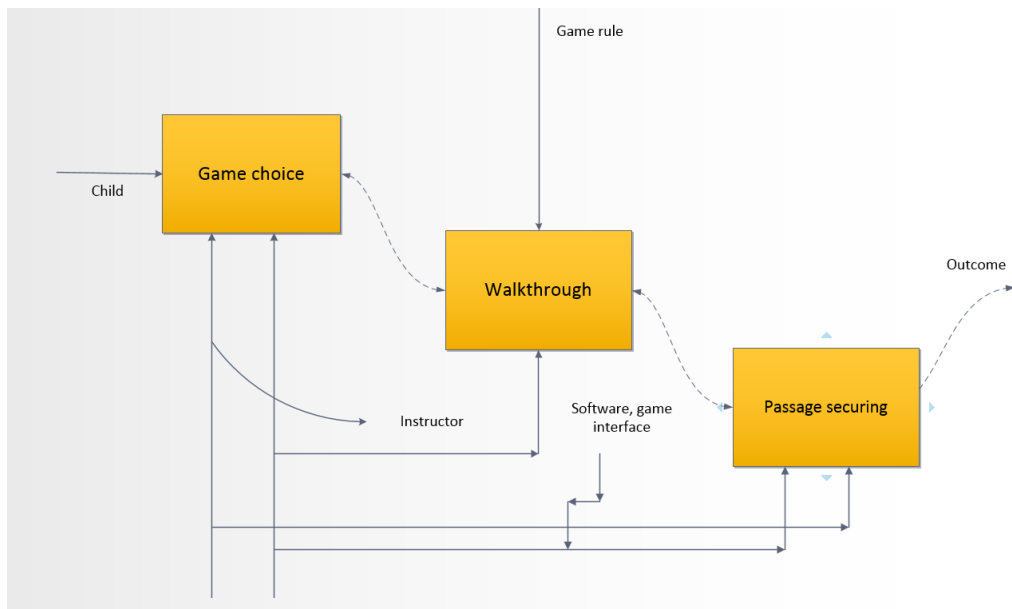


Figure 2: Subprocesses with prioritized responsible persons

of "scenario" of multimedia of the lesson was implemented by the principle of "game in game", i.e. 3 games in 1, thereby giving the opportunity to the child most to select what game is more interesting to it in respect of knowledge new. The complex of game forms of lessons on the platform of multimedia was created for the help in training of children of younger school age with HL, taking into account their features and opportunities for development of their mental abilities. The main interface of game is shown on Fig 3.



Figure 3: Interface of the game "We Learn to Consider and Read"

#### 4 Research Methodology

The importance of inclusive education for development of society cannot be reevaluated, it gives hope that children with HL will acquire the right to full education and will be able to implement the potential, to bring benefit to

society and to find the place in life. [Fad10]

The specialists working with children with HL in the articles point to unavailability of pedagogical community to process of the full-fledged inclusion and the number of the accompanying risks [Lyg10].

One of the main opportunities of receipt of quality education and the solution of the set of the arising problems in training and socialization of children is use of the multimedia training systems. DEE as the modern growing and developing educational resource can become the important instrument of social integration of children with health limitations.

Technically speaking, "multimedia" decides as information representation on use of the text, video, the sound, graphics and animation. Five main types of media integrate in the uniform training environment [Moi17]. For the child with disability of multimedia technology is the opportunity to understand and remember material thanks to information representation in the fascinating and cognitive form [Mal17] of DEE provide new methods of training at schools and at home.

The developed game technologies on the basis of multimedia of software solutions are used in elementary grades of SEI and are directed to forming of elementary mathematical knowledge: abilities to consider, to perform elementary mathematical operations, and also training in reading.

In all provided games the child can independently control correctness of accomplishment of tasks with the help - sounds, tunes, laughter of characters, the applause. Thanks to games children develop such important components as attention, thinking, motivation, perception.

Multimedia games have much more advantages and are very effective in education and teaching children with special requirements. The benefit of use of games in comparison with the traditional method is that games cause cognitive interest in children, at first, as game occupation, and then as educational occupation. This interest is the cornerstone of forming of cognitive motivation, any memory and attention, these qualities provide psychological readiness of the child for visit of school.

Practically all researchers, both domestic, and foreign, agree that development, training and education of children at younger age shall happen to HL within game activity. The developing games best of all are suitable for development, training and education of children.

## 5 Result Of Research

To estimate influence of use of multimedia interactive educational tools on education of children with HL of younger age, comparative analysis and the stating experiment in SEI Special School was made.

In two experimental classes lessons of mathematics and reading in 1 classes within the month - September 20018 years were conducted. In one of classes training was conducted in the traditional form on the basis of classical lessons on the basis of personal contact of the teacher and trained. In another - classes were given by the teacher jointly with the specialist of information technologies on the basis of the computer games developed for training of children of younger age with different types of HL. Analytical results of pedagogical experiment are presented in Table 1.

Table 1: Comparative figures of initiative of the pupils training by the traditional method and with multimedia games

Multimedia			Traditional		
The general quantities of the lessons which are actively participating in the course	Total quantity wishing to participate actively in the lesson use of multimedia Initiative growth	Initiative growth	Total quantity the lessons which are actively participating in the course	Total quantity it is active to participate in the lesson	Initiative growth
45	52	30	45	52	10

On the basis of test tasks results of research for the purpose of identification of quantity trained, successfully mastered material in two different classes where training was provided with use of traditional techniques or

multimedia technologies were analyzed. The extent of influence on the academic progress use of game technologies on the basis of multimedia expressed by results of progress in two different groups is provided by the chart on Fig 4.

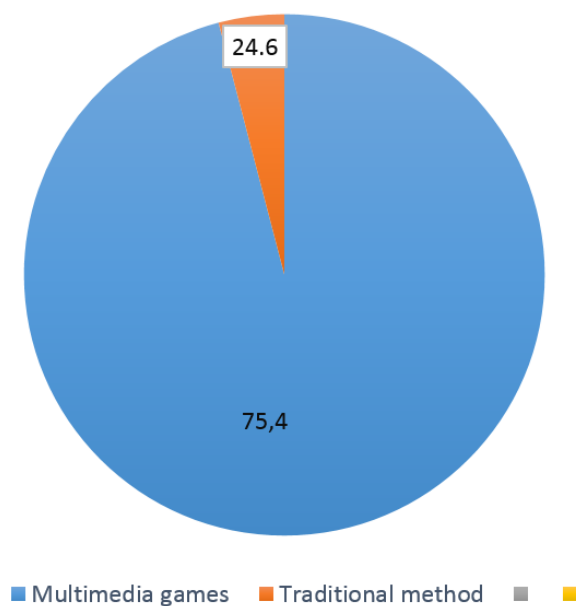


Figure 4: Result of experiment

## 6 Conclusion

Multimedia of technology get into all spheres of modern society, including into educational institutions. Computer games also enter the arsenal of different instruments of development. According to researchers, implementation of computer games in system of didactic methods became the powerful factor of enrichment of the intellectual basis of mental, esthetic, social and physical development of the child.

Acquaintance to computer games positively influences different aspects of the identity of children, promotes improvement of the principles of the information culture defining behavior of the person in the information computerized society.

In the course of use of multimedia of technologies new types of activity appear: automated design, creative experiments, design. At the same time the thinking, attention, memory, imagination begin to be shown fully, the self-assessment and independence of the child considerably increase, the lexicon is enriched skills of communication. Thanks to implementation of multimedia games children with HL become mobile, to study, to adapt learn to adapt in the conditions of the changing world. In modern social and philosophical sense inclusive education is understood as the form of coexistence of all children normal and with limited opportunities. Integration into education is considered the option of the place of everyone.

## References

- [UN48] Universal declaration of human rights (UN, 1948) [Electronic resource]. - Access mode: [www.un.org/ru/documents/decl\\_conv/declarations/declhr](http://www.un.org/ru/documents/decl_conv/declarations/declhr).
- [Bor00] Bordovskaya, N. V, Pedagogics: the textbook for higher education institutions / N. V. Bordovskaya; A.A. Rean. - SPb: 2000.
- [Yar12] Yarychev N. U., Sarakayeva of A.H. Theory and methodology of the BASIS of the TRADITIONAL EDUCATIONAL SYSTEM AT the PEOPLE of the NORTH CAUCASUS//Modern problems of science and education. - 2012. - No. 3. - Mode dostupa:url: <http://science-education.ru/ru/article/view?id=6447>;
- [Liv12] Nigmatov Z.G., Akhmetova D.Z., Chelnokova T.A. Inclusive education: history, theory, technologies. - Kazan: Knowledge, 2014. - 219 pages.
- [Iva12] Ivanova V. Yu., Ryskina V. L. Studying of readiness of pedagogical community for process of integration (inklyuziya) of children with violations in development//the Russian and foreign researches in the field of inclusive education. - Moscow: FORUM, 2012. - Page 146-151.
- [Nar12] Nartova-Bochaver S. K., Samsonova E.V. Research of professional competence of the teacher of the preschool educational institution implementing inclusive practice//the Russian and foreign researches in the field of inclusive education. - Moscow: FORUM. - 2012. - Page 139-145.
- [Lev01] Levchenko I.Yu., Prikhodko O. G. Technologies of training and education of children with violations of the musculoskeletal device. - M - 2001.
- [Fio18] Fioriyello Patricia. 4 Huge problems in education today and as to solve them. 2018. URL: <https://drpfconsults.com/4-huge-problems-in-education-today-and-how-to-solve-them/>;
- [Sem11] Semago M. M. Determination of the educational route of the child with OVZ on psikhologo - the medico-pedagogical commission of the resource center for development of inclusive education//Psychological science and education. - 2011. - N 3. - Page 50-58.
- [Vyg03] Vygotsky L.S. Fundamentals of defectology. - SPb.: Fallow deer, 2003. - 654 pages.
- [Fad10] Fadina A.K., Semago N. Ya., Alekhina S. V. Inclusive education. - M.: School Book center, 2010. - 132 with
- [Lyg10] Lygina M. A. Problems of social adaptation of disabled children//Collections of conferences of Research Center Sotsiosfera. - 2010. - No. 4. - URL: <http://cyberleninka.ru/article/n/problemy-sotsialnoy-adaptatsii-detey-invalidov>
- [Moi17] Moiseenko N. A., Alisultanova E.D., Bisultanova A.A., Magaziyeva Z.A. Pedagogical aspects of forming of professional competences of area of technologies of multimedia//Modern high technologies. - 2017. - No. 1. - Page 131-134.
- [Mal17] Malysheva M. A. Information technologies in vocational education//Vocational education. - 2017. - No. 1. - URL: <https://cyberleninka.ru/article/n/informatsionnye-tehnologii-v-spetsialnom-obrazovanii>;
- [Mit11] Mitchell D. Effective pedagogical technologies of vocational and inclusive education. Chapters of the book. / Edition of N. Borisov. - M.: ROOI "Perspective", 2011. - 139 pages.
- [Vyg03] Vygotsky L.S. Fundamentals of defectology: the textbook for higher education institutions. - St. Petersburg: Fallow deer, 2003. - 656 pages.
- [Ale15] Alekhina S. V. Current trends of development of inclusive education in Russia//Development of modern education: theory, technique and practice. - 2015. - No. 3. - Page 10-15. - URL: [http://www.inclusiveedu.ru/content/File/alehina/raboty/alehina\\_s\\_v\\_sovremennye\\_tendencii\\_razvitiya\\_inklyuzivnogo\\_obrazovaniya\\_v\\_rossii.pdf](http://www.inclusiveedu.ru/content/File/alehina/raboty/alehina_s_v_sovremennye_tendencii_razvitiya_inklyuzivnogo_obrazovaniya_v_rossii.pdf)



- [Yar03] Yarskaya-Smirnov E.R., Loshakova I.I. Inclusive education of children of disabled people//Sociological researches. - 2003. - No. 5. - Page 33-36. - URL: [http://paralife.narod.ru/library/science/IarskaiaSmirnova\\_Loshakova\\_SR03.pdf](http://paralife.narod.ru/library/science/IarskaiaSmirnova_Loshakova_SR03.pdf)
- [Sle18] Slee R., Allan J. Excluding the Included: reconsideration of inclusive education//International Studies in Sociology of Education. - 2001. - Vol. 11, No. 2. - pp. 173-195. Available at: <http://www.tandfonline.com/doi/pdf/10.1080/09620210100200073>