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## **IMPROVEMENT OF REHABILITATION PROCESS ON THE BASIS OF ICT: PRACTICAL EXPERIENCE**

**Abstract.** Application of ICTs by a modern education institution may ensure better results of the system of rehabilitation work with students with disabilities both in terms of quantity and quality of learning outcomes. However, effective introduction of ICTs needs a considerable change in the current educational system. The given article describes the experience of modeling the educational system of a boarding school for children with severe speech disorders on the basis of ICTs including the experience of introducing alterations in the general goals and content of education, in the process of designing curricula and programs, in the specific aims of management of the pupils' activity, in the models of grouping pupils, and in the methods of control, report and procedures of assessment of the rehabilitation-educational process.

The introduction of the discussed model in a concrete educational institution resulted in the transfer of a number of trivial functions that needed hard work of specialists towards ICTs; it also improved the quality of rehabilitation-educational activity in the areas where conventional practice did not obviously guarantee the necessary results due to insufficiency of the data traditionally used by specialists.

**Keywords:** education system modeling; rehabilitation process; ICTs; effectiveness of rehabilitation process; logopedics; children with speech disorders; severe speech disorders; boarding schools.

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New (higher both in terms of quantity and quality) outcomes of the system of rehabilitation work with students with disabilities are facilitated at a modern education institution by means of introducing information and communications technologies (*hereinafter:* ICTs) [1; 3]. But the efficient introduction of ICTs needs change: in the general goals and content of education, in the process of designing curricula and programs, in the specific aims of management of the pupils' activity, in the models of grouping pupils, and in the methods of control, report and procedures of assessment of the rehabilitation-educational process. The given article discusses the experience of modeling the educational system of a boarding school for children with severe speech disorders on the basis of ICTs.

The stable increase of pupils with severe speech disorders and a complex structure of defect [7] and persisting intensification of labor of the rehabilitation-educational block specialists causing their overload [15], on the one hand, and, on the other hand, the fast development of ICTs of rehabilitation-educational orientation [2; 5; 6; 9; 10; 12; 13; 14, etc.] and the increase of the lev-

el of information and communications competence of the pedagogical staff [15] and other tendencies become important preconditions for specification of the goals of the management of the educational system of an institution. Multiplication of the given tendencies needs the formation of a salient vision of the avenues of the education system development via the transfer of a number of trivial functions, demanding hard work of specialists, towards ICTs and the search for and implementation of new technological opportunities for improvement of the quality of rehabilitation-educational activity in the areas where conventional practice does not obviously guarantee the necessary results due to the insufficiency of the data traditionally used by specialists.

We have singled out peripheral functions in the activity of the specialists of the rehabilitation-educational block of the boarding school, as well as complex functions which need algorithmization due to the multi-level nature of the phenomena of psychological reality and the issuing diversified character of rehabilitation-educational intervention. We have also worked out and implemented the system of op-

timization of rehabilitation-educational work on the basis of ICTs. The content of the ICT elements in rehabilitation-educational work is shown in the table. The created model of the education system is characterized by some peculiarities.

*Design of curricula and programs of rehabilitation-educational work* is based on the “pupil’s chart” – a software product “Individual Rehabilitation-Educational Route” (IRER) application of which is reflected in the content of the process “Design of curricula and programs” of the quality management system [3]. The IRER is a universal tool. It allows fixing the areas of rehabilitation work with children optimizing in-class and out-of-class activities time; it also helps to organize interaction between specialists, pedagogues and parents. The IRER has a module structure. Filling the IRER in does not take a long time, but helps to collect and use all information necessary for rehabilitation.

Separate ICT elements have been introduced in the previously worked out programs of rehabilitation-educational work of teachers-logopedists and pedagogues-psychologists including:

- computer-assisted indicator complex “VOLNA” for training breathing skills and learning the diaphragmal respiration technique (in cases of the child’s non-organic attention disorders, impairment of working capacity and arbitrary behavior control, logoneurosis, impaired adaptive capabilities, presence of psycho-emotional problems, etc.);
- logopedic trainers “Special Educational Means. First Steps” for correction of the prosodic aspect of speech and development of coherent speech;
- logopedic trainer “Delfa-142” for development of phonic breathing, force of the voice control, correction and automation of pronunciation, reduction of excessive voice nasality and for work with any speech unit – from a sound to a sentence;
- information rehabilitation program “Stalker” for development of a stable life position preventing teenagers from addiction to drugs, alcohol and tobacco; formation of the skills of correct behavior in difficult situations; realization of personal responsibility for one’s behavior and choice of the course of life; development of communication skills, etc.

**Table.** The content of the rehabilitation-educational work on the basis of ICTs

Blocks of rehabilitation-educational work	Problems (“bottlenecks”) needing new technological solutions	ICT-based solutions
Block of incoming diagnostics and design of rehabilitation-educational process	To carry out multi-factorial diagnostics of speech development of newly enrolled pupils	Hardware and software complex for biological feedback (BFB) produced by the scientific production enterprise “Amalteya“
	To reveal the inner hidden picture of psychological reality, including the risk zones and compensatory potential of the pupils’ psyche	Hardware and software complex produced by the LLC “Biosvyaz“; used to assess the child’s physical state and the regulatory mechanisms of his psyche. The program “Individual Rehabilitation-Educational Route” (IRER). The package “Amalteya Tests“. Information rehabilitation program “Stalker”. The complex BFB “Komfort”.
Block of practical skills	To move to the information-technological periphery (provided there is proper quality control) the training functions that need long-term formation of behavioral skills (diaphragmal respiration skills; skills of relieving excessive psycho-emotional, psycho-physiological tension; techniques of general muscle and psycho-emotional relaxation; muscle awareness; the skill of coordinated consecutive arbitrary regulation of muscle tension; the skill of progressive muscle relaxation)	Hardware and software BFB complexes produced by the scientific production enterprise “Amalteya“. The program “Neyrokor 3.1S”. Hardware and software psycho-emotional BFB complex produced by the LLC “Biosvyaz“. Hardware and software logopedic BFB complex produced by the LLC “Biosvyaz“. The package of psycho-rehabilitation programs “Volna”, “Stalker”, “Ekvator”, “Komfort”, speech rehabilitation program “The World of Sounds”, logopedic trainers “Special Educational Means. First Steps”, “Delfa-142”.

The block of rehabilitation-educational work of the adapted educational program includes rehabilitation-educational programs on the basis of biological feedback (*hereinafter*: BFB) – BFB trainings of various orientation:

- rehabilitation of vegetative disorders, normalization of the vegeta-

- nervous system activity (RSA-BFB-training);
- rehabilitation of the psycho-physical state of the pupil (EMG-BFB-training);
- learning skills of relieving excessive psycho-emotional and psycho-physiological tension, techniques of general muscle and psy-

cho-emotional relaxation and development of muscle awareness (BFB trainings);

- teaching self-regulation on the basis of control of biorhythms of the functional activity of the brain – EEG-BFB (BFB by the parameters of bioelectrical activity of the brain);

- development of the skills of coordinated consecutive arbitrary regulation of muscle tension, improvement of coordination of the movements of eyes and hands, dual coordination of using both hands simultaneously, teaching movement control and precision of movements (BFB training);

- treatment for ADHD, prevention of behavioral deviations in pupils with psycho-emotional disorders (a complex of BFB trainings);

- development of the higher nervous processes, teaching to maintain significant intellectual effort and to concentrate attention (“Brain-fitness” training), etc.

Authored lesson plans in all the above mentioned areas have been worked out and implemented [4; 8; 11, etc.].

The institution specialists in cooperation with the pedagogues of the Chelyabinsk State University have created a trainer aimed at developing attention on the basis of the mobile EEG Holter monitor; work is being carried out on the hardware and software complex on the basis of biological feedback

with innovative principles of remote access and indicators of the patient’s movements; the corresponding methodological guides are being created.

In the course of development of the information technological software for education processes, we have specified *the particular goals of management of the learners’ activity*: we have renovated the mode of rehabilitation-educational activity at the institution – on the basis of analysis of the time of usage of the hardware and software complexes, we have formed the models of grouping pupils according to the principle of provision of the new kinds of services to all those who may need them.

The improvement of the system of rehabilitation-educational work on the basis ICTs involved specification of *the methods of control and specialist report and the methods of assessment of the rehabilitation-educational process*. We have figured out “the bottlenecks” in the traditionally collected data about the course and outcomes of the rehabilitation-educational process and have worked out and selected the criteria and parameters for the new lines of monitoring. The general goal was to establish objective ICT based criteria of assessment of efficiency of the rehabilitation-educational measures. Thus, for example, the efficiency of the EEG-BFB-training was evaluated accord-

ing to the following objective criteria (depending on the EEG type at the given diagnostic stage): increase of the power of alpha-activity and alpha index, and stability of the alpha index in the EEG. The ICTs implemented in the process give the specialist opportunities of automatic interpretation of results after training sessions.

Thus, the specification of the rehabilitation process model on the basis of ICTs demanded revision of the traditional practice and determination of its “bottlenecks”; inclusion of the pupil’s chart in the process “Design of curricula and programs”, introduction of separate information technological elements in the rehabilitation programs worked out before, and implementation of new rehabilitation-educational programs based on the latest hardware and software complexes; renovation of the mode of rehabilitation-educational activity at the institution on the basis of analysis of the time of usage of the hardware and software complexes; modeling grouping pupils according to the principle of provision of the new kinds of services to all those who may need them. The experience of implementation of ICTs in the system of rehabilitation-educational work testifies to the fact that the effectiveness of the education system has grown in accordance with the following strategically important for the institution lines:

the quality of rehabilitation-educational work has improved in the areas where the traditional practice did not allow getting the desired outcomes; new rehabilitation services have been implemented; the opportunities of individualization of education of children with disabilities have been expanded; the staff potential of the institution has been extended by organizing methodological work on the ICTs of rehabilitation-educational orientation.

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