Teaching Special Subjects for Students with Disabilities in Preparation for the Profession by Using Innovative Educational Technologies

Olimov Kakhramon Tanzilovich, Sayfullaeva Dilafruz Ahmedovna, Khimmataliev Dustnazar Omonovich, Ashurova Sanobar Yuldashevna, Gaffarov Feruz Hasanovich

Abstract*: *This article highlights the opportunities, essence and content of teaching students with disabilities using special technologies such as "Self-government", "Morphological matrix" and the recently developed five-step process of teaching special disciplines in professional training in specialized colleges.The results of experimental tests and mathematical statistical analysis of the use of these technologies in the teaching of specialized subjects in specialized colleges are presented.It is based on the possibility of achieving high efficiency by organizing the teaching of special disciplines using innovative technologies.

Keywords: Students with disabilities, specialized colleges, professional education, special disciplines, the educational process, innovative technologies, teaching methods, individual approach, pedagogical experiment, quality of education, educational materials.

I. INTRODUCTION

Worldwide, specialized centers for the development of material, social, psychological, educational and methodological assistance to people with disabilities are developing. In the process of globalization, a large number of studies are conducted aimed at ensuring the social adaptation of people with disabilities in society, improving the quality and effectiveness of professional training and implementing strategies to overcome difficulties in inclusive education.

Searching, implementation of the best solutions in practice and improvement of methods and scientific and methodological support to improve the quality and effectiveness of the educational process in educational institutions in order to demonstrate the skills and abilities of students with disabilities in the process of training and growth as free citizens in accordance with the best foreign experience are one of the important issues. Moreover, there is an urgent need to create favorable and pedagogical conditions, the effective use of innovative educational technologies in the training of the profession, the development of modern educational and methodological support and the improvement of educational materials, taking into account psychological and pedagogical features for the development of personal and professional qualities based on an individual approach to their physical and mental development. In this regard, it is necessary to improve the methodology for teaching special subjects in specialized colleges, develop modern didactic tools, expand access to e-learning resources and develop educational and methodological support.

II. MATERIAL AND METHODS

Socio-economic reforms in the Republic of Uzbekistan are aimed at training highly qualified, creative and independent decision-makers who can quickly master technologies and technologies and quickly adapt to innovations. In particular, the Strategy of actions for the Further Development of the Republic of Uzbekistan sets the priority “Strengthening state support for people with disabilities, improving social services, expanding access to quality educational services” [1]. From this point of view, one of the most important tasks in the training of students with disabilities is the use of modern teaching methods and scientific achievements, their integration in the educational process and the introduction of best practices of developed countries in the educational process. The training of young people with disabilities, an individual approach to training and the widespread introduction of innovative educational technologies in the educational process are important.

The laws of the Republic of Uzbekistan “On the social protection of persons with disabilities” and “On guarantees of the rights of the child”, as well as other regulatory documents related to this activity, provide all the opportunities for the protection of persons with disabilities. [2].

Specialized colleges should be designed in such a way as to ensure guaranteed achievement of the planned educational process using innovative educational technologies based on an individual approach to specific subjects. [6]

Revised Manuscript Received on November 22, 2019.

***** Correspondence Author

Olimov Kakhramon Tanzilovich, Doctor of pedagogical sciences, professor, Ministry of preschool education of the Republic of Uzbekistan.

Sayfullaeva Dilafruz Ahmedovna, Doctor of Philosophy (PhD) in Pedagogical Sciences, Bukhara Engineering and Technology Institute, Uzbekistan.

Khimmataliev Dustnazar Omonovich, Doctor of Pedagogical Sciences, Professor, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Uzbekistan.

Ashurova Sanobar Yuldashevna, Candidate of pedagogical sciences, associate professor, Ministry of preschool education of the Republic of Uzbekistan.

Gaffarov Feruz Hasanovich, Doctor of Philosophy (PhD) in Pedagogical Sciences, Ministry of preschool education of the Republic of Uzbekistan.

III. RESULTS AND DISCUSSION

It was recommended that the training process in specialized colleges be carried out in the form of individual and pair work. The form of individual work contributes to the individualization of the educational process and the activation of students. At the same time, students independently perform educational tasks or work-related activities. The following possibilities of using this form of training in the educational process are possible:

– practical work performed as a result of completing tasks related to work or comparing manufactured products and samples;

– independent planning of training tasks or practical work;

– independent search and collection of important information by students;

– retraining and repetition;

– self-esteem.

Working in pairs is one of the forms of individual learning when two students work together.

Innovative teaching technologies are actions aimed at the effective organization of interconnected learning between a student and a teacher to achieve the stated learning goals in teaching special subjects. [5]

We conducted learning processes using innovative technologies in specialized colleges for teaching students with disabilities, using a self-directed morphological matrix and a new five-step innovative technology based on an individual approach to teaching specialized subjects.

Unlike traditional technologies, “self-management technology” provides a high level of self-expression in learning professional activities for students with disabilities and represents a transition from the theory of knowledge transfer to self-management learning. The organization of self-government education in specialized colleges is mainly based on independent education and training activities, and its functions include activity, self-government, active independent movement, the development of knowledge, skills and the effective use of modern didactic tools. [3]The environment has a great influence on the development of personality, and the concept of "activity" can be understood as one's own needs of the person in the environment.In technology of self-regulation, activity is achieved through action. That is why we need to present the activities of students with disabilities as a model of action in the teaching of a particular subject.From the point of view of the teacher, this is a learning activity. At the same time, learning activities may lose focus, especially when teaching special subjects to a student with physical disabilities.Therefore, these actions should always be adjusted and controlled.

Human motivation is self-motivation. It is also a factor that initiates feedback. If the internal and external needs of a person are activated by conditions, then they are of interest to the activity.With the emergence of new needs in a person, the results of actions appear.

The formation of independence of students with disabilities in the process of preparing them for the profession is a complex process in which these skills are gradually formed as a result of multiple levels of feedback.The multifaceted experience of teaching in special subjects suggests that there may be cases of the development of students with disabilities in the pedagogical process. In turn, we see them as actions that are more formal and more important than the development of the student’s personality. The teacher must have sufficient competence to use innovative technologies in the educational process. Must work in an innovative learning environment. In this context, we conducted training sessions with the science teacher before applying several innovative educational technologies.

It is shown that the innovative technology of "Self-government" has the following effect in relation to the teaching of special subjects[5]:

1. In the process of training young people with disabilities, all the features of the formation of an independent movement are demonstrated, that is, an active attitude to life needs and the acquisition of new knowledge and skills.

2. The independence of a student with disabilities is formed through feedback, and it is impossible to predict and predict.

3. The task of the teacher of a special subject is to create conditions for independent learning activities of a student with disabilities. The process is self-directed.

We conducted practical classes in teaching specialized disciplines based on the technology "Morphological matrix" in specialized colleges. The morphological matrix is one of the active learning technologies in which the learning problem is divided into several elements, the search for solutions to problem elements and, if necessary, the maximum number of solutions.The didactic goal of using morphological matrix technology is to help solve the problem by drawing up a complete picture of the problem, as well as its structure and systematization.

The morphological matrix technology is implemented in the following steps.

1. The task is divided into important, independent elements (parameters).

2. For each element, regardless of the initial problem, all possible solutions are identified and written to the right along with the parameters.

3. The main task is chosen so that each element of the task is the most convenient. A key problem solution for each possible combination is shown.

4. The optimal solution to the main problem was chosen.

We have developed and implemented a five-stage innovative educational technology, which is very effective in providing specialized courses in specialized colleges.

The “five-step” technology is intended for students working in individual, paired or small groups on time, to perform labor activities (product and sample preparation, practical work, etc.). In this technology, students participate in the planning, execution, introspection, drawing conclusions and evaluating results. The homework is carried out individually or in pairs, and work in small groups is the coordinated result of students' joint activities.

In the "five-step" educational technology, the task is carried out in the following stages:

1. Understanding of the task. At this stage, the teacher provides samples, diagrams, technical drawings; work description; instructions; materials on learning objectives should be prepared. The teacher encourages students to

fully understand the task and analyze it. Then they formulate the steps of the assignment.

2. Planning. At this stage, students independently complete the work plan. The plan provides information about the stages of operation, that is, about the technological sequence and the time allotted for them, the necessary equipment, raw materials or products and labor protection measures. Students discuss problems with the teacher during the planning phase.

3. Exercise. Students complete the task on their own, based on a work plan. The teacher controls the workflow and writes intermediate results in the notebook "Grades".

Students complete the assignment at the appointed time. If there are any difficulties during the work, students turn to their teacher for help. Students should be able to apply the knowledge and skills acquired at this stage in a new context.

4. Checking. Students themselves check the results. For example, they can evaluate performance based on quality criteria.

5. Marking. Student and teacher analyze workflow and results together.

The use of the "five-step" technology is focused on independent student learning. In addition to self-study, this technology is aimed at acquiring individual skills and abilities needed to acquire a specialty, and all the knowledge and skills necessary to complete a task are acquired throughout the work. Students work independently or individually on the task in their assignment, working together to implement and draw conclusions from independent planning. The teacher monitors and systematically manages the learning process.

In 2016-2018, specialized colleges (for students with impaired limbs) will conduct trial work on special subjects “Technology for sewing and sewing knitwear”, “Designer of a wide range of clothes”, “Technology for sewing products” and “Sewing equipment”. Research work was carried out in specialized professional colleges for the disabled in Fergana and Samarkand, as well as in the control and experimental groups of the Republican professional college of disabled people in Tashkent.

The purpose of the pedagogical experiment is to prove the hypothesis presented in the study. The experiment was carried out in the following stages:

1. The preparation stage:

- Key research areas have been identified;
- The theoretical and practical state of the identified problem of vocational training of youth with disabilities is studied;
- conducted interviews and questionnaires with specialized teachers of specialized professional colleges;
- Studied the process of training and education of youth with disabilities in specialized professional colleges;
- educational and normative documents in special subjects were analyzed and studied;
- The teaching of special subjects at specialized vocational colleges was studied.
- The accessibility of educational and laboratory equipment and scientific and methodological materials for training and piloting in specialized vocational colleges is investigated;
- necessary;
- Seminars were held with teachers of special subjects working in specialized professional colleges.

2. The second stage:

- the experimental process was continued;
- Educational technologies have been developed for innovative training in special subjects “Technology of garments” and “Equipment for the production of garments”;
- Lesson plans have been developed for each theoretical and practical course;
- Scientific evidence has been compiled in a digest;
- If necessary, changes were made to the content of experimental training materials and the methodology for their implementation;
- The results of pilot studies were analyzed in quantitative and qualitative terms;
- The results of the pilot work were discussed at seminars and meetings.

3. The next work was performed in the third stage of the study:

- final experimental work was carried out;
- The effectiveness of training using innovative technologies for teaching special subjects “Technology of garments” and “Equipment for the production of garments”;
- The opinions of specialized science teachers who participated in the pilot study were surveyed, interviews and questionnaires were conducted to ensure that the quality and effectiveness of the learning process were improved;
- The results obtained in the course of our study were statistically processed to give recommendations, to prove their reliability and to popularize our methodological recommendations.

In the test groups, the initial knowledge of students with disabilities in special subjects “Technology of garments” and “Equipment for the production of garments” was determined by the practical skills of the tests. The teaching results of these special disciplines using innovative educational technologies are systematically analyzed and compared with each other. If necessary, the comments of specific teachers involved in the process were discussed, and changes were made to the methodology for teaching special subjects using innovative technologies. The experiment was attended by 201 students and 24 college teachers. To ensure the reliability of the experimental results, a mathematical and statistical method was used.

A seminar was held for teachers of special subjects at specialized vocational colleges on the use of innovative teaching technologies and active teaching methods for teaching special subjects.

We have developed an educational and technological training complex for teaching the disciplines “Technology of Sewing Products” and “Equipment for Sewing” based on innovative teaching technologies. Lessons, active teaching methods, time allocation, activities of teachers and students were clearly identified, providing theoretical and practical topics for the lesson. In the organization and conduct of the educational process, a number of studies were carried out

using innovative five-stage innovative educational technologies, as well as other active methods developed by us: “Self-management” and “Morphological matrix”.

Educational materials for theoretical and practical training on the use of innovative teaching technologies in special subjects “Technology of garments” and “Equipment for the production of garments” have been developed.

- To determine the effectiveness of the educational process using innovative technologies in special subjects, motivational, active, innovative criteria for the level of professional activity of students with disabilities were developed and based on these criteria, the level of training of students with disabilities was determined.
- Two parallel experimental and control groups were obtained and the results were comparable at the Republican vocational college for people with disabilities in Tashkent, the Specialized vocational college for people with disabilities in Samarkand and the Specialized vocational college for people with disabilities in Fergana (Appendix 5). The evaluation results of the control and experimental groups for teaching special disciplines “Technology of garments” and “Equipment for the production of garments” were constantly analyzed and compared with each other. The effectiveness of the final control test in the experimental group was theoretically and practically proven.

To determine the level of knowledge of students in special subjects “Sewing Technology” and “Sewing Equipment”, we present the statistical results of practical tasks and tests of control groups and experimental groups.

Table-1

Name of control	Number of students	Students' knowledge of tests and practical tasks							
		“5” excellent		“4” good		“3” satisfactory		“2” unsatisfactory	
		№	%	№	%	№	%	№	%
Control group	90	30	33.3	29	32.4	26	28.8	5	5.5
Experimental test group	111	45	40.5	37	33.3	29	26.2	-	-

Indicators of the experimental group of students on the use of innovative technologies for teaching special subjects “Technology of garments” and “Equipment for the production of clothes” (based on practical and test tasks).

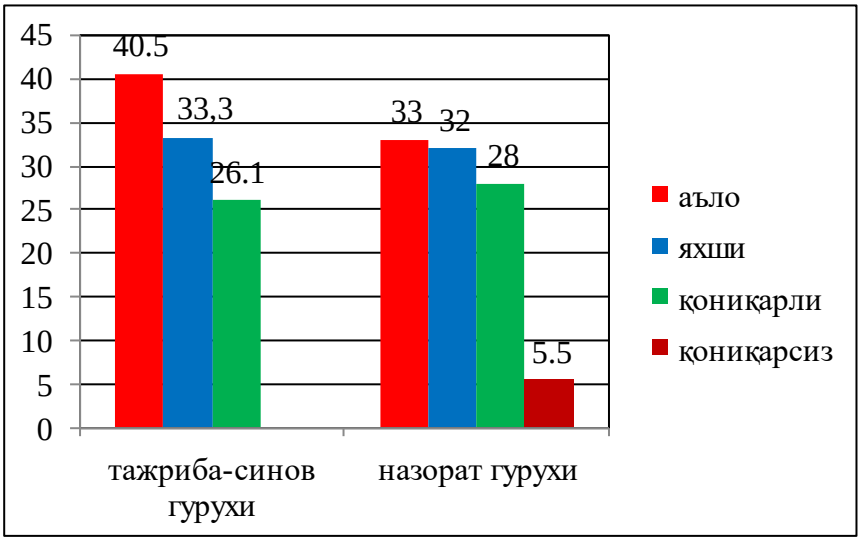

Figure.1. Diagram of the results obtained in the control and experimental groups in specialized professional colleges

The experiment was conducted to assess the effectiveness of teaching special subjects in test cases using methods of processing mathematical statistics.

Table-2: Statistical results of piloting specialized professional colleges

№	Indicators	Experimental test group	Control group
1	Average performance (x,y)	16,5	14
2	Performance indicator	12 %	
3	Confidence Interval Average a_x, a_y	82 %	70 %
4	Average indicator of standard error (Sx, Sy)	2	3
5	Definitive indicator (Cx, Cy)	1,2	2
6	Student statistics (T)	2,2	
7	Summary of indicators	H_1hypothesis will be accepted	

The results of our study show that the control group and the experimental group among students demonstrate differences in practical tasks and test results. Based on the calculation results, it was proved that the above parameters were high for the experimental tasks of the experimental group and for testing

The results of experimental studies showed that the number of students who received marks “excellent” and “good” in the experimental groups increased the number of students with marks “excellent” and “good” in special subjects “Technology of sewing products” and “Sewing equipment”. The number of "satisfactory" ratings decreased compared with the control groups.

IV. CONCLUSION

In specialized professional colleges for teaching special disciplines held at republican professional colleges for the disabled people in Tashkent, Fergana and Samarkand (for students with limited support capabilities), the number of students who received “excellent” and “good” grades in the experimental groups for teaching special subjects “Technology of sewing and sewing-knitwear” and “Designer of a wide range of clothes” for 2016-2018, “Technology of garments” and “Equipment for the production of garments” increased , the number of “satisfactory” marks was lower than in the control groups, and there was not a single student who received “satisfactory” marks. This means that 12% of efficiency is achieved through the organization of the educational process using innovative technologies.

It can be concluded that higher education in specialized professional colleges can be achieved through the use of innovative teaching technologies.

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