Author's experimental program of the health culture development at future electric welders in the process of vocational training

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Abstract

VTT (vocational technical training) system is designed primarily to develop vocational training for the work and students adaptation to operating activities in a market economy. Vocational education problem has acquired a particular urgency in connection with the improvement of teaching content and the tasks set before technical vocational schools for young workers of high qualification. The study of physical culture in relation to the profession of electric welder in practice and production showed some deficiencies in considering this issue. Career development of electric welder implies a complex process that requires the learner to develop certain professionally important mental, psycho-physiological and physical qualities and functions. A complex of unfavorable factors influences on the body. A large burden falls on the cardiovascular and respiratory systems, nervous and muscular systems and analyzers. For the time being the issue of finding ways to optimize the learning process of welders and its further continuation with a vocational orientation is becoming more and more crucial. With regard to the solution of this issue the use of different additional means (innovative technologies, techniques, models, unconventional means, substan-
dard multi-bundled and training equipment, special training simulators for electric welding, information technology, etc.), positively affecting the availability and stability of training, is of a great significance. This question of vocational training of electric welders is still poorly understood.

**Keywords**

Welding students, maintenance and strengthening of health, assistance the correct forming and comprehensive development of organism, maintenance of high capacity, further production activity, domestic life, health culture, physical education.

**Introduction**

The relevance of the study is conditioned by the fact that modern living conditions and conditions of professional activities of skilled workers put forward higher requirements for the health of students of vocational technical training (VTT). Therefore, the health aspect is becoming increasingly important in the VTT system.

Psychological and pedagogical technologies of the formation of conscious attitude to own health at adolescents are can be found in the works of V.A. Anan'ev, I.V. Dubrovina, V.M. Kabaeva, E.V. Kon'kina, G.S. Nikiforov, I.V. Sapel'tsova, B.A. Titov et al. The health protection issues in the aspect of health promoting orientation of the learning process were exposed to light in the studies of L.B. Dykhan, V.I. Zagvyazinsky, N.N. Malyarchuk, P.I. Pidkasisty, T.I. Shamova etc. Different approaches

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2 Dykhan, L.B. (2009), *Theory and practice of health saving activities at school [Teoriya i praktika...*
to individual experience of health protection are considered by V.K. Bal'sevich, V.S. Bykov, V.A. Vishnevsky, V.I. Dubrovsky, N.A. Fomin, etc.

**Analysis of the research**

We have developed an experimental program of physical education and methodology for arrangement of operational procedures of welding students. Author's professionally-oriented program on the educational subject "Physical Education" for training future electric welders at vocational-technical schools is compiled on the basis of educational qualification characteristics and educational and vocational programs of working welders. It reflects aspects:

- formation of the valuable relation of students – future welders to health in the process of learning and future professional activities;
- peculiarities of welder's professional activities;
- challenges of applied physical training in electric welding teaching and methods, forms and remedies to meet them;
- recommended sports and acceptability constant of the welder;
- Organization of cultural and recreational activities in vocational technical schools to consolidate its expertise at future welders.

Considering profession of a welder, we can visually compare the possibilities of building a culture of health in the future welders in the process of implementation of the experimental program (Table 1).

The experimental program gives an opportunity put up a good show during skilled welders training, whose training at vocational schools is carried out according to the curricula. If we com-
pare the number of hours by study years, we see that essentially experimental groups students are engaged in 10-15 times more in training exercises and psychophysiological and strength training than students in the control groups of the regular program. In Table 1 we see that the time allowed for one course for students at vocational schools with a three-year training period, according to the state physical education program, is 76 hours, in the experimental – 488 hours; over a three-year training period at vocational schools under the state program – 182 hours. In comparison with the regular program the experimental program provides 1684 hours, that is 1502 hours more. It bears testimony to the great opportunities and a wide field of activities in our experiment in vocational training for high-quality education of future welders.

In terms of justifying the content of the author's program in relation to the welder's professional activities we focused on such *diverse modeling* of their physical qualities and abilities as:

- model of the development of general endurance, energies and strength endurance of a welder;
- model of the development of speed endurance and mental agility of a welder;
- model of education of welder's emotional resilience, courage, determination;
- model of education of welder's creativity, resourcefulness and perseverance;
- model of education of welder's ability to operate accurately and dexterously in terms of physical and mental stress;
- model of education of welder's ability to operate successfully with limited mobility, persistence and resistance to work overload;
- model of education of welder's resistance to motion sickness, overheating;
- model of the development of welder's ability to a wide distribution of attention and its rapid switching, spatial orientation.
1. The purpose of discipline teaching

The experimental course is a comprehensive discipline that forms the basis of physical fitness, mastering the system of special practical knowledge and skills, motor skills, provides psycho-physical readiness of future welders in professional activities and their training for the work.

2. Theoretical tasks for discipline studies

Preserving and strengthening the health of welding students, facilitation to proper formation and comprehensive development and conditioning, maintaining high working efficiency during the entire period of study, further production activities and everyday life.

In the process of the discipline studying performed the development and improvement of students' moral, volitional and physical qualities, endurance, strength, speed, agility, flexibility, professional and applied skills; preparing students to special exercises of strength training, with fitness machines, nonstandard multi-bundled gymnastic exercise equipment, based on the norms of the experimental methodology, the program and the State standard of physical education of Ukraine.

Upon the discipline studying the student MUST KNOW:

– on the safety during strength training and all kinds of physical training conforming to the program during training sessions and extracurricular activities;

– on physical activity and sports training in weightlifting activities, athletic gymnastics, athletics, team sports, tourism, cross-country, swimming as a means of high availability support;

– on the value of professionally-applied physical training, psycho-physiological and mental training with a specialization in welding;

– on the role of physical culture in the family;

– on the means of psychophysiological regulation and self-regulation;

– on the importance of independent activities on physical culture and sport.

3. Practical training subject matter

Resulting from the practical study of the discipline the student MUST BE ABLE TO:

Athletics: basic task: education of physical qualities of endurance, speed, agility, speed and strength endurance, increase the resistance of an organism to hypoxia, overheating:

run 30, 60, 100, 400, 800, 1000, 1500, 3000 m;
cross at various distances from 1 km to 5 km;
special runner exercises;
depth jumps, standing long jumps;
throwing a small ball, med ball, grenades, shot put.

**Professionally applied character exercises:**

endurance exercise: steeplechase, 30, 40, 50, 60 m runs;
exercise on the development of motor coordination;
exercises on the development of overall endurance;
exercises on the development of speed in action.

**Gymnastics. Professional training.** Main task: development of qualities – strength, flexibility, agility, coordination and strength endurance, static endurance, orientation in space and time. Exercises at high and low bars. Acrobatics.


**Professionally applied character exercises:**

– Exercises for attention development;
– Exercises for static endurance development;
– Balancing exercises;
– Exercises for strength endurance development;
– Exercises for willpower, courage, determination development;
– Exercises for qualities against acrophobia, motion sickness development.

**Sports games.** Basketball. Main task: development of general endurance: development of spatial orientation skills, development of responses to sound and visual signals, improvement of accuracy of movements.

Ball possession technique: handling the ball in studied ways. Dribble, throws (various), handling, free throws, groundmoves, picks. Two-sided game. The practice of judging. Tactical actions on the playground during the game.

Professionally-applied game "throw a pumpkin", "run out of captivity".

**Professionally applied character exercises:**

– Speed exercises in motion;
– Exercises for accuracy in actions;
– Exercises for agility in motion;
– Exercises to coordinate in motion;
Ball throws in a circle on the wall at a distance of 2, 3, 4, 5 m with open and closed eyes.

**Cross country training.** Main task: development of special endurance, movement, over rough terrain. Technique of walking and running in different terrain conditions, overcoming natural obstacles, up to 5 km. Accelerated march (run-walk) for boys – 6 km, for girls – 3 km.

**Athletic gymnastics, weightlifting, athletics**

*Professional strength training of a welder.*

Main task: development of strength qualities, strength endurance.

1. Combined developing exercises without items.
2. Exercises with items.
3. Exercises with assistive devices (light dumbbells, small bars, disci).
4. Exercises with cast and collapsible dumbbells.
5. Exercises on fitness machines and apparatus.
7. Exercises with weights for the development of small muscles (shoulder, deltas, forearm, hand, intercostal, sub-costal).
8. Middle muscles (shank, triceps, oblique).
9. Large muscles (back, abdomen, thigh).
10. Increasing the strength of fingers, hands, arms, hands, shoulders, neck, torso, legs; exercises with weights, dumbbells, wadding balls, with a bar; exercises on new type fitness machines using "circuit training".
11. Muscle-strengthening exercises on fitness machines and nonstandard multi-bundled gymnastic equipment using "circuit training".
12. General physical training as a basic version of physical education.
13. Special physical fitness:
   a) study and improvement of physical exercises;
   b) development of physical qualities.
15. Scoring requirements.
16. Training and improving physical education exercises on fitness machines and accessories.

**Swimming.** Required type of professional applied physical training of students, which includes the study of different methods of swimming and the development of physical qualities needed for welders.

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Tourism. Professional orientation of training and professionally directed form of students physical education. Main task: development of endurance, courage; learn to walk in azimuth; get geographical bearings with a map and a compass, and without it.

Knapsack packing. Reading a topographic map. Choosing a location and setting-up of the tent, starting up bonfire, food preparation.

Overcoming natural obstacles. Providing first aid in case of injury. Training hikes. Hiking in the day offs with a tourist multidiscipline competition.

Professionally applied physical preparation of the welder (PAPP) – a mandatory part of physical education in which exercised: overall physical condition and PAPP during all the years of intensive training and learning at the initial stage of electric welding with visual analyzer disconnection.

PAPP goals – the formation of special professional knowledge, skills, abilities and vital motor skills and physical qualities to ensure the readiness of students for the upcoming work as a welder and military service.

PAPP tasks – constant, purposeful use of physical culture and sports in preparation for professional activities of future welding specialists. It is carried out during all the courses of study for the purpose of quality training for professional activities of welders.

For this purpose are necessary: the development of physical and mental qualities for the chosen profession, motor skills, exercising different sports in extreme methods and conditions, sports advancement of students in the chosen kind of sport; continued participation in the PAPP multidiscipline competition at different levels; fostering patriotism, collectivism, conscious discipline, conscientious attitude to work, study, public property and other qualities; building habits for systematic physical exercises and introduction of participant kinds of physical culture and sports into the life of the students.

The content of the educational material of each section of the experimental program of physical education has a special versatile professional direction and solves the main problem of professional training in course of physical education.

Main sections of physical education stipulate the formation of a culture of health precisely of future electric welders, taking into account the content and features of their professional activities. For this purpose, physical education takes place in the following areas:
1. **Physical education classes**, which contain material of professionally applied physical training of welders, contribute to the development of their physical qualities and psychophysiological functions needed in the labor activities, as well as the formation of motor and applied skills. The PAPP proportion varies depending on the period of study. Its volume for the 1-2 training courses comprises from 30 to 60% of the time, at the third – 50-85%. We plan to increase PAPP gradually. The highest level of the development of professionally important qualities at students should be achieved by the end of the second year. The main objective of the third year is to keep the attained level before the beginning of independent work. For the best development of professionally important qualities of welders in physical education, we use fitness machines and nonstandard multi-bundled gymnastic exercise equipment.

2. **Athletic and recreational activities in training day mode**: conduct an industrial gymnastics (introductory, P.T. breaks).

3. **Extracurricular physical education**: morning exercises; group classes (sections) of the general physical and applied professional training; training in sport and tourist sections given their applied aspect; independent study designed according to PAPP.

4. **Participant sports and tourism activities**: conducted in the days of health and sports, competitions in applied sports, tourism.

PAPP elements are planned from the 1st course from the third lesson, in the amount of 30% of the total lesson time, from the 2nd course – in the amount of 40-60%, and from the 3rd course – 50-70% of the total lesson time. Essential condition for scoring requirements is a participation of future welders in the PAPP competition for such sports as athletic, applied, artistic gymnastics, weightlifting, powerlifting, having professional focus on multidiscipline competitions, basketball, athletics, cross country, table tennis, etc. Specialized classes with professional orientation – is a basis of future welders training and aimed at solving application tasks (applied skills training and their improvement, in-depth development of individual qualities and functions). The idea of teaching using unconventional elements of industrial training methods, accessories and simulators with visual analyzer disconnection (blindfolded), contributes to the rapid development of the labor movement, accelerating the cycle of training at the initial stage of training at higher technical education.
school. All accessories and simulators for training welders have labour-saving certification and introduced in the learning process. Upon that, the student must learn that there are recommended positions of electrodes and vibrational motion schemes of the stump of electrode for different types of welded seams.

The author proposed to split the process into two stages. The first stage is proposed to carry out without operating on the welding equipment with new special equipment. Novelty of this technique is that learning of physical training, extracurricular activities, PAPP and industrial training form student's motor skills and working postures of the welder (position of body, hand movements, especially of the hands and fingers with welding electrode holder and electrode under the visual control and without visual analyzer in future). Gradually teaching the correct electrode motion in different positions of the welded seam (horizontal, vertical, overhead), a teacher on special techniques of the visual analyzer disconnection is seeking quality performance of the simulated seam during the period of seven weeks. The proposed simulator allows welding student with various manipulations of the welding electrode holder and electrode to develop skills and ability to maintain a constant length of the electric arc, holding the electrode at a certain distance from the seam, regardless of the direction of movement of the electrode and its position. Using this simulator can increase the quality of musculo-articular sensitivity of the hand, generate reliable professional motor skills of the welder, improve the quality of education and save energy and materials.

Only then comes the second stage. Complex classes have three, four or more didactic purposes. The main content of classes aimed at students' consolidation of knowledge and acquisition of new knowledge and motor skills for professional training.

We include physical exercises with a professionally oriented application throughout the training year in all kinds of physical conditioning and give on each lesson. Hours with applied orientation for students, who master the profession of the welder, mostly held in the fixed form, developing all the physical qualities, and aimed at improvement of professional competencies and motor functions of the students. To increase the motor density of the lesson and active students involvement we hold it by the method of circuit training, at 10-15 stations with the performance of psychophysiological exercises within the
welder's specialty, on vestibular stability, attention, savvy.

**Discussing the results obtained in the course of the research**

Physical training classes is a main occupation in vocational training. Considering the practical ways of PAPP in educational and training process on example of a specialty of the welder, we offer options for the classes of physical education with a professionally-oriented application in respect to other occupational groups as well.

Mention as an instance one of the complex classes with a professional orientation: 1 year of study, boys, profession of welder. Based on the authors' methodology, the actions of the teacher and students in the classroom are: preparation and installation of tools and equipment for the quality exercises conducting (all installed, and at the end of the execution of each task of the lesson students put off the equipment within 30 seconds — 1,5 minutes maximum) — nonstandard multibundled gymnastic fixed bars, pommel horse, gym mats, sticks, med balls, skipping ropes, carpal expanders, weights, basketballs, eight shaped rope. A gym turns into a sports area. Preparedness of training equipment.

**Purpose:** to develop forces, speed-strength qualities, psychophysical and mental qualities, courage, willpower, work in uncomfortable positions, strength of hand muscle, shoulder girdle and hands, torso, feet, improvement in balance, development of movement coordination, formation of the correct posture, development of overall and strength endurance. Physical education hours are determined that there is a possibility to solve strategic problems of physical culture and professionally applied physical training – providing comprehensive and harmonious development of students, aimed at effective preparation for their chosen profession, working and household activities, military service, etc.

Relatively to all other forms of physical training of students, the classes of physical education have the following advantages:

1) are the most widespread form of organization of the educational process, students systematic training exercise aimed at professional development in the chosen profession;

2) are based on scientifically grounded experimental program of physical education, designed for long-term student learning in their chosen field;

3) are carried out under the guidance of teachers of physical culture and

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sport, taking into account the age and sex and the individual characteristics of students;

4) promote directed professional development and physical training of students for their chosen profession, as well as optimization of their physical condition and health.

**Conclusion**

Distinctive and peculiar feature of the classes of physical culture as a subject of the curriculum of the experimental methodology conducted by a complex method (model) is that it allows for a more efficient development of the physical abilities of students in accordance with state requirements and professional orientation of the educational process. New types of physical training appeared – athletic gymnastics, powerlifting, weightlifting, types of martial arts; new facilities – nonstandard multibundled gymnastic exercise equipment, specialized grip training equipment and special devices, which largely solve the problem of motor skills improving.

Side by side with this, there was some discrepancy between the volume of program material and the number of hours dedicated to study of the subject of physical culture. Making adjustments in the curriculum both in time and by means and methods of teaching, the author of the article has made a training program based solely on the material sport bases and traditions available, best practices acquired throughout many years of teaching practical work at the technical high school. In the context of integrated planning of educational material, the classes are instantiated by its specialization and full-range. We have good material and sports facilities available for quality training, that allows training welders systematically. Introduction of work-improvement suggestions for their training will allow us to save by the most conservative estimate 33% of the funds – electricity, electrodes, metals and most importantly time to teach students. In the initial stages of training it is encouraged to ensure verification of standard of performance of each operation, provided that student learns about the error immediately and quickly corrects the improper operation. It should be kept in mind of the special importance of the initial skill formation. Thus, the effectiveness of the training process using simulators largely depends on proper training and monitoring of the system of skills formation, as well as the influence of control and self-control on its course. When operated at the simulator with welding electrode holder a process of self-
control goes into overdrive, which refers to the conscious evaluation not only of an eventual, but primarily of an intermediate result of own activities, with its subsequent adjustment to ensure consistency with the model result to the required one. We effectively use the means of general and professional applied physical conditioning, the circuit training method and other means, forms and methods to prepare students for their chosen profession. Concurrently, using all the above mentioned arsenal of equipment and devices for preparation of programmed cards with tasks, while on practicing experimental types of physical training and preparation of the various versions of the classes, one can always achieve high density of the classes and high quality of young workers training, creating a health culture.

References

8. Malyarchuk, N.N. (2009), "Health culture of educators as an essential condition for the preservation of students' health" ["Kul'tura zdorov'ya pedagogov kak vazhneishee uslovie sokhraneniya zdorov'ya uchashchikhsya"], Nachal'naya shkola plyus do i posle, No. 7, pp. 91-93.

Авторская экспериментальная программа формирования культуры здоровья у будущих электросварщиков в процессе профессиональной подготовки

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Аннотация
В статье раскрываются вопросы формирования основ культуры здоровья у будущих электросварщиков на основании углублённой психофизиологической профессионально-направленной подготовки физического и спортивного воспитания, а также обоснования и реализации специальных организационно-педагогических условий её формирования.

Ключевые слова
Учащиеся-электросварщики, сохранение и укрепление здоровья, содействие правильному формированию, всестороннее развитие организма, поддержание высокой работоспособности, дальнейшая производственная деятельность, бытовая жизнь, культура здоровья, физическое воспитание.

Библиография


