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OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2023 Issue: 01 Volume: 117

Published: 15.01.2023 <http://T-Science.org>

Issue



Article



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EDUCATIONAL TECHNOPARK AS AN INNOVATIVE PLATFORM FOR TRAINING QUALIFIED WELDERS

Abstract: An idea of the educational technopark created in classrooms, laboratories and workshops of the Vladimir Industrial College is given in the article. The methodology of the educational process of training welders (manual and partially mechanized welding) in the laboratory and production conditions of the College was described.

Key words: welding, educational technopark, simulator, traineeship.

Language: English

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Citation: Chemezov, D., et al. (2023). Educational technopark as an innovative platform for training qualified welders. *ISJ Theoretical & Applied Science*, 01 (117), 427-431.

Soi: <http://s-o-i.org/1.1/TAS-01-117-27> **Doi:**  <https://dx.doi.org/10.15863/TAS.2023.01.117.27>
Scopus ASCC: 3304.

Introduction

High competition in the labor market of any state, associated with the search for highly qualified specialists to work on modern equipment by the employer, leads to the introduction of additional elements of innovative technologies in the educational process. This is especially true in the conditions of training specialists for various industries.

The Vladimir Industrial College (the Vladimir region, Russia) provides training in various professions and specialties, including the profession of 15.01.05 Welder (manual and partially mechanized welding (surfacing)) in accordance with the Federal State Educational Standard [1]. The professional training cycle, consisting of several professional modules, is implemented on the material and technical basis of the College. The material and technical base of the College includes technological equipment located in classrooms, laboratories and workshops.

The Vladimir Industrial College interacts with manufacturing enterprises of strategic and competitive sectors of the economy of the Vladimir region. This interaction led to the creation of an innovative educational technopark. Achievement of the goal of the educational technopark was carried out in three stages: analytical-prognostic, activity-based and effective. Each stage provided for the solution of the tasks. The main tasks were the modernization of the material and technical base of the College, the creation of educational and methodological complexes for e-learning, the accreditation of platforms for demonstration exams and regional WorldSkills championships, the creation of dual training infrastructure, etc. The mechanisms for implementing the social partnership of the educational technopark and employers included the following areas of activity: *education* (Administration of the Vladimir Region, Vladimir Institute for Education Development), *science* (Vladimir State University, "Volgabas") and *production* (Scientific and Production Complex "Avtopribor", Vladimir Production Association "Tochmash", "Stavrovsky plant of automotive equipment"). The history of the creation of technoparks in Russia and abroad, as well as the experience of implementing educational technoparks in other educational institutions can be found in the works [2-10].

The goal of this article is to analyze the effectiveness of functioning of the educational technopark of the Vladimir Industrial College by the example of training students and trainees of traineeship programs in the profession of 15.01.05 Welder (manual and partially mechanized welding (surfacing)).

Training on the simulator

Training begins with theory in the specially equipped classroom. The material is presented in a lecture form with elements of multimedia technologies and demonstrations of real welded parts.

Consolidation of theoretical knowledge is carried out on the "Tekri Welding" virtual welding simulator (the "Tekri" company, Republic of Kazakhstan). The interactive welder simulator is designed for students to acquire motor skills in a virtual environment when working on welding equipment. The following options are available: manual arc welding, semi-automatic welding, argon arc welding, gas welding, multimedia demonstration and testing. The general view of the simulator for training the welding process and the window for setting welding modes are shown in the Fig. 1.

The simulator includes the following components: a welding holder, a welder's helmet with video glasses working in 3D mode, a number of blanks for simulating welding and a wireless keyboard. The selection of modes is carried out on the simulator display. The virtual instructor points out mistakes and corrects actions. The simulator has high efficiency, i.e. real materials, special clothing, range hood and disposal are not required.

The Figure 2 shows a fragment of a gas welding master class in simulation mode, performed by lecturer Tatyana Komarova. The following conditions were accepted for welding: chameleon protective helmet, semi-automatic holder, type of welding machine – Universal, current – 100 A, T-bar and butt joints of steel plates, location – welding shop. After completing the exercise, the results are displayed on the simulator screen. The results are evaluated by the points obtained for each performed parameter of the welding process, such as welding speed, deviation from the path, longitudinal and transverse angles and arc length. The welding time on the simulator and the final score are also displayed. The results of welding on the simulator are shown in the Fig. 3.

Training on industrial equipment in the workshop

Practical skills are worked out in the production conditions in the workshop on the skill of "Welding technologies", created within the framework of the federal project ("Young Professionals"). In 2022, a traineeship was carried out in the workshop for teaching staff implementing educational programs of secondary vocational education, ensuring the implementation of the activities of the federal project ("Professionalism") in the field of mechanical engineering on the skill of "Welding Technologies".

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Trainees from the Kursk Assembly College, the Far Eastern Shipbuilding College and the Regional Rail College were invited to the traineeship at the Vladimir Industrial College. In a few days, trainees got acquainted with the safety procedures for performing

work in the workshop, with technological equipment and performed tasks of varying complexity on it. Trainees who came for the traineeship are depicted in the Fig. 4.

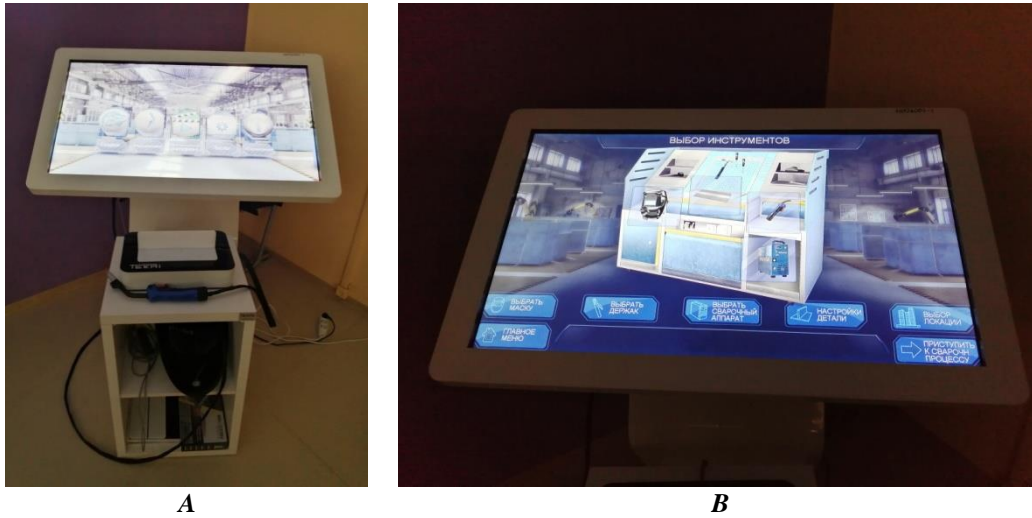


Figure 1. *A* – the general view of the simulator, *B* – the window for setting welding modes.

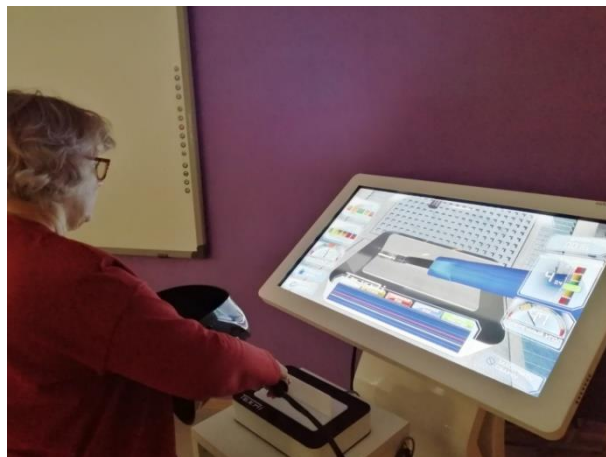


Figure 2. Imitation of welding is performed by Tatyana Komarova.

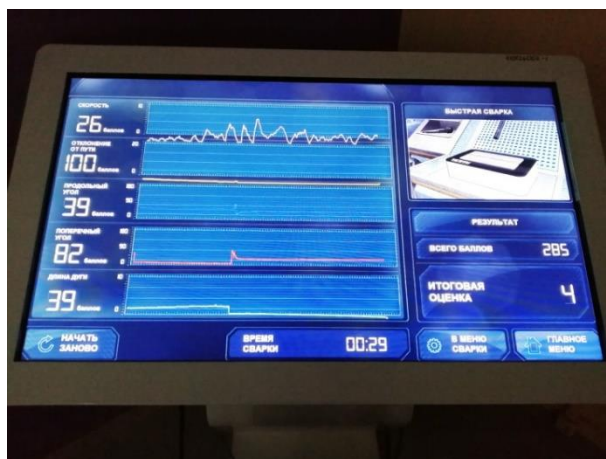


Figure 3. Welding results on the simulator.

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The welding station of the workshop is presented in the Fig. 5. The welding process is carried out on technological equipment (the Fig. 6). The main technological equipment in the workshop is the MasterTig MLS 2300 ACDC welding system (Finland). The Kemppi MasterTig MLS™ ACDC welding machine is designed for industrial production for welding with a non-melting tungsten electrode (TIG method), with characteristics developed

especially for welding aluminum and stainless steel. Equipment consists of a power supply, a control panel and a welding torch.

The final attestation of trainees took place in the form of the demonstration exam. One of the trainees performs the practical task in the Fig. 7. Students of the Vladimir Industrial College undergo a similar extended training program.



Figure 4. Trainees studying in the advanced training program.



Figure 5. Welding station in the workshop.



A



B

Figure 6. A – the general view of the welding system, B – the panel for setting welding modes.

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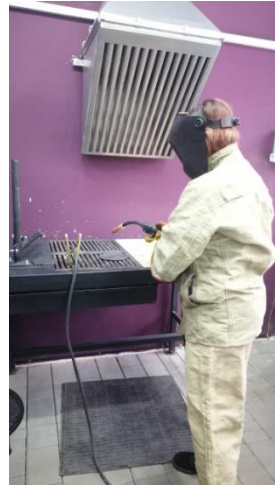


Figure 7. Task execution by the trainee.

Conclusion

The implemented project ("Educational technopark") provides quality and comprehensive training of highly qualified specialists in the profession of 15.01.05 Welder (manual and partially mechanized welding (surfacing)) on modern equipment. The joint cooperation of the College with resource centers in the field of education and

industrial enterprises makes it possible to effectively design educational and methodological documentation and implement modern equipment for training students and lecturers of educational institutions and consider graduate candidates for employment in accordance with the qualification obtained.

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