Online information service for training in Industry 4.0 technologies

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Abstract. A new element of the information service in the field of technical training of specialists for Industry 4.0 is an online platform that implements distance forms of e-learning for specialists. An online learning service is an interactive transdisciplinary infrastructure that accumulates knowledge in demand by the intellectual industry. The information potential of the online learning service allows students to create curricula based on an arbitrary sequence of studying theoretical disciplines. The designer of professional courses ensures the structuring of content and its presentation to the listener in informational forms that cause maximum involvement of students in the disciplines studied. The online training information service contains methods and scenarios based on generally recognized world practices and adapting the trajectories of individual training of specialists to modern industry requirements. A scheme of an online information service for training technical specialists for Industry 4.0 based on network technologies of interaction between the listener and educational content is proposed. It is shown that online training services form an informational competitive environment that integrates the resources of private business, state educational institutions, scientific, industrial and academic communities.

1. Introduction

Technological challenges of our time have determined new trends in the development of the market for technical teaching aids, focused on the needs of advanced industry [1]. The model of training a promising specialist provides for a personalized approach to mastering educational materials and is based on the symbiosis of the existing educational groundwork and new tools for distance coaching [2, 3].

Alternative educational formats and remote informative technologies led to creation of a mixed education form, which may propose [4, 5]:

- a student will take theoretical disciplines inside an educational company or from an online electronic platform;
- a student will take some practical tasks in a real production with a super modern equipment
An industrialized approach implementation in ways how to configure the specialist competences profile is a promising joint initiative of the State and a business directed to develop global educational environment to target some pilot projects of technical parks creation specialized in technical education [6, 7]. The technical parks entrepreneur activity with all necessary resources helps to integrate classical and digital education technologies and the technological online platforms content placed in the virtual space [8].

Online platforms are an effective solution for a scaled rating of best tutorial practices and educational content mass distribution having its necessary immersive level among wide population layers [9, 10]. Online platforms provide a centralized approach for a listener from a single content provider to some educational services market system players, which may guarantee the necessary industry knowledge quality [11, 12].

Business interests to create an online platform include a possibility to make some commercial profit with some private electronic educational courses being placed as a technical park digital resource like open access educational applications [13, 14].

The State investments into business education advanced technologies create the necessary base to form some national and international laws to justify the digital educative diplomas globally. An interactive educational environment is a driver to develop the digital economy and to provide the law regulation [15, 16]:

- online platform educational content listener digital passport;
- worker or student digital profile (case) who wants to be employed or enrolled into a high school;
- civilian digital signature who wants to receive a State or a private educational service;
- a digital contract which is a legitimate form of an educational service reception credit contract.

The interaction of the state and business in the educational aspect makes it possible to create multidisciplinary centers of competence that support interdisciplinary models of mastering technological knowledge that are relevant for modern industry [17, 18].

2. Principles of functioning of online educational information services
Cyber-manufacturing Industry 4.0 is based on unique forms of human interaction with advanced technologies and equipment. Industrially developed countries today make great efforts to implement totally innovative methods and means into the industry to manufacture mass consumption goods. The obsolete production resources of business companies are being replaced by new generation cyber-machines, which leads to the problems of an increased need for industry in qualified personnel with competencies in digital technologies.

Technological solutions offered by international consortia to the markets of developing countries have limited opportunities for traditional methods of training specialists in relevant industrial areas. The leading role to transform the educational system in practice is for new educational standards to provide individual trajectories to grasp the content by the students. Individualization of the technology for training specialists corresponds to the ideology of product customization, adopted for the «education as a service» paradigm.

At the present stage, the project system for training specialists should provide for the implementation of two parallel approaches [19]:

- to prepare new specialist in high and medium special education in the Industry 4.0 relevant directions;
- to adapt specialist knowledge into a system of additional professional education who were employed for a long time in the Industry 3.0 companies and who want to receive some new competences (to improve qualification) in the field of cyber-production.
The State importance to solve the problem to provide the qualified industrial cadres is the government participation in co-financing of the specialized educational online platforms creation digital projects. Ways to support could be target subsidiary (a development grant) or a State order to prepare cyber-technology and intellectual production specialists.

The value of online information platforms lies in providing the population with an accessible educational environment that provides the competence of specialists in all areas of production. Comprehensive and high-quality training of specialists will allow developing countries to make a technological breakthrough in backbone industries, guaranteeing the progressive development of industry.

The online platform application significance is for its resource educative support for young specialists and students start-ups, which have some innovative ideas into cyber-production technologies. Large companies interested in innovation, through a system of business accelerators, will be able to identify and promote competitive youth projects to the high-tech market at the stage of seed financing, which, ultimately, will form a favorable business environment for entrepreneurial activity of the general population.

3. Information online educational service
The new training standards for specialists are based on adaptive methods and involve the formation of a competency profile containing basic and additional knowledge. In the context of Industry 4.0, the basic knowledge of specialists corresponds to the digital culture of cyber-production, and the additional knowledge of specialists corresponds to cyber-technologies. The filling of the competence profile of a specialist is ensured by the development of educational cases provided by the information services of online platforms by students in an interactive mode.

![Diagram of interaction between the listener and the online information platform with educational content](image-url)

**Figure 1.** A scheme of interaction between the listener and the online information platform with educational content.
Educational cases implement the best pedagogical practices and carry out the comprehensive development of specialists in a specific area of cyber-production. Online platforms provide educational services to learners that contain content developed jointly by industry and academic professionals. The scheme of interaction between the listener and the online information platform with educational content based on network interaction technologies is shown in figure 1.

To evaluate the education quality into an online educative environment is based on some interactive ready test task for students and passing results are to confirm a complex of formed competences. The positive results of test passing is a digital certificate. The student net interaction with online platform resources is a new system element to prepare specialists to make an educative environment more perfect and to provide new private investments into the knowledge industry.

The participation of private capitals into an educative project has an ambivalent character. From one hand a private business shows an increased specialist interests with fundamental and applicative knowledge to provide a worker with competitive advantages in the labor market. From other hand there are business society interests, which sometimes contradict the State interests to maintain educative programs. Vacant places in commercial companies correspond the personnel competences profile for a particular employer. In the same time the State maintain the specialist preparation which competences correspond a system of qualified requirements and norms formed by an expert educative society for an «average» employer.

To take away the interest contradiction between a private business and the State in the question of specialist professional competences formation is done by independent testing tools which is organized by specialized competences centers, which are established by businesses and accredited (licensed) by the State. Self-organization of participants in the educational process is the key to the successful training of competent personnel for the industrial labor market.

Correction of educational approaches to the training of promising specialists and the variety of educational content are the basis for teaching the population new professions focused on the innovative industry. In the new production environment, the cognitive abilities, knowledge and intelligence of a specialist are identified with high-tech tools for digital modeling and product manufacturing.

The creation of end-to-end information technologies for the formation of various models of professional competencies of specialists based on media resources is a key factor in ensuring the availability of knowledge, focusing the attention of workers, business and the state on the problems of reforming existing education systems to meet the current challenges of Industry 4.0. The strategic role of knowledge in the era of cyber-production serves as an incentive for the development of mobile educational online platforms that support effective interaction between the state and business and level social inequality of the population. The focus on innovation allows people with disabilities to be involved in high-tech business, who perform remote work to control cyber-production based on the knowledge gained in the information online educational environment.

4. Conclusion
Technological resources for the creation of new and development of existing projects in industry are professionally trained personnel who have the competencies for the effective operation of the latest equipment. Personnel challenges, inspired by large-scale transformations of technological models, necessitate the development of advanced information technologies that provide advanced technical training for the population in blue-collar and engineering professions related to cyber-production.

The essence of the new approach to improving the competence of industrial workers is to train the workforce through the introduction of the best pedagogical solutions that meet the world standards of Industry 4.0. Support for new educational tools based on online information services provides for a number of transformations in the knowledge industry, including:

- educative management modernization to provide new type corporative culture establishment which development factor is worker motivation to receive additional professional competences;
- to make actual the immersive educative technologies oriented for listeners personalized adaptive
education in traditional disciplines and ones for new occupation;
• to make digital the educative infrastructure, which require to create a co-action ecosystem to make the population qualification higher which functions with net technologies;
• to synchronize educative content (educative plans and disciplines content and structure) to provide the competence correspondence for student formation, which are required by the employer in the current economic situation;
• educative business concerns collaboration to integrate multi-disciplinary knowledge and entrepreneur efforts (resources) to develop economically in parallel some poly-sectoral regions and to stimulate some consumer demand markets;
• to standardize educative certificates (documents) to provide its international recognition in the specialists competences digital profiles labor markets which are formed after an electronic education;
• to mobilize educative environment for communication mobile technical means scaled support using which the student may access the online platform ecosystem and to study the educative materials;
• to probe the current educative competences, which the student acquire after new knowledge grasp in the work places in the advanced industrial companies (studying in direct contact with a cyber-production);
• to socialize listener educative cases to develop the specialist cognitive abilities to secure the good inter-persons communication in the work society for the student and other.

The potential for the development of information technologies in the training of industrial workers today is the subject of discussion of specialized specialists who speak at international forums and offer their own versions of concepts for the transformation of national educational systems. A key component that ensures the interface between information technology and Industry 4.0 is the updated legislation that regulates the legal aspects of the use of digital online services in industry.

Acknowledgments
This article was prepared with the Financial support of the Ministry of Science and Higher Education of the Russian Federation under the agreement No 075-15-2019-1707 from 22.11.2019 (identifier RFMEFI60519X0189, internal number 05.605.21.0189).

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