

# СИСТЕМА ОБРАЗОВАНИЯ: ПРОБЛЕМЫ И ПУТИ МОДЕРНИЗАЦИИ

RESEARCH ARTICLE

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## Non-formal education resources for the “professions of the future”

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**Abstract.** This article reveals the opportunities and limitations of non-formal education for mastering professions of the future. The authors note that the transition to high-technology economy is accompanied by the rapid development of new areas of work. The dynamics of the modern world requires a quick response, the need for constant updating of knowledge and skills is growing, the importance of formal diplomas in the labor market is decreasing (inflation of credentialism), and the role of non-formal education is increasing. The purpose of the research presented in this article is to identify promising areas of professional activity in a high-tech economy and the potential of non-formal education for mastering the professions of the future. The authors conducted a qualitative content analysis of job search sites, illustrating the indicators of demand for the professions of the future in different countries, the key skills required for these professions, the resources of formal and non-formal education for mastering these professions. An empirical study was carried out using the survey method (N = 1388, the age of the respondents was from 18 to 80 years old, data analysis was made by using SPSS), conducted in Russia, revealing involvement in non-formal education. The novelty of the study derives from the role of non-formal education, which prevails in mastering the professions of the future: the absolute majority (85%) use non-formal education for retraining, gaining knowledge in related fields. According to the results of the

study, it was found that the range of professions of the future reflects uneven post-industrial transition in different countries, in Russia the role of non-formal education as an element of life-long learning is rising. The authors conclude that the labor market, where the professions of the future are represented, will not be characterized by credentialism; individual learning paths based on non-formal education will dominate in mastering these professions.

**Keywords:** professions of the future, non-formal education, labor market, educational resources, employers, skills, professions in demand, sociology of education.

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## INTRODUCTION

Ratings of new demanded and highly paid professions appear annually. The modern scientific and public discourse contains lists of professions that will be relevant in 5, 10, 15 years' time, particularly for the X, Y, and Z generations — those who continue their professional careers or who are at the very beginning of their careers [5]. The key characteristics of the modern world — the changing conditions of the world economy, political shifts, the development of new areas of science and technology, the transition to a high-technology society — complicate the process of long-term planning, including the choice of professions and activities.

"Professions of the future" is a term referring to a set of professions emerging in the labor market mainly due to the transition to a high-technology economy based on knowledge with appropriate market infrastructure. Other reasons include introduction of new digital technologies and significant renewal of employees' functions within positions that formally retain their former names. Today, relatively new areas of work are developing at a high pace. Many professions are losing their relevance even before they gain popularity and become in demand.

To study the professions of the future and the potential for mastering them is equally important for the scientific community and professional environment, government agencies and international organizations, such as the UN, ILO, and OECD. The main approaches to studying the new labor market include discussing what professions will look like in the future, what conditions obtaining them will require, what skills are necessary to master them and, most

importantly, how the system of life-long learning should be structured to provide an opportunity for a person to gain, retrain or improve their knowledge and skills. Educational institutions are trying to build a marketing policy based on the list of "professions of the future" and to attract applicants; corporate companies are actively pursuing diversification of business processes, introducing new areas of professional activity in practice; countries aiming at economic development and global competitiveness are taking measures to advance the development of human capital at the national level.

Changing conditions and rules in the labor market force students and employees to adapt to professions of the future. Workers with so-called "horizontal" skills are valued first — those who are able to adapt quickly to the changing professional environment, cope with a large volume of tasks and have entrepreneurial initiative [25, p. 37]. It is clear that, due to the general automation and digitalization, some jobs will disappear, and entirely new professions that are not taught in higher education institutions will emerge [29]. Talking about modern education, the American physicist Michio Kaku notes that the current educational system trains specialists of the past. "We teach them to do the job that no longer exists and provide them with intellectual tools that have long been ineffective. That is why there is so much unemployment in the world" [23].

The COVID-19 pandemic, with many educational courses going online, has shown that the formal educational system is rigid and unable to quickly adjust to new conditions, especially in Russia [41]. It turns

out that the speed of learning required skills can be increased only in non-formal education, which has long been used for swift mastering specific skills.

In training for professions of the future, non-formal education has other advantages. Since it is based on voluntary participation and learner-centered principles, it can be used in various educational environments and situations [16, 38]. Non-formal education is available to a wide range of learners, and Gen X-ers and Millennials already receive more than a third of their knowledge and skills through non-formal learning [21, p. 4]. In the professional environment, non-formal education becomes a major resource in cross-training and multi-skilling paths [40].

The purpose of the article is to identify and analyze promising areas of professional activity in the economy of a new technological mode (knowledge economy), which can be considered “professions of the future”, to determine the potential of non-formal education in training for professions of the future, and study public participation in non-formal education.

### THEORETICAL FRAMING

The concept of structuration was chosen as a broad theoretical framework for the study of the category of “profession” [12]. It allows us to look at the emergence of new professions as a social process where professions of different qualification levels appear and are institutionalized (fixed in rules and regulations, standards and procedures). To understand the potential of non-formal education for professional training, we have relied on the provisions of the theory of credentialism formulated by David K. Brown. According to him, formal credentials are an abstract expression of the actual knowledge of credential holders whose competence may be questioned by employers, and we can raise the research question whether formal education is most effective in training for professions of the future [6].

Categorizing “professions of the future”, we have relied on the theoretical developments by Jens Rasmussen, who proposed the division of all professions according to the complexity of the tasks into three levels: skills, rules, knowledge framework [15, 29]. Professions in the “Skills” category include repetitive

typical tasks, mainly manual labor. Preparation for such professions does not require long-term training, as a rule, training is possible right at the workplace, for mastering the required skills, a short training cycle is sufficient. Professions of the “Rule” category represent the execution of routine, technical tasks, decisions are made mainly within the framework of the given instructions and rules, therefore, special professional training is required to master these rules (examples of such professions can be nurses, accountants, office administrators). Professions in the “Knowledge” category imply analytical work, creative solution of non-standard problems, and have high autonomy in decision-making. Such professions require a long training cycle, a high level of education and a broad outlook (examples of such professions are doctors and engineers, scientists, managers).

Within this article, “professions of the future” will be understood mainly as professions of Knowledge, which are in demand in high-technology society [3, 27, 28]. These are promising areas, professions of tomorrow, which are based on completely new skills and abilities, associated with the use of the latest technologies. We will interpret non-formal education in accordance with the International Standard Classification of Education — “education that is institutionalized, purposeful, planned by a person or organization that provides educational services. The defining characteristic of non-formal education is that it is a complement and/or alternative to formal education in life-long learning” [19, p. 11]. It is implemented in the form of short-term courses, master classes and seminars, not always accompanied by the issuance of a certificate based on the results of training. The research methodology of non-formal education is based on the principles of the activity approach (M. Weber, T. Parsons), which allows to consider social phenomena and processes from the point of view of the structure of activity. The respondents were considered as actors involved in social interaction within the framework of non-formal education; when analyzing the results, the intensity of their activity, motivation and other characteristics of the activity process were assessed. The systematic approach and the concept of lifelong learning (life-long learning), in which formal and

non-formal education are considered as full-fledged elements of the educational system, were also used as methodological basis.

### **Defining professionalization and non-formal education**

The theoretical analysis regards the category of “profession” mainly at the personal level as a kind of work, occupation, defined by the division of labor and its functions. From the point of view of the social structure, “profession” should be understood as a large group of people (professional group) united by their common labor activity [1].

Traditional and new models of professionalization have been determined in order to analyze the current situation where new professions emerge as social practices. The research uses an integrated approach to the concept of professionalization, combining the definitions given by the National Research Council (USA) [26, p. 15]. On the one hand, it is a combination of training and other activities that allows an employee to become a professional. On the other hand, professionalization refers to social processes through which an occupation becomes “profession”.

Historically, the transition to a knowledge-based high-technology society has significantly changed the models of professionalization — the process of mastering professional skills, their application in the labor market. Until the late 19<sup>th</sup> century, an employee’s professional development was determined by their environment, social status and innate abilities. In the 20<sup>th</sup> century, vocational training was provided by mass education. The 21<sup>st</sup> century brought cardinal changes to the professional sphere — there are more and more professions that are not taught in the formal education system: educational institutions do not keep pace with market trends, since it takes time to accredit a new specialty at a university or college.

Changes in the process of professionalization are featured so that, firstly, according to Sparks and Hirsh, the emphasis has shifted from the development of an individual to the development of an individual in an organization, in the corporate environment [33]. Then, the focus in the educational environment has shifted to the needs and academic

results of the learner. The gap between learning and practical skills required for the profession has also reduced. In addition, it becomes obvious that there is a need for training not only general professional skills, but also specific non-formal skills that an employee will need to build a successful career.

These qualitative changes have a positive effect on the employee’s capabilities: they make it possible to master new skills and to continue personal development. However, they are more related to the system of corporate and life-long learning, more focused on non-formal education. Non-formal education dominates more and more in new models of professionalization, with less and less formal education.

Non-formal education is a component of life-long learning along with formal and informal education (self-education) [10, p. 8]. It occurs outside educational institutions and does not always provide a certificate at the end of training but allows for the use of new principles: learning by doing, peer-to-peer learning, and the latest VR and AR driven learning. The peculiarity of non-formal education is that it does not formally assign a qualification for a certain type of work but enables you to acquire a new combination of advanced knowledge and skills necessary for professions of the future. The attitude of the individual and the system to non-formal education has changed — nowadays the share of non-formal education in life-long learning tends to increase.

### **METHODOLOGY**

This study investigates the key and most demanded professions of the future, as well as the potential of non-formal education in training for such professions.

Thus, we pursued answering the following research questions:

- Which professions of the future are in demand in the global labor market?
- Where and how can one obtain knowledge and skills to train for future professions in demand?
- What skills are needed for new professions and is there a demand for these skills in the labor market?
- How can non-formal education ensure advanced professional development?

To answer these questions, we conducted a comprehensive study.

### **Data collection and analysis**

Several research methods were applied to collection of the data. Triangulation of methods — a combination of quantitative and qualitative approaches in studying the object of research — made it possible to combine scales (international, national, institutional, personal) and consider the positions of different actors: employers and individuals/applicants. This resulted in a comprehensive study of the social structure and agents included in non-formal education and mastering professions of the future.

Sociological research was carried out using two methods: qualitative content analysis and a questionnaire survey. The information base for the content analysis consisted of 30 job search resources — Internet recruiting sites, which present openings of employers. The content analysis procedure included the selection of the category of analysis — professional areas in which certain requirements for professional activities based on the latest technologies have already developed — we called such professional areas “professions of the future”. As a result of selecting sites (for the keywords “professions of the future”, “list of professions of the future”), 10 sites with information materials about these professions were selected. The units of analysis were the names of professions that can be attributed to this category. The units of account coincided with the units of analysis — a selection of job openings that most closely corresponded to the category of “profession of the future” was carried out. The implemented content analysis made it possible to provide an overview of the labor market and professions of the future in Russia and in the world, to determine the core of these professions (a set of key skills necessary for the professions of tomorrow), as well as educational resources that allow to master them.

At the second stage, the research team conducted a questionnaire survey aimed at assessing non-formal education as a resource for mastering the professions of the future. The survey was carried out through “Survey Monkey” by sending the questionnaire link to the respondents. The access settings

allowed us to set a limit on filling only one questionnaire from one device, eliminating the possibility of multiple completion of the questionnaire. We designated mandatory questions to be answered by the respondent. As a result, the share of partially completed questionnaires is reduced to zero.

The survey was conducted in the Tyumen Region (Russian Federation) from March 30 to May 11, 2020 among the respondents aged 18 to 80. The sample type is a quota sample with the respondents represented by age and gender. The survey completed and the empirical data obtained (N = 1,388). In order to increase the representativeness, the sample was evaluated by the variable “respondent’s gender” assisted by SPSS Statistics 23, the data were analyzed in this program. With the help of the survey, we were able to identify the participation in non-formal education, the frequency of educational practices, key skills and the opportunity of their application in professions of the future.

## **RESULTS AND DISCUSSION**

### **Broad overview of the labor market and professions of the future**

A qualitative content analysis has been carried out to identify the promising professions of the future. The chosen countries demonstrate different rates of post-industrial transition and the emergence of new industries and professions. In these countries we selected job search websites as well as educational and employment resources with their own analytics and interviews with career and entrepreneurship experts.

The data presented in analytical articles and interviews with experts do not only broadcast the policy of the website, but also reflect a prospective future demand in the global and local labor markets. According to the experts, these very professions will be in demand in the specified planning horizon. Expert assessments do not only set trends, but also help to navigate in the world of future professions, accelerate adaptation, and assist future job applicants — school pupils and university students — to identify key skills for the future profession, choose their educational and professional development paths. The data presented in Table 1 illustrate the professions of the future in demand in different countries and the potential demand in the labor market.



Table 1. Expected professions of the future in the different countries

Таблица 1. Прогнозируемые в различных странах профессии будущего

Country	Job site	Professions of the future
<b>USA</b> (planned time-frame — 2030)	<b>Salary.com</b> The leading consumer and enterprise resource for compensation data, software, consulting, and education, also helps organizations attract and retain top talent [31]	Healthcare, IT professionals (programmers, security specialists, and administrators), alternative energy professionals, international law professionals, content creator, marketing professional, financial analyst
<b>Australia</b> (planned time-frame — 2025)	<b>SEEK</b> The Group encompasses a strong international portfolio of employment and education businesses and is a market leader in online employment marketplaces, with deep and rich insights into the future of work [32]	Data specialist, food chemist, foetal medicine specialist, front-end developer, nursing and care professions
<b>Ireland</b> (planned time-frame — 2035)	<b>CareerAddict</b> One of the world's leading resources for career development	School teacher, nurse, software developer, physiotherapist, information/computer systems analyst, doctor, app developer, data analyst, engineer, plumber, artist
<b>Singapore</b> (planned time-frame — 2025)	<b>JobStreet</b> Asia's leading online employment site. Facilitates the negotiation and exchange of information on job opportunities between job seekers and employers in Malaysia, the Philippines, Singapore, Indonesia and Vietnam [22]	Software developer, computer system analyst, marketing researcher, medical technicians, physical therapist, workplace ergonomic expert, sales and marketing specialist, customer service representative, education and training jobs, accountant auditor
<b>Turkey</b> (planned time-frame — not indicated)	<b>Work Study in Turkey</b> Association was established to serve issues such as presenting the capabilities of Turkish education system in domestic and international related areas [39]	Drone driver, urban farmer, 3D food printer, garbage designer, rewilding, nostalgist, augmented reality architect, telesurgeon, alternative currency speculator, digital death manager
<b>Malaysia</b> (planned time-frame — not indicated)	<b>Career Advisor Sdn Bhd</b> A part of the BAC Education Group aimed to create future leaders equipped with skills and the mindset to compete with the best in class globally [8]	Data scientist, user experience (UX) designer, full stack engineer, drive test engineer, content writer
<b>Russia</b> (planned time-frame — 2035)	<b>HeadHunter</b> The largest Russian internet recruitment company developing business in Russia, Belarus, Kazakhstan and Ukraine [13]	Biological engineer, biopharmacologist, bioinformatics scientist, smart environment designer, robotics specialist, cybersecurity specialist, alternative energy professional, neuropsychologist, 3D printing engineer, virtual reality architect and designer
<b>India</b> (planned time-frame — not indicated)	<b>India Employer Forum</b> An independent website aimed to discuss employment and labor legislations. It also represents a resource website for the employers in India [17]	Artificial intelligence (AI) professionals, algorithms and data professionals



Post-industrial countries (USA, Australia, Ireland) present the main professions of the future from both high-technology industries, e.g., ICT, medicine, and innovation in food, and traditional professions from service industry, which will still be in demand in the future. The newly industrialized first wave countries (Singapore) forecast that Health Care and Social Assistance Industries, Retail, Accommodation and Food Services, Administrative and Support, Waste Management and Remediation Services will account for the largest share of future employment. Expectations from the labor market of the future in the newly industrialized second wave countries come down to the fact that artificial intelligence will replace many present jobs; anything related to data analytics, information technology and robotics are good fields to venture into. Experts in the newly industrialized third wave countries (Turkey) predict that 60% of employment in the next 10 years has not even been invented yet, with jobs related to new currency circulation and housing management included in the range of professions of the future [39]. Russia, as a country of the industrial semi-periphery, has high expectations for professions in the digital, biological and energy fields. In developing countries (India) experts favor the increasing role of artificial intelligence in everyday life and related changes in the labor market. It is important that Indian experts point out a paradigm shift in HR in the future, and they see creating micro cultures within an organization, developing leaders with fungible skill sets among the main trends. Job roles will be personalized and bespoke in the future taking into account the interest areas of an employee [16].

The theoretical analysis of the primary data, presented in the public domain, identified a number of “professions of the future” that are only emerging in Russia, but are already present in countries with developed knowledge-driven economies (Table 1). In Table 2, we have identified key skills and competencies, and chosen educational resources that help to master these professions.

The data presented in Table 2 show that, firstly, a set of necessary skills has been defined for new professions, and secondly, the formal educational sys-

tem is no longer the only source of knowledge and skills for these professions.

As for the key skills (the core of a profession), they are mainly professional and highly specialized skills. However, the professional and scientific community predicts a shift in the soft skills for future employees. Current forecasts of educational organizations, large companies, employers and researchers for 2025-2030 show that some old skills are losing their power in the market, while many new skills are the source of outsized advantage. These are the primarily emotive (ability to understand motivations, navigate different personality types, emotional intelligence), process-related (resolving complex problems, critical thought, decision making/judgment, fluency of ideas, learning strategies) and communication skills (visualizing and improving conversational flow, deep understanding of and cultural attunement to languages or dialects), openness, and imagination [7, 9, 11, 14].

As for the second aspect — educational resources — there already exist special sites for many future professions where the necessary skills can be trained. At the same time, as Table 2 shows, the formal educational system is no longer a preferred source of knowledge and skills: today it is possible to learn a profession in a higher educational institution or college and also through open courses, either free of charge or for some payment. Despite the fact that institutions of higher (formal) education declare their willingness to teach such professions, it is important to understand that real skills and experience can be taught only in practice, so non-formal education is far superior to formal education in terms of relevant advanced skills. Workshops and hackathons, seeing experts in the Meet-up mode, master classes and intensive courses provide interaction on non-formal communication and education platforms. They are a powerful tool for professionalization and hand-to-hand skill training. The value of such non-formal education is that it allows one to build an individual educational path, learn the necessary skills for their current and future professional activities.

The wages of highly qualified employees in these areas of professional activity in the world and in Russia indicate a real demand for these professions

Table 2. Key skills of professions of the future and educational resources  
Таблица 2. Ключевые компетенции профессий будущего и образовательные ресурсы

Profession of the future	Key Skills	Educational resources	
		Non-formal	Formal
<b>Data Analyst</b>	Data Analysis, SQL and statistical analysis; database Management & Reporting; Microsoft Excel	<b>Russia:</b> Netology.ru, Praktikum.yandex.ru, Sphere.mail.ru <b>World:</b> HarvardX, IBM, Microsoft	<b>Russia:</b> Data Analyst (Certificate) National Research University Higher School of Economics; MS Big data and Machine learning, ITMO University <b>World:</b> MS Computer and Information Sciences, Western Governors University (USA); MS Computer and Information Sciences, Indiana University (USA); MS Data Science, The University of Western Australia (Australia)
<b>Urban Farmer</b>	Backgrounds in botany, horticulture, traditional agriculture, and engineering; organizational and management skills; life-long learner	<b>Russia:</b> Urbanieco.com <b>World:</b> Urbanfarm.org, Theurbanfarmer.co	<b>Russia:</b> – <b>World:</b> DC Master Gardener Program, University of the District of Columbia (USA); Horticulture (MS) with Urban Food Systems Emphasis, Kansas State University (USA)
<b>Full Stack Engineer</b>	HTML/CSS; JavaScript; Git and GitHub; back-end languages; Web architecture; HTTP and REST; database storage; basic design skills; NPM; soft skills	<b>Russia:</b> GeekBrains.ru, Skillbox, Itproger.com <b>World:</b> Udemy.com	<b>Russia:</b> – <b>World:</b> BS/MS Engineering, Stanford University (USA); BS/MS Engineering, Harvard University (USA); BS/MS Engineering, University of Pennsylvania (USA); MS of Engineering, Information Technology, JAMK University of Applied Sciences (Finland)
<b>Alternative Energy Engineer</b>	General understanding of the energy market, knowledge of relevant legislation surrounding energy efficiency and carbon emissions; good communication skills; scientific and mathematical abilities; organizational and negotiation skills; IT skills, including knowledge of 3D software such as AutoCAD; management skills; initiative and the ability to recognize emerging problems and proactively develop solutions	<b>Russia:</b> EduNano.ru <b>World:</b> Coursera (The State University of New York at Buffalo)	<b>Russia:</b> BS Alternative energy sources of vehicles, Togliatti State University <b>World:</b> MS Alternative Energy, The University of Rochester (USA); MS Solar Energy Engineering, Fraunhofer Academy (Germany); MS in Sustainable Energy Engineering, Iceland School of Energy, Reykjavik University (Iceland); Energy Studies Minor, Massachusetts Institute of Technology (USA)
<b>Biomedical Engineer</b>	Science, mathematics, systems analysis and evaluation, technology design, critical thinking, operations analysis	<b>Russia:</b> Openedu.ru <b>World:</b> Edx, Coursera (University of Manchester), Coursera (The Icahn School of Medicine at Mount Sinai, New York City), Coursera (The University of Minnesota)	<b>Russia:</b> BS Biomedical Engineer, Penza State Technological University; BS Biomedical Engineer, Tomsk Polytechnic University; BS Biomedical Engineer, Vladimir State University. <b>World:</b> MS Medical Biotechnology, KTH Royal Institute of Technology (Sweden); MS Biomedical and Medical Engineering, Stanford University (USA)

Source: adapted basing on the data presented in the open access on the job and educational websites (websites of universities and open educational resources); presented in the Supplement to the article, via the link: <https://disk.yandex.ru/i/qOyt5aTRi9GYMA>  
Источник: собрано на основе данных в открытом доступе на сайтах по поиску работы и образовательных сайтах (сайты университетов, открытые образовательные ресурсы). Список сайтов доступен по ссылке: <https://disk.yandex.ru/i/qOyt5aTRi9GYMA>



in the labor market. Salaries are based on job offers from employers on job search aggregator sites. The data are presented in Table 3.

The gap in wages for the professions of Knowledge in the world and in Russia reflects current labor market conditions and real demand for these specialists. The analytical report “Russia 2025: resetting the talent balance”, prepared by The Boston Consulting Group, says that a group of countries that have already transitioned to the knowledge-driven economy have a similar labor market structure. An increasingly significant role in this market is played by people who are able to work in conditions of uncertainty and perform complex analytical tasks requiring improvisation and creativity [34, p. 8]. Experts point out that at least 25% of the employment in advanced countries belong to professions of Knowledge, while in Russia the share of high-technology production is small, less than 17% of the employment here belong to professions of Knowledge [34, p. 8].

Following are the latest trends in the labor market. Firstly, the labor market will be changing under the influence of global demographic trends, primarily the aging of the population. In the next 20-30 years, generations will change, and old professions will

disappear along with the older generation. Another global trend is the development of technologies. In the next 30 years, the existing technologies will continue developing, but new breakthrough technologies will also appear. Three layers of labor will be formed: the highly qualified elite in demand, the middle layer, and low-skilled workers. Not all researchers agree that automation and robotization will lead to a surge of technological unemployment. Rostislav Kapeliushnikov in “Is technological change a devourer of jobs?” points out that due to robotization, the US labor market lost 360,000-670,000 workers in 1990-2007, especially in manufacturing, but this is only 0.2-0.3% [24]. If we do not take into account robotization only, but also computerization, the introduction of new technologies will ensure employment growth.

**Non-formal education:  
is it a resource for mastering professions  
of the future in Russia or not?**

*Participation in non-formal education.* The questionnaire survey showed that open educational resources (video lessons, popular science lectures on the Internet, massive open online courses, etc.) are

Table 3. Salary indicators for the professions of the future in Russia and in the world  
Таблица 3. Средняя заработная плата для профессий будущего в мире и в России

Profession of the future	Average salary in Russia, \$ per month	Average salary around the world, \$ per month
Data Analyst	1,000	5,607
Urban Farmer	945	3,450
Full Stack Engineer	1,608	6,250
Alternative Energy Engineer	608	4,630
Biomedical Engineer	348	8,810

Note: calculated using the US Dollar exchange rate as of August 3, 2020.

Source: data collected from job search websites <https://hh.ru/>; <https://www.ziprecruiter.com/>; <https://jobfilter.ru/career/software-engineer-fullstack>; <https://www.indeed.com/q-Alternative-Energy-Engineer-jobs.html>; <https://www.truity.com/career-profile/biomedical-engineer>.

Примечание: суммы рассчитаны с учетом курса обмена валюты доллара США на момент 3 августа 2020 г. Источник: данные взяты с сайтов поиска вакансий URL: <https://hh.ru/>; <https://www.ziprecruiter.com/>; <https://jobfilter.ru/career/software-engineer-fullstack>; <https://www.indeed.com/q-Alternative-Energy-Engineer-jobs.html>; <https://www.truity.com/career-profile/biomedical-engineer>.

used by the majority of the respondents (85%). The authors have conducted empirical research of non-formal education, studying the participation of the Tyumen Region's adult population; the skills trained; and the employer's attitude. The study especially focused on the questions: whether people use learning opportunities to train for professions of the future, what they learn and how they learn, what open educational resources they use to acquire advanced skills, where they apply their new knowledge.

Open educational resources (video lessons, popular scientific lectures on the Internet, mass open online courses, etc.) are used by an absolute majority of the respondents (85%). 11% of the respondents have used open educational resources daily, during the 12 months preceding the survey. 22% of the respondents have trained using open courses a little less frequently — “several times a week”.

More than a third of the respondents, including 15% (“once”) and 23% (“several times”), participated in educational marathons (including those devoted to financial literacy, self-esteem, weight loss, style, yoga, etc.).

Willingness to pay for their training is a criterion of the value of new knowledge. The respondents were asked to indicate what part of the training they attended either offline or online was paid for. Every other respondent said that all classes were free (55%), every fifth had to pay for less than half of the classes (22%). Every eighth respondent had to pay for more than half of the classes (12%), and the same number of respondents paid for the whole course (12%). Thus, two thirds of the respondents paid for a total of more than half of the classes or all classes, which indicates a high willingness of the population to invest in their non-formal education.

More than a third of the respondents stated highly active participation in non-formal education — last time they participated in seminars (outside an educational institution), training sessions and educational marathons was “this week” (27%), “last week” (10%), “last month” (13%), “less than six months ago” (18%) and “more six months ago” (32%). There are no statistically significant differences in the responses of officially employed and unemployed respondents, as well as no significant gender differentiation.

*What skills do respondents develop through non-formal education?* A large variety of resources offered by non-formal education both online and offline, are aimed at developing various personal qualities and social and professional skills. Following are the skills that the respondents prioritized. First came personal skills (38%), second — professional skills in demand at a particular job (28%), and third — universal professional skills (22%). It should be noted that every second employed respondent developed their professional skills in their own and related professions (66%), among unemployed respondents this number is almost two times less — 36%. It is unemployed respondents who prioritize the development of personal skills (49%), which is twice as high compared to those employed (25%). This shows that the employed respondents are motivated to improve their professional skills, while the unemployed give priority to the development of personal skills.

At the same time, it is stated that the more highly educated are the respondents, the less they are interested in acquiring physical and social skills. Namely, 10% with primary vocational education, 17% with secondary vocational education, 6% with higher education and only 1% with an academic degree are interested in developing physical skills. The need for social skills is stated by 9% with primary vocational education, 8% with secondary education and 3% each with higher and postgraduate education and academic degrees.

It is noteworthy that the employed respondents develop their professional skills mainly “for themselves”, as in most cases employers do not recognize the value of this type of education.

*Reasons for choosing non-formal education.* Non-formal education has certain advantages that attract people. The key reasons for choosing non-formal education are “self-development” (72%) and “interest in professional activities, improving skills” (53%). Then, with a big gap: “receiving education without leaving home (remotely, via the Internet)” (30%), “It will allow me to have an additional source of income” (23%), “I’m planning to master a related activity” (15%), “I’m planning to master a new type of activity and subsequently make a living out of it” (15%), “recommendation of acquaintances” (10%), “lack of formal education in the area of my interest”

(9%), “no formal education” (5%). Regardless of their employment, three quarters of the respondents feel nothing prevents them from participating in non-formal education (78%).

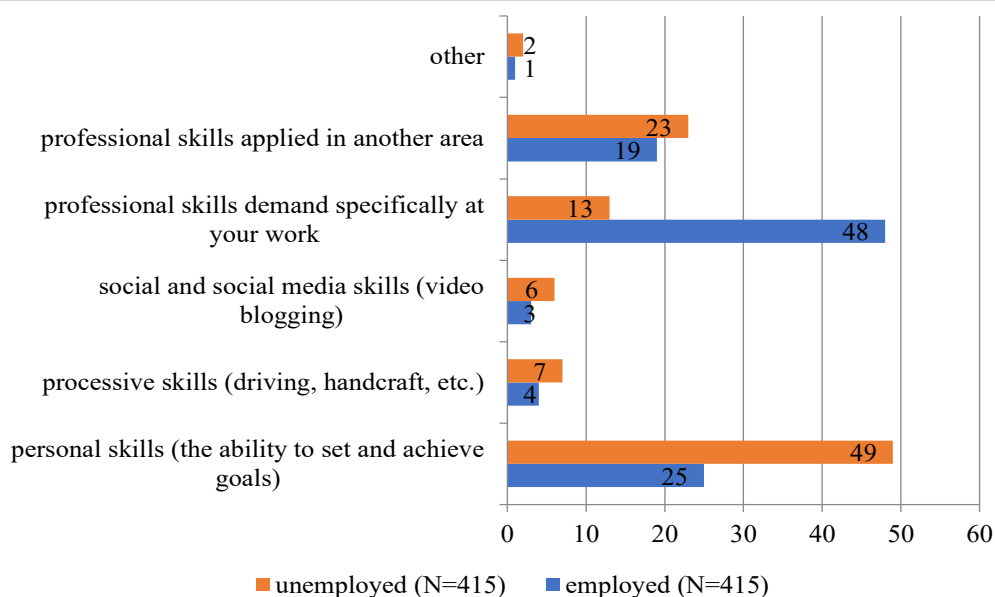
*Recognition of non-formal education by employers.* When applying for a job, more than half of the respondents (56%) did not inform the employer about their non-formal education (although only those respondents who had previously stated their non-formal education experience answered this question), every fifth stated it in their CV (22%), every sixth submitted their certificates (18%), every seventh (14%) mentioned it at the interview, and 8% demonstrated their skills. It is important how employers reacted to non-formal education of an applicant (or an employee). Negative attitude was not shown by any of the employers, 28% reacted neutrally, 32% reacted rather positively, and 39% reacted positively (asked clarifying questions, expressed their approval). It is important to emphasize that 89% of the respondents who stated that their

non-formal education was taken into account when being accepted at their current job (“yes, it was taken into account”) noted their employer’s reaction as “positive” and “rather positive”. There is a strong correlation between the variables “employer’s attitude to the employee’s non-formal education” and “the value of non-formal education when applying for the current job” (Spearman correlation = 0.425\*\*).

The frequency of non-formal education in the corporate environment shows the extent of employees’ updating their skills, and opportunities for advanced training. Corporate training is an important resource for staff training, aimed at improving management efficiency and organization development. According to the survey results, 70% stated that corporate educational programs are conducted in their organizations frequently, including weekly (5%), several times a month (13%), several times a year (28%) and annually (14%). 8% of the respondents stated that corporate educational programs are conducted in their organizations less than once a year. It is noteworthy that

Fig. 1. Distribution of respondents’ answers to the question: “What skills do you aim to develop through non-formal education?” (% , respondents)

Рис. 1. Распределение ответов респондентов на вопрос: “На развитие каких компетенций направлено ваше участие в неформальном образовании?” (в % к числу ответивших)



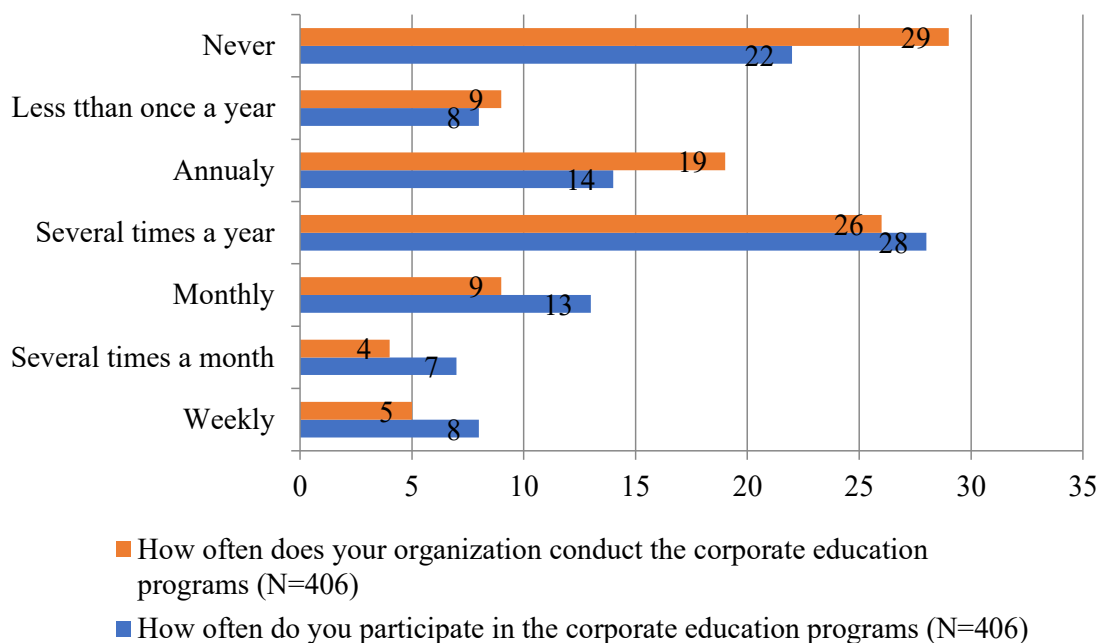
every fifth respondent (22%) stated that corporate educational programs are never conducted in their organizations/companies. Fig. 2 shows the distribution of answers regarding the frequency of corporate educational programs and the respondents' participation. The results indicate that less than a third of the respondents have never participated in corporate educational programs (29%). Most employees took part in them "several times a year" (26%) and "annually" (19%). The results prove a moderate participation of employees in corporate educational programs. Every fifth respondent showed a high level of participation (totally 18% of the respondents participated in educational programs at the workplace most frequently — weekly, several times a month or monthly). A moderate correlation with a high significance value (Spearman correlation = 0.743\*\*) was noted between the variables "How often does your organization conduct corporate educational programs?" and "How

often do you participate in corporate educational programs?".

It is noteworthy that senior managers are twice as likely to develop personal skills through non-formal education (48%, with a sample average = 29%). Department heads and ordinary employees give priority to highly specialized professional skills (which are in demand in their current job) — 42% each. At the same time, every third head of department strives to develop professional skills that can be applied in some other area outside their current job (31%, with a sample average = 21%). These results presented in Table 4 may indicate the preferences within the job hierarchy — ordinary employees prefer to develop their specialized professional skills to improve their performance in the current job, heads of departments prefer to develop their professional skills for prospective promotion, and senior managers prefer to develop their personal skills through non-formal education.

Fig. 2. Distribution of respondents' answers to the questions: "How often does your organization conduct corporate educational programs?" and "How often do you participate in corporate educational programs?" (% of respondents) (N = 867)

Рис. 2. Распределение ответов респондентов на вопросы: "Как часто в Вашей организации проводятся программы корпоративного обучения?" и "Как часто Вы участвуете в программах корпоративного обучения?" (в % к числу ответивших) (N = 867)



### Application of skills trained through non-formal education

The knowledge and skills acquired through non-formal education are applied most frequently in everyday life (36% apply them once a week and more often, and 21% monthly), as well as in professional activities (29% and 18% respectively) (Fig. 3).

The results of the survey showed high participation of the respondents in non-formal education, but employers rarely recognize its value as it was taken into account only in every fifth case of job application. However, more than half of the employees do not consider it necessary to submit the certificates of non-formal education or inform the employer about it, which proves mutual neglect of non-formal education. It is regarded as a minor detail of low importance in training important skills for employment. However, the respondents' statements prove that three quarters of employers have a positive or rather positive attitude to non-formal education of their employees.

There are two counter tendencies: 1) there is a growing gap between the needs of the labor market, the requirements of employers and the real skills of

employees; 2) adults show a strong interest in non-formal education, seek to update their knowledge and realize the need for continuous learning to acquire advanced professional skills.

### CONCLUSION

The study showed that in the modern world there is a growing demand for advanced vocational training, mastering skills for professions of the future. The national demand for professions of the future is determined by the level and pace of post-industrial transition. The demand for “professions of the future” in the national labor market depends on the economic demand. Countries with a high level of technological development are already experiencing professions of the future, while in Russia they are still regarded only as promising areas of professional activity in the near or distant future. Some states are betting on a certain high-tech area: for example, the UK is striving for leadership in the development of bioeconomy, the Netherlands is a global hub for processing “big data” [30, p. 14]. The processes of economic diversification in Russia are proceeding slowly, the raw material structure of the Russian economy hinders the emergence of promising pro-

*Table 4.* Distribution of respondents' answers to the question: “In your opinion, what skills have you developed through non-formal education?” depending on the job hierarchy position (% , respondents, N = 867)

*Таблица 4.* Распределение ответов респондентов на вопрос: “На ваш взгляд, какие навыки в большей степени сформировались у Вас по итогам пройденного вами неформального обучения?” в зависимости от уровня должностной иерархии (в % к числу ответивших, N = 867)

Possible answer	Level of the job hierarchy		
	Senior executive	Head of Department	Employee
	N = 58	N = 190	N = 619
Personal skills	48	24	28
Processive skills	4	0	5
Social and social media skills	4	2	4
Professional skills demanded specifically at your work	30	42	42
Professional skills applied in another area	5	31	20
Other	9	1	1
Total	100	100	100



fessions of the future, preparation for them is somewhat delayed in comparison with international experience. D. Peskov, head of the Agency for Strategic Initiatives, noted that in many countries these professions are already present: “There are no city farmers in Russia, but in London and New York it is a reality” [4].

Countries with a high level of technological development are already demonstrating the use of the professions of the future, while in Russian reality they are still positioned only as promising areas of professional activity in the near or long term. However, there are projects on auditing the promising industries and skills. The ILO’s Guide “Anticipating and matching skills and job” presents a joint project of the Russian Ministry of Education and Science and SKOLKOVO — Moscow School of Management “Skills 2030 Foresight”. The project aims to identify the impact of key trends and new technologies, the changing nature of the profession and the demand for em-

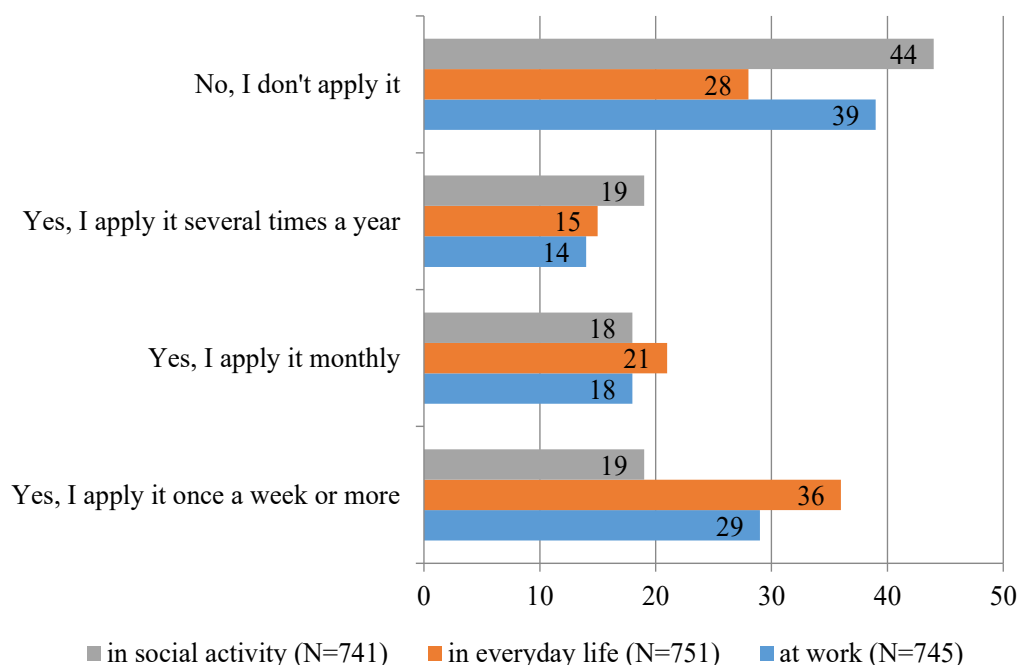
ployees’ skills [18, p. 7]. There are certain initiatives coming from Russia’s non-formal education that promote opportunities for developing advanced skills. One of such agents of change is the Russian Agency for Strategic Initiatives, which launches new educational processes: improving the efficiency of additional education and the development of non-formal education in Russia through creating infrastructure and support for best practices [2].

The results of the study highlight institutional barriers and restrictions in the implementation of non-formal education in Russia: there are no legal regulations to recognize qualifications obtained through non-formal education, there is no employers’ demand for the acquired skills, continuous life-long learning is not integrated in Russian everyday practice.

The results obtained are in many respects consonant with other studies on this issue. The World Development Report confirms our statement that the

Fig. 3. Distribution of respondents’ answers to the question: “Do you apply the knowledge/skills acquired through non-formal education in...?” (% , respondents)

Рис. 3. Распределение ответов респондентов на вопрос: “Применяете ли Вы знания / компетенции, полученные в ходе неформального образования в...?” (в % к числу ответивших)



paradigm of employee's skills is changing: skills that robots cannot have — general cognitive skills (critical thinking) and social behavioral skills (managing and recognizing emotions) that improve teamwork efficiency — are becoming more valuable. Employees with such skills can adapt more easily to the demands of the labor market. In addition, the World Bank experts say that in developed and developing countries there is a growing demand for cognitive and social and behavioral skills that are not related to routine work, and there is a declining demand for traditional professional skills. A combination of different types of skills is beginning to generate more income in the new economic environment [35, p. 23]. The convergence of globalization, digitalization and demographic change is bringing about a shift in the range of skills needed for future work, states the OECD. According to it, today 35% of employees claim the lack of skills necessary to perform their current tasks and would like to receive additional training. However, the ratio of the number of employees participating in training differs: 60% of high skilled workers and only 20% of low skilled workers [20, p. 3-4]. This suggests that, in the near future, the developed and developing countries, including Russia, need to focus not only on the content of education, but also on providing workers with the ability to learn and reskill throughout their lives. According to the G20, this is especially important for the Generation Z — those who will work till 2070 — because the modern ed-

ucational system cannot teach them skills for their future careers [37, p. 8].

This study has shown that the social construction of new professions (professions of the future) results from multiple factors and processes that are not always synchronized. At the national level, the social order for professions of the future must be given state support through creating jobs where advanced skills can be applied. The professions of the future are characterized by new models of professionalization. In addition to formal education, the complex of vocational training includes non-formal education that provides individual educational paths. The data of the present study are consistent with the results obtained by Tholen [36]. The role of formal education and credentials is diminishing. The labor market, where professions of the future are present, is not characterized by credentialism. This is clearly confirmed by Andrews & Higson [3].

The prospects for further research of the labor market and professions of the future may lie in studying new institutional links that arise in modern models of professionalization, the value of micro-credentials, most effective technologies in non-formal education, providing the dynamics of professionalization in a high-technology society.

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## НАУЧНАЯ СТАТЬЯ

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## Ресурсы неформального образования для «профессий будущего»

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**Аннотация.** В статье раскрываются возможности и ограничения неформального образования для освоения профессий будущего. Авторы отмечают, что переход к высокотехнологичной экономике сопровождается стремительным развитием новых сфер труда и новых профессий. Растет потребность в постоянном обновлении знаний и навыков, на рынке труда снижается значение формальных дипломов (инфляция credenциализма), и все больше возрастает роль неформального образования. Цель представленного в статье исследования — выявить перспективные направления профессиональной деятельности в высокотехнологичной экономике и потенциал неформального образования для освоения профессий будущего. Авторами проведен качественный контент-анализ сайтов по поиску работы, иллюстрирующий показатели спроса на профессии будущего в разных странах, ключевые компетенции, необходимые для данных профессий, ресурсы формального и неформального образования для их освоения. Реализовано эмпирическое исследование с использованием метода анкетирования (N = 1 388, возраст респондентов от 18 до 80 лет, анализ данных с применением SPSS), проведенное в России, раскрывающее вовлеченность в неформальное образование. Новизна исследования в том, что показана роль неформального образования, которое преобладает при освоении профессий будущего: абсолютное большинство респондентов (85%) используют неформальное образование для переквалификации, получения знаний в смежных областях. По результатам исследования установлено, что спектр востребованных профессий будущего отражает неравномерность постиндустриального перехода в разных странах, для опережающей профессиональной подготовки в российском контексте возрастает роль неформального образования, как элемента life-long learning. Авторы делают вывод, что рынок труда, где представлены профессии будущего, не будет характеризоваться credenциализмом, для их освоения станет доминировать индивидуальная образовательная траектория на основе неформального образования.



**Ключевые слова:** профессии будущего, неформальное образование, рынок труда, образовательные ресурсы, работодатели, навыки, востребованные профессии, социология образования.

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