VOCATIONAL EDUCATION IN THE CONTEXT OF DIGITAL TRANSFORMATION: NEW CHALLENGES AND UNKNOWN RESOURCES

INTRODUCTION

In the first decade of the 2000s the global economy entered a new phase of its development - the Fourth Industrial Revolution (hereinafter, FIR), which was an evolutionary continuation of the first three industrial revolutions. The FIR is based on the computer revolution and advances in computing technology. FIR marked the transition of human society into a new Digital Age, transforming the surrounding reality of modern societies, people’s worldviews and lifestyles at a rapid speed. The FIR has already been conceptualized by the world’s leading analysts, its forms, functions, technologies have been analyzed forecasts and scenarios for the development of the digital world are being elaborated. The world’s leading analysts unequivocally assert the human orientation of the FIR, dissecting the consequences of its impact on humanity and the possibilities of its use for the common good (SCHWAB, 2016). In this context the relevance and importance of multilateral international cooperation primarily in the scientific and technological sphere, the study of global experience and practices and the exchange of information are increasing.

DIGITALIZATION AS A MEGATREND OF THE FIR

Digitalization has turned out to be the most visible and sensitive trend of the FIR. The main spheres of life - governance, science, security, education, etc. are getting a new form and content. (MAKHUTOV et al., 2019). These changes have already transformed the foundations and forms of life of most states and their societies, people, including production, communication, health, education and recreation.

The digitalization of the global world and societies is being shaped by new technologies - the Internet, telecommunications, Big Data, artificial intelligence (AI), blockchain, cryptocurrency, etc. However, it is already clear that these technologies are more of a prerequisite and a toolkit. A characteristic feature of the "digitalizing" world is that each of these blocks is independently and actively developing and complementing and "it can be considered a structural part of the virtual world and a bridge connecting it to the real world" (MAKHUTOV et al., 2019). In fact we are talking about a global digital transformation.

Leading experts point out that unlike previous industrial revolutions the FIR "is not developing at a linear pace, but rather at an exponential one" (MAKHUTOV et al., 2019). This characteristic of FIR its breadth and depth are due firstly to the multifaceted and all-encompassing, systemic, interdependence of the global world and secondly to the nature of digital technologies themselves which are already "generating" more and more advanced and efficient technologies on their own. For example successes and advances in automation, computer science have literally transformed mathematics, creating a new generation of computational methods, system programming and automated control systems, robotics, computer graphics. The application of mathematical modelling techniques not only integrates large databases and tasks, but also changes the very nature of the organizations carrying out this process, turning them into system integrators. Computational power and data analytics enable and enhance innovation, they literally connect all areas of human existence - physical, biological, digital (virtual), social.

In the social sphere the shift in development paradigms is manifested in forms of communication and interaction between people, social institutions and groups; modes of work, production, education, health, recreation, business, scientific and cultural activities.
Digitalization is ambiguous in this respect. On the one hand it can integrate and erase barriers in the form of state and ethno-cultural borders, open up opportunities for scientific and technological breakthroughs, new space exploration, new discoveries in medicine, genetics, etc., ease the environmental burden on nature, free people from hard work, increase productivity and optimize the management of cities ("smart city"). Of particular importance and popularity are the so-called digital platforms, which have minimized transaction costs, optimized business processes, and created new formats for trade, transport and educational services. Ultimately digital platforms have created the foundation of public trust in digital. The list could go on.

However on the other hand, the digital future of the world may also threaten serious unemployment, the displacement from the economy of millions of specialists whose professions have become obsolete, the dominance of AI and synthetic biology capabilities, the as yet poorly understood impact of digital on the psycho-emotional and intellectual development of people, especially children. A significant percentage decline in the share of labor in GDP is demonstrated by many developed countries and countries with dynamically growing economies (MAKHUTOV et al., 2019). The development of innovation lowers the prices of the means of production, making the providers of intellectual or physical capital the main beneficiaries. Thus a new digital form of inequality emerges.

Obviously, the most vulnerable link in the new digital world is the individual and the areas of life that "work" for the individual - medicine and education. Humanity still has little idea of what "digital health" and "digital education" are.

**DIGITALIZATION IN RUSSIA: YESTERDAY AND TODAY**

Russia like other countries around the world has adopted a digital economy strategy. The Digital Economy Programme of the Russian Federation interprets the digital economy as "an economic activity in which the key factor of production is digital data, the processing of large volumes of data and the use of the results of analysis compared to traditional forms of economic activity allow for significant efficiency gains in various types of production, technology, equipment, storage, sale, delivery of goods and services" (Order of the Government, 2017). In April 2021 following the EAEU summit in Kazan the participating countries signed the document "Main Areas of Industrial Cooperation until 2025" (Main areas of industrial cooperation within the Eurasian Economic Union until 2025, 2021), which is aimed at solving the main task of ensuring the transition to a new level of technological development of industry through digitalization.

In 2018, following the May Decrees of Russian President Vladimir Putin, a new Ministry of Digital Development, Communications and Mass Media of the Russian Federation was formed, and the Ministry of Science and Higher Education of the Russian Federation and the Ministry of Enlightenment of the Russian Federation were formed taking into account the new digital agenda.

The Russian Academy of Sciences in cooperation with universities, the business community and various branches of government is implementing a programme of measures in seven priority areas of scientific and technological development of Russia, approved by the state Strategy for Scientific and Technological Development of the Russian Federation (Decree of the President of the Russian Federation, 2016). The RAS based system of Councils is designed to ensure the efficient operation of all links in the chain: fundamental science-R&D-production-market.

According to the Russian Federation’s Strategy for Scientific and Technological Development “in the next 10-15 years the priorities of scientific and technological development of the Russian Federation should be those directions that will produce scientific and scientific and technological results and create technologies that are the basis for innovative development of the domestic market of products and services and Russia’s sustainable position in the foreign market and will ensure: transition to advanced digital, intelligent production technologies, robotic systems, new materials and methods of construction, creation of big data processing systems, machine learning and artificial intelligence” (Decree of the President of the Russian Federation, 2016).
Russia has formed a structure of supercomputer centers in education and science (MAKHUTOV et al., 2019), which work for high-tech industries. Successes have been achieved in a number of areas: intelligent systems for processing computer tomography images; intelligent systems for detecting deviant (non-standard) human behavior in a crowd; smart city and smart home systems; smart Internet assistants that open up new opportunities in security, online education, online medicine, online banking, etc.

Modern achievements and developments were a continuation of the phenomenal success of Soviet scientists primarily those employed at the Institute of Applied Mathematics of the USSR Academy of Sciences, established in 1953 by the outstanding scientist, mechanic and science organizer M.V. Keldysh (1985). The USSR IAM became the basis for the future industry of computer science and as it turned out the digital economy. In the past, the development of the computer technology and mathematical modelling was successfully carried out by Academician V.M. Glushkov (1986), L.V. Kantorovich and A.B. Gorstko (1972); modelling of economic systems by Academician N.N. Moiseev (1972); programming problems by Academician A.P. Ershov (2015); development of semiconductor heterostructures by Nobel Prize laureate Z.I. Alferov (2001); problems of surface waves by the scientific school of Academician Y.N. Gulyaev (2016); development of computer technology and mathematical modelling by the founder and first director of the Institute of Computational Mathematics RAS.; the development of computer technology and mathematical modeling by Academician G.I. Marchuk (1977), founder and first director of the Institute of Computational Mathematics of the Russian Academy of Sciences; and many others. Domestic science has created a fundamental basis for the widespread use of computers in the national economy, for the "digital economy" (MAKHUTOV et al., 2019). But “the experience of post-Soviet development shows that the main problem lies not in the ideas, but in their implementation” (IVANOV, MALINETSKY, 2017).

New advanced technologies and business models are rapidly emerging and penetrating deeper into all sectors of Russia's economy, thus creating a need for qualified specialists primarily in information systems and cyber-security. The labor market and companies are assessing a specialist's complex so-called "digital footprint" reflecting the quality of professional and personal development.

Despite the existing network of technical universities in Russia that train programmers and IT specialists there is a deficit of millions of jobs in the labor market. Despite the existing network of technical universities in Russia that train programmers and IT specialists, there is a deficit of millions of jobs in the labor market. This deficit is explained by the total penetration of information and communication technologies (ICT) into all sectors and types of economic and business activities of the country, continuous improvement of existing technologies and emergence of new generation technologies based on them.

Academician A.P. Ershov (2015), the founder of Novosibirsk programming school, who predicted mass demand for programmers in the foreseeable future back in 1970s, laid the foundation for system of programmer training, defined the essence of programming as an activity and its importance for human civilization outlining future digital world.

The exceptional importance of programming is determined by the fact that it is the one that correlates word with action, helps to move from knowledge to action. Programming along with literacy is an expression of man's organic capacity that is a capacity prepared by the organization of his nervous system and inherent in man in all his social functions: in communication with each other in work, in contemplation of nature and in struggle against it (ERSHOV, 2015). The machine becomes an intellectual tool and partner in almost all spheres of human life and activities. The need to actualize in the form of programs the information model of the world the constant complication of the environment require and at the same time make it possible to significantly increase the intellectual power of mankind. A significant place in this progressive development of human intellect has to be occupied by the laws of information processing ways of transition from knowledge to action, the ability to build programs, to reason about them and to foresee the results of their execution. Managers who have no idea about computers and programming will disappear into oblivion professional programmers will become system analysts and system programmers, and everyone will be able to programming (ERSHOV, 2015).
METHODOLOGICAL FRAMEWORK

Methods
The following methods were used during the study: comparative and comparative method; systematic approach and methods of analysis and synthesis; historical and logical methods, comparative analysis, content analysis.

LITERATURE REVIEW
In the course of the work a corpus of sources was collected and analyzed: normative legal documents of the Russian Federation (Federal project, 2019) and international organizations, posted on the official websites of the agencies.

The history of the industrial revolution since its inception is presented in the works of J. Urinson (2018), S.S. Buldygin (2017). The concept of the industrial revolution and its digitalization has been considered in detail by K. Schwab and N. Davis (2018), R. Bucht and R. Hicks (2018), N.A. Makhutov et al. (2019).

The analysis of the digital world from interdisciplinary positions and through the prism of socio-humanitarian aspect, the development of philosophy and culture is investigated by a team of famous scientists V.V. Ivanov, G.G. Malinetsky and S.N. Sirenko (2018). The content of the "digital economy" programme, prospects and risks of digital reality are analysed in detail in the works of V.V. Ivanov and G.G. Malinetsky (2017), Corresponding Member of the Russian Academy of Sciences, and Head of the Department of Mathematical Modelling of Nonlinear Processes at the Keldysh Institute of Applied Mathematics (IAM). G.G. Malinetsky, Head of the Mathematical Modelling of Nonlinear Processes Department of the Keldysh Institute of Applied Mathematics (IVANOV, MALINETSKY, 2017; MALINETSKY, 2019A; MALINETSKY, 2019B; KVON et al., 2019). Socio-economic consequences of the spread of digital technologies in the labor market are analysed in the article by D.N. Baranov (2018).

Socio-economic factors of education development in the era of transition to a post-industrial society and strategies for updating the content of general education are considered in the works of B.L. Wolfson (1994, 1999). Problem points in education that exist in the context of the digital revolution and proposals for improving the training system are presented in the scientific works of S.N. Sirenko (2018), B.E. Starichenko (2020).

The study of various aspects of digitalization of education, personalization in training are devoted to the works of V.V. Afanasyev et al. (2016), B.E. Starichenko (2015, 2020). The methodological basis for the formation of modern educational environment is presented in the monograph of the team of authors consisting of I.V. Avadaeva et al. (2018). The work by M. Gianelli (2018) considers the forms of e-learning. The readiness of university teachers for online education is analyzed in the scientific article by E.F. Seeer, N.V. Lomovtseva and V.S. Tretiakova (2020).

A critical reflection on the state of the Russian education system is presented in the scientific works of Y.V. Gromyko (2019) and O.N. Chetverikova (2018).

RESULTS
Human Resources for the Digital Economy
The FIR has rapidly formed new industries, new fields of activity and types of employment putting on the agenda of states and their national economies the task of training qualitatively new qualified specialists, both highly skilled programmers and specialists of other profiles at all levels with digital competences, including managers and "teachers for teachers".

Russia has sufficient intellectual and technological potential to secure leading positions in the world market of software and electronic devices as well as to export these products. However, there is a shortage of programmers in Russia as well as in the world as a whole.

The shortage of specialists with digital competencies for other industries is also being discussed by business and the government. At the same time there are risks that "the professions that trainees are learning or preparing to learn may soon be overtaken by
technological solutions” (ARNTZ, GREGORY, ZIERAHN, 2016). Today, companies address this deficit in two ways: they develop specialists within the company or “grow” them in cooperation with universities including specialized departments and programmes created by them.

**Users for the Digital Economy**

There is another human aspect to the global digital transformation - the development of digital literacy in all population groups as almost 100% of adults and young people in the country use digital technologies and gadgets (communication, online banking, e-commerce, use of public services, education, entertainment, etc.). In this context a set of new rules for digital communication and security, digital ethics and aesthetics is emerging. Comfortable and safe use of gadgets has become compulsory; it is not only a guarantee of an individual’s inclusion in economic, political and other processes, but also a kind of indicator of his education and even culture (BAYANOVA et al., 2019).

**New Ways of Living, New Ways of Thinking**

Modern people using gadgets and a variety of digital technologies in professional, social and interpersonal environments are under the influence of these technologies. Children and adolescents are particularly vulnerable to this impact. Today psychologists and educators state that the periodization of mental development proposed by L.S. Vygotsky (1983) in the twentieth century can no longer be applied to children today. They are characterized by qualitative changes in the cognitive and communicative sphere, they have smaller working memory, clipped thinking, poorly developed reading skills and habits (MAKHUTOV et al., 2019). In the course of the changes taking place, the individual has ceased to be only a subject, he or she has become an “object of the changes taking place” (IVANOV, MALINETSKIY, SIRENKO, 2018).

**New Challenges for Education**

Education is the main mechanism for transmitting knowledge and traditions, nurturing and developing a child’s personality and professionalising adults. In the context of the global digital transformation of socio-economic systems the education system faces a new and complex challenge: to adapt to new global processes, which are often turbulent and unpredictable in their development trajectory; to create new learning technologies for children and adults, capable of developing personal potential, forming and timely updating knowledge, skills, abilities throughout life, taking into account the individual characteristics and goals of the student and in accordance with the constantly changing knowledge, skills and attitudes.

The challenges for teaching staff are immense and the amount of knowledge and information is increasing at an enormous rate: from 1950, the amount of knowledge has doubled every 10 years; from 1970 it has increased every 5 years; and from 2010 it has increased every 2 years (ZAKHAROVA, 2003). Teachers need to learn how to process vast amounts of information and how to effectively transfer this knowledge in an accessible form to students taking into account the increasing informative capacity of classes. The solution of these problems requires new scientifically grounded methods for professional training of teachers (educators) of all levels and profiles. The educational process and pedagogical practices nowadays already include the use of ICTs, multimedia, e-learning, etc. This gives weighty didactic advantages to electronic educational content in comparison with traditional content first of all because their application makes it possible to integrate and generalize large amounts of information (virtually unlimited quantity), makes the learning environment visual and as accessible as possible to the learner.

The accumulated foreign and domestic experience in IT-based education confirms the real possibility of individualization of education through personalization of learning. In this regard, the task is to improve the methods and models of ICT-supported education and take into account the impact of "numbers" on the learner.

Currently, the main trends of modern education have emerged: continuity, individualization, personalization and digitalization.
The basic documents defining the principle of continuing education are the Convention on Human Resources Development of the International Labor Organization (AFANASYEV et al., 1975), international legal and development documents on European integration in education, and the new concept of sustainable global education adopted at the World Education Forum with 1600 participants from 160 countries in May 2015 and enshrined in the UNESCO (2015) Incheon Declaration “Education 2030: Ensuring universal inclusive and equitable quality education”.

Closely related to the concept of lifelong learning is the concept of personalized learning. There are different interpretations of the concept of personalization (CHERNYAEVA, 2020).

Important elements of the Western version of personalized learning are the use of exploratory, problem-based and project-based learning, which develop students’ research skills, the ability to set goals and objectives, to find solutions independently, analytical and critical thinking, and the ability to formulate value judgements. An integral part of personalized learning is the learner’s informed choice of his or her educational route. The teacher accompanies and supervises the learner and discusses his/her ideas with him/her, which differs significantly from the domestic approach. There has been a shift in the roles of institutional (formal) education and non-formal education as demanded (requested) by the individual throughout life. Non-formal education accounts for up to 80% of the personal and professional success of professionals in various professions (Cross, 2007). The UNESCO Institute for Lifelong Learning foresees the transformation of Information Society into Learning Society (JIN YANG, RAÚL VALDÉS-COTERA, 2011).

Digital competences the skills of the 21st century remain a matter of debate. A list of digital competencies for citizens is presented in the model S. Carretero, R. Vuorikari and Y. Punie (2017) and includes eight skill levels and examples of use.

The Russian experience of personalized learning is based on the ideas of personality-centred approach (interests and needs of learners over the externally set programme; varied educational content for different subjects of assimilation; orientation to development of own views in specialists; predominance of creativity over “schematism”; dialogue over monologue; individuality) (AFANASYEV et al., 2016).

The research of individualization and personalization problems is conducted by many domestic scientists: K.A. Abulkhanova (1999), O.S. Grebenyuk and T.B. Grebenyuk (2000), A.N. Leontiev (2004), V.A. Petrovsky and E.B. Starovoitenko (2012), B.E. Starichenko (2020) and many others. The foundations of the Russian research cluster are the theories of cognitive activity and creativity (Vygotsky, 1983; Leontiev, 2004; Rubinshtein, 2000) and personality structure (ANANYEV, 2007; RUBINSHTEIN, 2000, etc.).

A pool of experts on the digitalization of education is forming: A.A. Andreev (2009), G.O. Astvatsurov (2004), I.V. Robert (2014) and many others. V.V. Afanasyev et al. (2016), O.N. Chetverikova (2018) analyze the risks of digitalization of education.

The Russian approach is characterized by the following features: digital platform is interpreted as a basis and a centre of learning activity management, designing comes from the result; development of learner’s personality is formulated as a goal and result of personalized education; culture of learning; individual trajectories, soft skills development.

In Russia the Moscow Electronic School project (MES) has been most fully implemented, which covered all Moscow schools from 2016 to 2018. MES experience: the learner takes part in designing the learning process, forms the skill of self-assessment and measuring its effectiveness; cumulative assessment system, modular planning.

One of the serious problems of domestic schools is lagging behind the requirements of the digital economy and social life and often an excessive adherence to traditional methods and technologies. The education system continues to ignore the digital tools that children and adults successfully use in their daily lives (AVADAeva et al., 2018) or emasculate the potential of new learning technologies. Currently there is no single list of skills required to use digital technologies and Internet resources safely and effectively (ZEER et al., 2020), despite the existence of several studies that present innovative models of digital competencies such as M.V. Polevaya (2019).
Additional Vocational Education
In the context of global digitalization and rapidly restructuring of the economy industries and market segments, there is an urgent need to have an effective AVE system that can timely and effectively pass through large groups of specialists, train, certify them and thus meet the need of a particular economic sector (market) for specialists of a certain quality and a given number. In this regard it is necessary to purposefully improve the system of organization and management of AVE programmes to introduce modern methods and technologies, primarily personalized, digital, electronic and distance learning. In the case of adult learning these methods are appropriate and fully justified. Considerable experience and practice has already been gained mostly from abroad (AFANASYEV et al., 2016).

Personalised Technologies in Education

- Digital technologies include computer hardware and software, networking and communication technologies as well as application software development tools. With the development of high technology (communication, internet marketing, cloud computing, big data, artificial intelligence, etc.), the content of modern information technology is constantly being added to and expanded. Digital learning applications and services, innovative methods.
- Distance learning: using modern information technologies (networking and multimedia technologies, as well as online learning), based on modern electronic information and communication technologies, with audiovisual support, with full-time and part-time learning.
- Digital learning resources.
- E-learning: delivered through audiovisual materials using projectors, slide projectors, tape recorders, televisions, VCRs, video cameras and specialized electrified classrooms, language laboratories and other facilities.
- Gamification: bringing in the principles of game design that keeps the learner’s attention and motivation.

DISCUSSIONS
The FIR and its mega-trend of digitalization are literally online reshaping the foundations of industrial society and the economy, shaping modern states into new forms of life and economy. Despite the existence of a corpus of academic literature analyzing the concept of the FIR and digitalization, it can be stated that the research process on these issues is undergoing a hectic period of debate due to the ever-changing nature of the object of study. A corpus of works by researchers and analysts who are critical of the forms of digitalization that are rapidly dominating all spheres of society including education is forming. The main criticism is focused on the consequences of the impact of digital technologies and virtual environment on human nature itself, its psycho-emotional and intellectual development, primarily manifested in educational outcomes. There is an urgent need for a consistent and systematic study of the results of the penetration of new technologies into people’s lives, including through the reformed educational system.

Serious research is needed into the formats, methods and results of “digitized” education, and their subsequent adjustment.

CONCLUSION
It has been established that Russia is undergoing a transition to the digital reality, having a serious backlog of Soviet scientific and technological heritage in the field of applied mathematics and computer science. A methodology and a national legal regulatory system are being developed a state strategy for developing the digital economy and education has been adopted and organizational mechanisms for its implementation are being formed. The problem of a shortage of new personnel for the digital economy and the elimination of digital illiteracy among various population groups has become most acute. It formulates the following
tasks for the education system: the study of the risks of the digital reality and their impact on the participants in the educational process; the development of science-based training methods (including those for professors and teachers) using ICTs and mechanisms to mitigate the risks of digitalization.

Digitalization is a key trend in education worldwide. Digitalization is changing the forms and methods of knowledge transfer, and personalized learning has become one of them. The personalized learning approach itself originated in the West where this concept is deeply researched and widely used and has a number of features.

Digitalization has also penetrated the field of education in Russia with its consolidation in the legislative sphere, the development of its methodology, the development of new technologies and their approbation in educational institutions at all levels. Russian scientists have developed theoretical approaches to the concept of “personalized learning”, which has a number of distinguishing features from Western theories. In the scientific community and Russian society in general the introduction of the new concept of education and the use of new teaching technologies provoked a broad discussion. Experts state both positive results and new opportunities for the use of ICTs in education, as well as serious risks characterizing the threats to humanity in the long run.

In the context of the transition to digital education the use of personalized learning as the leading learning technology has fully proved its usefulness. The system of supplementary vocational education can be considered an effective tool for solving many problems in the labor market and employment, but the current format requires improvement in terms of updating the methodological foundations, the technologies used and the management organization.

RECOMMENDATIONS
The results of the analysis integrate international and domestic developments in understanding the socio-humanitarian aspects of the digitalization process and existing approaches to the digitalization of education.

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Resumo
O objetivo do artigo é analisar as principais características da digitalização do sistema educacional no contexto de FIR e da transição da humanidade para a Era Digital para formular novas tarefas surgidas para a educação neste sentido, para considerar novos recursos para o seu desenvolvimento. No decorrer da pesquisa, serão utilizados os seguintes: método comparativo e comparativo; abordagem do sistema e métodos de análise e síntese; métodos históricos e lógicos, análise comparativa, análise de conteúdo. Justificativa da conveniência da aprendizagem personalizada na transição para a educação digital como tecnologias de aprendizagem líderes, a necessidade de melhorar os métodos e modelos de ensino de competências digitais, bem como o sistema de formação profissional complementar como uma ferramenta eficaz para a resolução de problemas no mercado de trabalho e emprego. Os resultados da análise permitem integrar desenvolvimentos internacionais e nacionais em termos de compreensão dos aspectos sócio-humanitários do processo de digitalização, as abordagens existentes para a digitalização da educação.

Palavras-chave: Economia digital. Educação personalizada. Competências digitais. Recursos humanos.

Abstract
The purpose of the article is to analyze the main characteristics of digitization of the education system on the background of FIR and the transition of humanity to the Digital Age to formulate new tasks arising for education in this regard, to consider new resources for its development. In the course of research, the following will be used: comparative and comparative method; system approach and methods of analysis and synthesis; historical and logical methods, comparative analysis, content analysis. Justification of the expediency of personalized learning in the transition to digital education as leading learning technologies, the need to improve teaching methods and models of digital competencies as well as the system of additional professional education as an effective tool for solving problems in the labor market and employment. The results of the analysis allow integrating international and domestic developments in terms of understanding the socio-humanitarian aspects of the digitalization process, the existing approaches to the digitalization of education.

Keywords: Digital economy. Personalized education. Digital competencies. Human resources.

Resumen
El propósito del artículo es analizar las principales características de la digitalización del sistema educativo en el contexto de la FIR y la transición de la humanidad a la Era Digital para formular nuevas tareas que surjan para la educación en este sentido, para considerar nuevos recursos para su desarrollo. En el curso de la investigación se utilizará lo siguiente: método comparativo y comparativo; enfoque de sistema y métodos de análisis y síntesis; métodos históricos y lógicos, análisis comparativo, análisis de contenido. Justificación de la conveniencia del aprendizaje personalizado en la transición a la educación digital como tecnologías de aprendizaje punteras, la necesidad de mejorar los métodos de enseñanza y modelos de competencias digitales así como el sistema de formación profesional adicional como herramienta eficaz para la resolución de problemas en el mercado laboral y empleo. Los resultados del análisis permiten integrar desarrollos internacionales y nacionales en términos de comprensión de los aspectos socio-humanitarios del proceso de digitalización, los enfoques existentes para la digitalización de la educación.

Palabras-clave: Economía digital. Educación personalizada. Competencias digitales. Recursos humanos.