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Challenges for Modern Higher Education in the Context of Social, Digital, Technological, and Sustainable Trends

УДК: 316.1
DOI: 10.24412/2079-0910-2021-2-130-142

The research paper presents some considerations on how to include the discussion on global trends in the higher education system, particularly in social and humanities disciplines. Such trends as digitalization, technological progress, change in communication, need in expert knowledge, and sustainability issues define the modern interrelation between science, technologies, and society. The inclusion of such topics in the higher education program for students (in the form of theoretical concepts, empirical research, business cases) contributes to the development of critical thinking, enlarges the perspectives for students during the studying and later by the job search. The awareness of the global trend discussion creates the idea of new social and cultural values, increases the interest in studying and learning actual tendencies in a specific field, and supports the status of expert knowledge in the time of information access. This article provides an overview of those global trends that, when included in the content of educational programs of higher education, can positively affect both the programs themselves and the quality of students' knowledge and competencies.

Keywords: trends, digitalization, sustainability, technologies, communication, expertise, value, modern higher education.

Introduction

Science and technology studies today play an essential role in defining the future development of industries, manufacturing processes, and the state of scientific research. Due to the actual technological progress, innovations boost, and information access, the significance of including the discipline about science and technologies into the higher education process dashingly grows. Moreover, the awareness of scientific and technological achievements at the global and local levels produces those social and cultural competencies that participate in the establishment of social and cultural values of younger generations. So, the interconnection between science and technologies, from the one side, and society, cultural norms, social values, from another side, become the object of studies and research as well as the key focus in the higher education process [*Sismondo*, 2008].

The main focus of this article concerns the actual global trends that affect the development of science, technologies, and social relations. Specifically, it relates the following ideas: 1) digitalization and digital culture; 2) technological progress and innovations; 3) changes in individuals and ways of communication; 4) the demand for expert knowledge; 5) sustainability and sustainable ideas. Those trends are interconnected and complement to each other. Moreover, they represent the ideas that should be included in the university disciplines as an independent course as well as in the form of research cases, student practices, or additional learning materials for social and humanities sciences.

So, this article, firstly, describes the actual situation with the science and technology studies and defines the problematic areas in the higher education system to be improved. It highlights the importance of discussions with students about global trends and the demonstration of successful cases and ideas related to such global tendencies. Secondly, the article reviews scientific investigations regarding technological determinism, changes in social behavior and social values due to the change of communication ways, transformation in interpersonal interactions, and the impact of digital technologies. Thirdly, the article describes five global tendencies that affect the interconnection between science, technologies, and society. In particular, this part emphasizes the influence of those trends on the higher education process and demonstrates some profits of implementing the trend discussion as in technical disciplines as well as in social and humanities disciplines. Finally, the article highlights the importance of the above-mentioned trends for the social and humanities disciplines as an answer to the changing conditions of everyday life.

Problem situation

Science and technology studies as an interdisciplinary field reveal the interconnections and influences between science, technologies, and society. This discipline has switched the main focus in the research from only human beings to the objects (tools and instruments) that participate in human activities and interactions. Some contradictory applications of technologies and scientific innovations awakened the interest of scholars to investigate the evolution of science and technologies within the influence of concrete individuals. Among theoretical concepts and empirical research, various industries and business structures obtain a strong interest in investigating technological development. So, they generate a demand for periodical structural analysis and predictions in the area of science and technologies that coordinate the economic flows and settle social and cultural interactions at the global and local levels.

The increased attention to the areas that combine scientific achievements, technological progress, societal and individual interests can explain the need for the development of science and technology studies. For instance, climate change demands sustainable solutions and technologies in the global production processes; scientists and engineers conduct research and work on various measurements in order to provide such sustainable ideas. Consequently, society should implement sustainable ideas into the system of cultural values; individuals as well have to deal with new sustainable challenges and transformations in everyday life. Those ideas are included in the agenda of meetings of international organizations, summits, and world conferences; the significance of these issues is recorded in many international documents and reports (e.g., Agenda 21, the Kyoto Protocol, 17 sustainable development goals).

Furthermore, there is a remarkable connection between science, technologies, and social and cultural values that should become a convincing part of the higher education system. With the knowledge of scientific and technological success in different areas, students understand key focus in the global, national, and local social and economic development and define the priorities in the scientific and private lives. By examining the key problems with the economics, social sector, and environment, students fix the idea that human beings are dependent on the natural resources and that the human impact on the environment should be planned, measured, and controlled. Additionally, they learn that it is more than a fashion fad to separate the trash, reduce disposable, and use smart technologies for a sustainable household. Such knowledge determines sustainable practices in everyday life (e.g., recycling, conscious consumption, zero-waster lifestyle) and demonstrates the need for the careful management of natural sources at the individual level. In this way, students receive not only dry facts, theories, and research concepts but the perspectives to implement this information into their lifestyle, studying, and working routine.

In the time of technical and technological progress, in the era of digitalization and the increased attention to the topic of sustainable development, it is necessary to include the complex discussion about those tendencies into the higher education process, as a part of the interdisciplinary context and practice for trend-searching and trend-analysis. For technical disciplines, this discussion enlarges the perspectives for studying and experimenting, and demonstrates how to apply scientific and technological achievements to the social and cultural sphere. For social and humanities disciplines, the discussion proposes the actual research area concerning the social and cultural transformations caused by technological progress, digitalization, and sustainable challenges. In particular, modern social and humanities knowledge from the higher education should reflect the processes that build social interactions, priorities, and tastes as well as predict further development of social mood.

Additionally, modern higher education should react to the changes, transform the content, and answer to the information society in which students very often know and understand more than their educators. The possibility to create a productive dialogue and interchange of knowledge between educators and students generates a better understanding of the learning objectives and their implementation in the study process. Furthermore, this discussion should facilitate an innovative combined higher education course that can be used at any level of the educational process and can be profitable as a complex of cases and practices.

So, firstly, the discussion on modern technological and sustainable trends opens for students a variety of perspectives for studying, research, and self-development. The modern higher education process has to be up-to-dated, although including the previous achievements and solid theoretical background. Secondly, it enlarges the horizons for job search and career planning due to the awareness of the current trends and the ability to analyze them. Thirdly, the higher education process that reflects the current social, economic, technological, digital trends pretends to achieve the trust and interest of students, to gain the attention, and to incorporate the previous experience into useful, practical instruments.

Literature review

Technological progress creates new challenges and goals for the industries as well as for universities that prepare future employers. As Wyatt (2008) mentions, technological

determinism defines human actions and interactions, creates references and relationships through technological artifacts. So, technologies demand social and economic changes. The robotization of production processes and some services leads to the transformation at the job market, development of specific professional skills and competencies to use and communicate with new automated systems [*Gasumova*, *Porter*, 2019; *Ignatyev*, 2019]. The high speed of innovations spread emphasizes the need to include in the higher education system innovative cases and practices for learning and analyzing. Moreover, innovation policies at the national and international levels create a productive potential for students' discussion and structure the information database regarding the latest scientific achievements and research challenges.

The digitalization process influences the academic field. On the one hand, the popularization of online-education and online-courses facilitates the studying process, opens new perspectives for research and teaching. On the other hand, the variety of online-presented information, in some cases, intricates the choice for a trustful and reliable source. For scientists, the development of digital information means a simplification of spreading scientific knowledge and research results but also transforms the idea and the value of the online-published scientific article [*Meyer, Schroeder*, 2009]. Online-provided scientific communication mainly increases fruitful scientific collaboration [*Shibarshina*, 2019]. Academic mobility and interdisciplinary approach support the academic exchange and creation of trading zones for researchers. However, it demands from scholars a digital competence and more flexibility (as well as the knowledge of the foreign language, access to the computer, and the internet).

Regarding the quality of knowledge, in particular sociological, Platonova (2018) emphasizes that macrosociology investigates the science as a social institution and scientific trends, and microsociology — scientific practices and scientific collaborations that construct new ideas and theories. The scientific knowledge can be constructed with its ideas, social institutions, and social structures. However, the results of investigations, technological objects, and scientific facts, in the same way, create scientific knowledge. The scholar combines these ideas into the methodological considerations regarding the "weak" and the "strong" programs of researching the science. The quality of knowledge in modern science can be questioned regarding theoretical and methodological practices applied online as a part of an emerging e-science due to the increased informatization and digitalization [*Wouters et al*. 2008].

Particular focus should be given to the question of scientific expertise and scientific leadership as key competencies in modern higher education. The problem of authority for students is a crucial problem today in the time of digital culture, bloggers, and influencers. As Allen (2019) denotes, due to social diversity and variety of social, cultural, geographical, ethnical, and other contexts, it becomes more and more complicated to provide definitions, normative, and regulations for scientific literacy.

In order to provoke and strengthen the scientific interest of science and innovations by students, it is significant to deliver capable, practical instruments for its exploration and analysis [*Woolgar*, 2004]. For Russia, in particular, it is relevant to implement specific studying tools and instruments in order to support the concurrence level of Russian higher education and to educate future employers not only for the national but also for the international job markets. Moreover, some scholars mention the significance of the involvement of young scholars in innovative national development [*Biricheva*, 2019].

In contemporary Russian reality, there are very few higher educational programs that obtain methodologies and instruments to talk about science and technology studies. However, the increasing need for professionals who are able to critically evaluate the innovative potential of science and technologies, to define preconditions and challenges in social, cultural, economic, political sectors, and to deal with technological progress and social reality — defines the prospective dimensions in the transformations of the higher education system.

It is necessary to develop and implement those instruments, methods, and techniques that will allow students of different disciplines to be aware of modern trends in various areas, to analyze those trends depending on the studied subject, research goal, or future professional orientation. Moreover, those instruments and techniques should include the solutions and considerations regarding possible difficulties and obstacles in the learning process by implementing in different contexts as into the theoretical basis as well as into the practical exercises. Last but not least, it is significant to differentiate scientific knowledge and everyday knowledge in order to obtain experience in defining valuable and invaluable content.

The following sections describe crucial global tendencies that have to be included in the higher education process as a part of theoretical and practical exercises.

Global trends that influence modern higher education

Several trends affect everyday life and become a significant source for investigation, studying, and analysis, particularly within higher education. These trends combine the cooperation of science, technologies, and society by providing for each field opportunities for changes and challenges. Moreover, a request for transformations stimulates the higher education system for further improvements and practical implementations at the job market.

1. Digitalization

Digital technologies in the last years actively entered academic communities and research centers, business structures, and production processes, even the everyday life of human beings. Digitalization concerns the workflow, the higher education system, the opportunities for entertainment, and spending free time. Digital transformation in business and technologies simultaneously means several risks and some challenges and perspectives at the global and local levels [*Götz*, 2019].

Within the internet facilities, job seekers apply for job vacancies, and recruiters conduct job interviews with the help of digital instruments. So, *online-recruiting* becomes a regular practice in the labor market. Popular online-resources (e.g., LinkedIn, Glassdoor) provide sufficient information regarding potential employers and employees.

The practices of *online-consulting* and *online-education* become an integral part of everyday reality. Realization of certain services online saves time and facilitates the information spread, creates direct connections between consumers and sellers, students and teachers even within the geographical distance. The demand for consultations is increasing due to the development of new areas and fields in the labor market, due to the lack of expert knowledge that is needed up-to-date. Furthermore, the variety of *online-courses* and *online-platforms* offers unlimited opportunities for learning as professional and soft skills as well as various exciting and trendy subjects via the internet. It changes the traditional higher

education system and its tools and instruments of presenting information, of analyzing data and of performing results. The development of *online-libraries* simplifies access to various sources that help in studying and reduces the borders.

At the same time, the trend for digitalization creates *digital culture* and defines the framework for *digital communication*. Social and cultural values of *generation Z* (the Millenials, generations born between 1996 and 2000) are mostly connected to digital culture and digital communication. These young people, as digital natives, know how to deal with mobile devices and electronic gadgets from their early childhood; they consume and interpret the information in a different, digital way [*Williams*, 2015]. Bloggers, as a new reference group and authorities for younger generations, receives their fame, audience, and profits entirely due to the digitalization trend. Visual content prevails the textual information, including the higher education system.

Moreover, the digital culture supported by the popularization of social media determines new norms and values in society. The digital etiquette, digital norms in communication, the variety of digital products help individuals to deal with everyday routine and daily tasks (e.g., mobile apps). Digitalization and access to the internet stimulate the networking processes as in the science as well as in education, at work, by interpersonal contacts. The area of entertainment and free time is slowly moving to the digital world, too. Today individuals can meet new friends, date with someone, do shopping, practice sports and hobbies — and this is possible within the digitalization process.

However, parallel to the popularization of digital culture and digital communication, there is a trend for *digital minimalism* [*Brabazon*, 2012]. It mainly refers to the temporary denial of the use of gadgets for a digital detox as a way to minimize stress and anxiety [*Sutton*, 2017].

Regarding the higher education system and generation Z, new requirements, not only for the job market but primarily for the higher education system, appear. Young generation with different relations to media and digital data expects new teaching methods and advances approach in learning and practicing [*Baumöl, Bockshecker*, 2017]. These expectations endanger the higher education system that is not always prepared for such demands and transformations. Some scholars, for instance, mention the sufficient level of digital infrastructure in Russia to provide the digitalization of the higher education system [*Bogoviz et al.*, 2018]; however, some gaps in establishing governmental regulations and digital modernization slow down the advancement of Russian digital higher education system.

So, apart from the general awareness of the digital trends, students should be involved in various digital activities provided by the universities, at the formal and even informal levels. The delivery of knowledge about digital instruments in study and job search and the understanding of the digital culture by students will positively affect the construction of today's higher education image.

2. Technologies

Technologies serve today all possible needs of the modern world, from ordering food to organizing a global online conference. The leading areas of its business and scientific applications are *robotics*, *analyzing big data*, *3D-printing*, and *cloud computing*. The job market demands specialists with expertise, particular experience, and abilities to work in fast-changing conditions [*Fossen, Sorgner*, 2019]. The development of *start-ups* in some points became possible due to the interest in digital technologies and the need to implement and develop them. As some scholars mention, specific knowledge and skills in establishing

start-up ideas are high-demanded and send, in turn, a request to the higher education institutions for proposing education programs [*Fritsch, Wyrwich*, 2019].

In the same way, technologies deal with the *app's development*, create the *software* for online-recruiting. The popularity of *live-chat services* endangers the need for offline-offices and service centers. Furthermore, *online bots,* which replace human beings, endanger the need of people at work at all. Some scholars already mention the potential risks of implementing automation technologies at the Russian job market [*Zemtsov*, 2019].

Technologies provide the functioning of online-services mentioned above (e.g., education, training, recruiting, dating online). *E-commerce* provides new business models and a new type of customers through the use of internet-based platforms and mobile applications [*Aktymbayeva et al.*, 2018].

Furthermore, a *high-technology business* that is obviously based on technological achievements and instruments provides a new business sector. *Business incubators* for start-up initiatives foster the establishment of a new type of business people and business communication [*Davey et al.*, 2008]. For instance, such online-platforms as Instagram create by presenting the visual content a competitive model at the economic market and successfully deal with big amounts of digital information [*Fakhrutdinova*, 2020].

Technological tools as *wikis, blogs, podcasts*, different application for online-learning and self-study facilitate the implementation of technological progress in the education process. Some scholars define successful higher educational strategies and instruments that help students communicate, collaborate, work with different data, and analyze it [*Beldarrain*, 2006; *Hsu*, 2007]. Moreover, the capacities of virtual technologies provide the chance to replace some of the learning activities and materials and transform them into much attractive for students studying area [*Martin-Gutierrez et al.*, 2017].

At the same time, other scholars denote some difficulties in the implementation of technologies in the higher education process. For instance, differences in technology adoption, openness for changes from students and university administration, or in levels of technological progress in different countries may hamper the educational transformations [*Keengwe, Bhargava*, 2014; *Rogers*, 2000].

The use of modern technologies, apps, and online-platforms for the study process will incorporate technological trends into the education process. Moreover, technological competence will increase the students' chances for attractive internships and job offers.

3. People and communication

Both digitalization and technological progress affect the way people communicate. It becomes more comfortable and faster due to connect due to the working duties as well as for interpersonal communication. Moreover, digital culture establishes *new social and cultural norms* in personal and business communication; the ideas of *digital etiquette* receive the attention and interest of business practitioners and researchers [*Mamina, Yelkina*, 2019]. *New formats for business meetings* as Skype- or Zoom- conferences become an integral part of the everyday working reality. Business correspondence operates in the online-format; recruiters use the candidates' profiles preferably in social media to receive the information about the person. As a part of *social media marketing*, big and small companies create accounts in popular social media in order to catch the potential audience at their usual communication resource [*Ramsey*, 2010].

Online-based networking as a part of private and business communication simplifies the search for coworkers/colleagues, clients, business partners; it provides useful online-sources

and private contacts by saving costs, money, and time. Moreover, online-networking participates in the creation of thematic online-communities in business and science. Online-communication by several advantages replaces face-to-face-communication [*Subramanian*, 2017]; however, interpersonal contacts in the offline-format still play a significant role in human interactions.

Digital culture determines the *dominance of the visual content* as the most attractive and demanding, particularly by the younger generations. The visual content today is also created by the developed digital technologies: visualization of objects and ideas prevails textual information. The increasing speed of changes and the expanding amount of information that individuals consume everyday lead to the transformation in the information perception; so, the visual content becomes a solution. For the younger generation, the Millenials, it is more convenient today to communicate via mobile devices by sending audio messages and making videocalls (in comparison with texting and direct calling).

As a consequence of access to various information and the appearance of new professions, the need for self-development and learning new skills grows day by day. Online-education platforms, online-courses and online-coaching, as was mentioned above, stimulate the interest to further education and create new social and cultural challenges. Furthermore, access to digital information through web-resources and online-libraries simplifies the learning process, provides better knowledge quality, and activates the knowledge exchange.

On the one hand, individuals develop their own business, implement personalized ideas for start-ups and social business [*Lobareva et al.*, 2018]. On the other hand, the practices of co-working, co-living, sharing objects, ideas, and services gain popularity in different areas of human life. Special attention receives the individual practices of self-care, digital detox, and personalized medicine. The increase of stress and acceleration of time in modern society negatively reflect on individual's minds. The growing interest in various sports, mediation, yoga practices allows individuals to decrease the level of nervosity and anxiety. Furthermore, practices of digital minimalism, mainly dependent on the digitalization and technological trends, perform the contradictory idea to stay connected and to stay disconnected.

Particular attention receive studies regarding human health, genome, and methods to prolong human life by preventing potential diseases. It may be connected with the technological progress that offers scientists to conduct studies and tests at the new level [*Ahteensuu, Blockus*, 2016]; with social and media pressure and translated images of the perfect healthy body that provoke the mass to copy such a lifestyle. Additionally, personalized medicine brings all the investigations at the level of forecasting, predictions, and precise analysis; it is a connection with futuristic ideas and concepts about infinite life [*Sagarin*, 2013].

The modern higher education process should include all the latest digital facilities to provide access to actual data, software, and online resources. The communication between students and course instructors may include interactions through social media if it answers the studying goals. The ideas of digital etiquette and new social and cultural norms in the digital context should be transmitted from the university structures to the students.

4. Expertise

In the time of innovations and transformations, the need for experts is incredibly high. *New professional areas, new software, new business strategies* create a variety of expertise

demanded. Technological determinism requires those professionals who can deal with new challenges and innovations and create business ideas that fit technological trends in the market. The digitalization trend claims for deepening those competencies that apply for the digital areas of work and communication.

So, the advancement of offline- and particularly online-courses and platforms provide the knowledge and the authority in a specific field. Digital culture and technologies simplify the spread of such expertise within social media (e.g., Instagram). Plenty of bloggers and influencers today transmit their expert knowledge through private media channels and accounts.

In the higher education system, the expertise demand challenges the *authority of a course instructor* in comparison with popular media experts. So, the main goal for the higher education process and course instructors in the new conditions is to deliver expert knowledge by following modern digital and technological trends and including them into the learning materials and teaching instruments. Furthermore, expert knowledge of educators that embraces digital technologies should dominate the expertise of media authorities and support the higher education system by providing digital instruments applied to the study cases and practical work.

5. Sustainability

Finally, the topic of sustainability embraces today all the areas of human life. From natural resources and national economics to the urban planning and conscious consumption, the sustainable development concerns the interaction between science, technologies, and individuals. Furthermore, the *need for the expert knowledge*, *technological innovations*, *digital communication* for sharing successful practices, *effective instruments* of implementation of sustainable ideas create the fruitful field for scientific research, business investments, governmental policies, and citizen participation.

In the scientific area, sustainable challenges create new *networking hubs*, stimulate *partnership* in research, analysis, and publishing, provide new perspectives for investigation, and warn about endangered areas and negative impacts. Technological progress maintains the implementation of sustainable innovations, assures the variety of creative approaches in different disciplines, motivates for the search of novelties and new solutions.

In business, sustainable ideas change the *structure of financial relations*, relations between manufacturers and consumers, sellers and customers constitute new vacancies at the job market. Sustainable solutions in business and manufacturing influence on the brand image, marketing, investments, and ranking at the global and local levels [*Katrandjiev*, 2016].

In particular, the interest on sustainable expertise at the level of corporations and at the level of regular consumers provide new options for higher education system. It opens the possibilities to study the topic from the interdisciplinary perspective, take into account various factors that influence the final result of sustainable innovations. Furthermore, it is possible during the classes to discuss sustainable ideas and analyze sustainable practices applied to many disciplines and areas of human activities (e.g., economics, manufacturing, fashion, urban design, transportation, waste systems, health system). So, as in the technical field of studies as well as in the social and humanities field, the discussion of the topic of sustainability will be fruitful and profitable. Additionally, a course instructor's competence to explain sustainable ideas on the examples from various areas will strengthen his/her expertise and authority among students.

Conclusions

So, the article explained the importance of including the discussion about global trends into the process of higher education. It defined preferred areas of scientific research and analysis and emphasized future dimensions for business development and financial investments. By challenging the content of social and humanities disciplines, this article reviews the profits for students and educations of certain transformations in higher education process. The main goal of this work was to determine the need for changes in the higher education today and the relevance of discussions about global technological, social, digital, and sustainable trends.

Science and technology studies include several disciplines and provide an understanding of scientific and technological knowledge. It embraces the ideas of technological determinism, social and economic welfare, environmental issues, digital communication, expert knowledge in new technological fields. However, it is significant to include in this approach the connection to society and individuals: human beings consume all the technological and digital products, implement them in everyday life, something ignore, something accept; define social and cultural values resulted by new global trends. In this way, society influences the development of science and technology studies.

The digitalization trend is presented by using digital tools and technologies for the study process (e.g., online courses, online-libraries, online-consulting). Moreover, it determines the digital culture and the ways of communicating online as well as some digital minimalism practices in the online activities that are suitable for the education process. The technological trend covers many areas of human activities (e.g., software, different apps for work, study, and entertainment). The technological competence becomes a significant skill today as for students as well as for educators that facilitates the trend incorporation and development in the higher education process. Digital technologies establish the basis of digital etiquette and online-networking that simplifies the communication between students and educators. The need for expert knowledge is quite applicable to the higher education system to provide an authoritative perspective supported by digital competencies and technical skills. Finally, the sustainable trend today constructs the core competence that will be useful and significant at the university as well as at work.

Social approach in the studies of science and technologies maybe useful as in the academic field as well as in business, production processes, and sales [*Noell, Gansle*, 2009]. So, there is a need in the Russian higher education system to develop those studies, to accelerate theoretical ideas and empirical research in order to deliver the high-competent product to the educational and job markets, preferably at the national and the international levels.

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Вызовы к системе современного высшего образования в контексте социальных, цифровых, технологических и экоустойчивых трендов

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Статья рассматривает некоторые идеи относительно того, как включить дискуссию о глобальных трендах в систему высшего образования, в частности, в социальные и гуманитарные дисциплины. Такие тренды, как цифровизация, технологический прогресс, изменения в коммуникации, запрос на экспертное знание и экоустойчивые решения, определяют современное взаимодействие науки, технологий и общества. Включение таких тем в высшие образовательные программы для студентов (в форме теоретических концепций, эмпирических исследований, бизнес-кейсов) способствует развитию критического мышления, расширяет перспективы для студентов как во время учебы, так и после нее в процессе поиска работы. Осведомленность о глобальных трендах способствует развитию идеи о новых социальных и культурных ценностях, увеличивает интерес к изучению актуальных тенденций в конкретной области, а также поддерживает значимость экспертного знания в эпоху всеобщего доступа к информации. Статья предлагает обзор тех глобальных трендов, которые при включении их в содержание образовательных программ высшей школы могут положительно повлиять как на сами программы, так и на качество знаний и компетенций студентов.

Ключевые слова: тренды, цифровизация, устойчивое развитие, коммуникация, экспертиза, ценность, современное высшее образование.