

Formation of Information and Communication Competence as a Factor of Sustainable Development in the Digital Economy

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Abstract: The article deals with the problem of human adaptation in a constantly changing information society. Socio-economic changes that affect not only society as a whole, but also the life of each individual, require changes in the education system, including higher education. The concept of "information and communication competence" as a key characteristic of the personality of the new knowledge society is clarified. Given the impossibility of predicting the consequences of the explosive development of digital technologies, every subject of labor relations should be prepared to create a situation where many professions will be automated, and the people employed in them will be faced with the choice of a new direction of labor activity. In this situation, changing the content of academic disciplines to include content that contributes to the formation of an algorithm for responding to any stressful unfamiliar situation becomes justified. The student, in the course of performing various tasks, forms the components of competence that ensure an adequate response to any changes in professional activity. The study revealed the initial level of formation of information and communication competence among students of the technical university. The analysis of the consequences of the willingness of students to show this or that quality of personality is carried out. The goals and objectives of further work are outlined to form the readiness of students to respond to any unfamiliar situation with the least psychological and physical costs with the greatest efficiency.

1 INTRODUCTION

The beginning of the XXI century in Russia and around the world was marked by fundamental changes in the economy and the structure of society. There were new concepts that did not exist at the end of the XX century. The rapid development of technology has caused changes in society at the level of state governments. In the Russian Federation, the need to transform the regulatory framework for the existence of the Russian society is confirmed by the Decree of the President of the Russian Federation of May 9, 2017 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017 – 2030" (Decree of the President of the Russian Federation, 2017). It establishes the main provisions governing changes in all spheres of the country's life, such as the "information society", "digital economy", and "knowledge society".

In the current circumstances, the role of the education system in ensuring the stability of the country's existence is repeatedly increasing: on the one hand, education lays the foundation for the success of the country's young population, on the other hand, the effectiveness of the system of advanced training or professional retraining contributes to the confidence of older generations in the future.

Informatization and globalization of the world economic space require the search for new models of education, self-development and self-actualization.

2 RESEARCH METHODOLOGY

As part of our research, we conducted an experiment that allowed us to identify the initial situation with the formation of the competencies that interest us, which make up information and communication

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competence (Timoshchuk & Myakinkova, 2018). This competence allows a person in an actively changing society and economy to develop a successful strategy for personal change, to think through a plan for implementing this strategy, to implement this plan with optimal expenditure of mental and physical strength. Such personal transformations will allow the individual to be confident in the success of their professional trajectory, which means that they will ensure the stability of the individual in an ever-changing world.

The set of competencies under study was determined based on the analysis of socio-economic characteristics of an actively developing information society.

The ability to navigate the flow of information, the ability to work with various sources, classify and summarize the found content – all this will be a fundamental component of the professional competence of a specialist of any profile in the near future.

Conscious motivation of the individual in the information society for continuous self-education, the ability to strategically and tactically plan their educational and work trajectories, and the willingness to implement effective interaction in the process of information exchange are the most important characteristics of the professional personality in the digital economy.

The study was conducted on the basis of Samara State Technical University with first-year students of the Institute of Oil and Gas Technologies (INGT) and the Faculty of Heat and Power Engineering (TEF). The total number of participating students is 91 people.

Before conducting the survey, a lecture was given, during which information was presented that reflects the main trends in the formation of a new information society.

The survey consisted of questions selected in such a way as to reveal the readiness of students to start working in the conditions of active manifestation of informatization and globalization of the world economy. Some of the questions reveal students' motivation for constant changes in their educational and work trajectories.

At the end of the survey, the results were analyzed both for an individual and for the entire group as a whole. The summary characteristics of the group were presented to the students at the next lesson before performing practical tasks with an explanation of the role of a particular personality quality for success in work.

3 RESULTS OF THE STUDY

One of the key features of modern society can be called uncertainty in the prospects of social development, because the digitalization of all spheres of human life, as well as the virtualization of living space, is actively taking place at the moment. And the results of these two processes are very difficult to predict.

In our study, a whole group of questions is devoted to identifying the motivation and readiness of students to constantly stay in an unstable society. The realities of modern society have created the effect of "employment on demand" (Schlichter, 2020), so the ability to draw up a plan for effective integration into the situation, to implement the prepared plan with constant adjustments if necessary, becomes the main one in ensuring the stability of the individual in an unstable society (Ayob, 2021).

When asked about the reasons for choosing the direction and profile of study at the university, as well as the importance of the future profession in society, the students answered as follows:

- interesting work – 22 people (24%);
- promising profession – 14 respondents (15%);
- high salary – 19 students (21%);
- in-demand profession – 10 people (11%);
- selected on the advice of parents/relatives - 11 students (12%).

The rest of the students chose the profession by chance, because of prestige, etc.

A very important profession is considered by 53 students (58%), not the most necessary in society by 18 people (20%), the rest of the respondents consider the future profession not important (22%).

When determining the profession that will need to be chosen, if there is such a need, the answers were distributed as follows: the field of IT technologies interested 30 respondents (33%), medicine – 6 people (7%), and then the range of professions was very wide: architecture, ecology, sociology, actor/presenter, law enforcement agencies, entrepreneurship, stylist/designer, etc., but in general, for each profession, no more than one or two respondents.

When determining where to get an education in a new profession, some of the respondents were inclined to higher education – 39 students (43%), 37 people (41%) chose self-education/courses, 10 people (11%) they count on corporate / additional education.

48 students (53%) expressed confidence in the right choice of profession, 24 people (26%) doubt their choice, 5 respondents (5%) are not sure that the

choice is correct, and the rest found it difficult to answer.

30 students (33%) are ready to show creative initiative in their work, 39 respondents (43%) prefer calm, measured work without any uncertainty, and the rest found it difficult to give a definite answer.

29 students (32%) are interested in technological innovations, 31 students (34%) are not interested, the remaining respondents could not formulate an answer.

Answering the question about the sources of information, students noted that 75 people (82%) most often use Internet resources, 70 students (77%) are in the second most popular place (television, radio, newspapers, magazines), 52 respondents (57%) are less popular with books, and 28 people (31%) communicate with other people.

The question of how to process information for more complete memorization, as well as visual representation, caused great difficulties. The most popular method turned out to be taking notes – 23 students (25%), 15 students (16%) also called the selection of information by color/symbols, 16 people (17%) convert information into a diagram, 12 students (13%) make charts, plan, write theses, prepare presentations (for each type less than 10% of the respondents).

The following answers were received to the question of what we use to form an opinion about a stranger: 74 students noted the role of a person's appearance (81%), and 70 respondents (77%) consider speech/behavior/mannerisms to be equally important. The value of intelligence and humor was noted by 5 people (5%).

The question about the knowledge of style differences in the language revealed the following picture: 53 respondents (58%) know the features of the scientific style, 48 people (53%) know the official business style, 47 students (52%) know the conversational style, 38 people (42%) know the journalistic style, and 38 respondents (42%) know the artistic style.

The main task of education is the formation of a personality that would be ready to recognize any innovations in the socio-economic sphere, reflect on them, as well as develop an effective strategy for responding to them in order to adapt. In case of insufficient effectiveness of the actions taken, the person of the future should be ready to analyze the reasons and make adjustments to his life path.

Information and communication competence as an integrative characteristic of an individual contributes to the willingness to realize all these

personal qualities in order to achieve social and individual success.

In order to most effectively build the educational process, it is necessary first of all to identify the level of competence formation at the initial stage of the study.

In our study, the following definition of information and communication competence was taken as a basis: an integrative characteristic of the student's personal qualities, manifested in the ability to assimilate educational information, independently determine the amount of necessary additional information, identify the sources of its receipt, evaluate the reliability of these sources; in the knowledge of the channels for obtaining information, the optimal ways of processing it for the most effective use in the learning process, as well as interpersonal and intergroup interaction.

4 DISCUSSION OF THE RESULTS

The rapid change in social formations at the beginning of the XXI century creates many problems for both society as a whole and the individual: "Digitalization does not just affect all spheres of human activity and the functioning of the state – it transforms them at the fundamental, systemic, paradigmatic level, laying information and communication technologies as the basis of each sphere and industry" (Korshunau & Kroitor, 2020). A person should not just be aware of the changes, he must be ready to meet them intellectually, mentally, physiologically, so as not to feel "falling out" of society (Holgerson, Jia & Svenkerud, 2021).

The results of the survey are indicative: when choosing a future profession, representatives of the younger generation think about the prospects (15%) and demand (11%). But in quantitative terms, such young people are a quarter of the respondents. A fifth choose a profession based on the size of the salary, and the same number on the degree of personal interest. The results show that few representatives of the younger generation of Russians think about the near professional future, not to mention the long-term professional perspective. Especially in the light of research that shows that in the next twenty years, "in the United States, 47% of professions are at high risk" (Schlichter, 2020). One can, of course, hope that the situation in Russia will differ from the global one, but so far there are no prerequisites for this. On the other hand, long-term forecasts in the professional sphere are now difficult to give with a high degree of confidence.

As a result, it becomes clear that it is not necessary to teach a particular profession, but to prepare students for the fact that it will be necessary to master any professional activity that will suit the subject of labor relations according to the required parameters. To choose a new profession, several factors must appear: a person must realize the obsolescence of the existing profession, determine the direction of changes that best suits him according to the signs. In the conditions of rapid development of digital technologies, it is highly likely that a new profession will be associated with a technological innovation, which is now only beginning to be considered by technical specialists. This means that the professional of the future is required to track innovations.

Our research has shown that only a third (32%) of the younger generation is interested in technological innovations. And such results were shown by a study conducted among those who practically coexist with digital technologies from birth, what can we say about those who are faced with innovations in adulthood. As a result, it can be determined that the task of vocational education, including additional education, is to eliminate or at least reduce the digital illiteracy of active participants in labor relations.

Then the choice of a new profession will not be difficult for a professional. Especially if the goal of education is to train a transprofessional specialist "with relevant competencies (hard -, soft -, digital-skills)" (Zinchenko, Dorozhkin & Zeer, 2020). Such a participant of labor relations in the case of obsolescence of the profession will be able to understand all the characteristics of the current situation, to understand the problematic points, to outline a way to overcome difficulties. And the beginning of the path of change always begins with the collection of information necessary to obtain new professional competencies.

The study showed the full confidence of the younger generation in Internet sources of information (82%), as well as the mass media (77%). 57% of respondents receive information from books, 31% trust the information that becomes known after communicating with other people. The preference given to such sources of information determines the importance of critical thinking, because the mass media, which can include various sites, blogs, social networks on the Internet, represent a wide field for various manipulations of people's minds (Oleshko & Mukhina, 2020). And indirectly, such influence occurs through communication with other people, because they can also fall under the influence of unscrupulous sources of information.

On the other hand, in an information society, a person consciously or unconsciously tries to limit the number of sources of information, especially those that violate the established picture of the world (Zakharkin & Rakitina, 2020). In a situation of urgent need for a change of profession, a person, on the contrary, needs to collect the information that he has not yet used in his life, because it was irrelevant or because it was uninteresting. In order to understand what knowledge is not enough for changes in life and work, it is necessary to restructure the existing information or constantly transform new information in order to increase the visibility and depth of understanding of new knowledge through systematization. From this point of view, it is worrying that no more than a quarter of the students surveyed use various ways of processing information in order to increase clarity and clarity. The process of converting text information into a diagram, table, selection of abstracts, and writing an abstract contributes to the "compression" of a large amount of information, which provides a faster analysis of the reliability of the source, as well as awareness of what information is missing for a more complete picture of life. It is not surprising that it is difficult for the younger generation to cope with a large amount of information that remains unreflexed, and therefore does not pass into the "piggy bank of knowledge" of a professional.

The next step after receiving and processing the necessary information is to understand in which area to continue professional activity. Often, a new profession requires a more or less systematic education. And the surveyed students are quite confident about the ways to provide it: higher education institutions (43%), as well as self-education and courses (41%). Obtaining a second higher education is time-consuming, on the other hand, it is experiencing serious difficulties associated with many objective circumstances (Pilipenko, 2020).

Self-education and training in various courses (including online) require students to be self-disciplined, ready to use innovative technologies. The latter indicator explains the high level of popularity of the second higher education. The younger generation is often ready not to spend too much time on re-education at the university, but in the conditions of the need for monetary costs, it is necessary to focus on the older generation, which is more conservative. Therefore, more confidence is placed in the traditional way of obtaining education, i.e., the second higher education (Pishnyak & Halina, 2021).

It is necessary to note another aspect of self-education: the motivation of students to use

educational electronic content. On the one hand, the negative point is that non-core subjects are perceived as unnecessary by students, so electronic resources in these disciplines are not used at all or are used as a source of ready-made materials for writing term papers, passing tests or exams (Belyakova & Zakharova, 2019). In such a situation, special attention should be paid to motivation, because often students, due to a shallow immersion in the specifics of the profession, consider academic disciplines optional for study, and later the gaps in knowledge have to be filled in the course of professional activity.

On the other hand, the use of electronic resources in the educational process will make it possible to move from a monological style of interaction between a teacher and a student to a dialogical one (Somkin, 2019).

The results of the answer to the question about the readiness for creativity are indicative – only a third of students are determined to be creative in their work, 43% would not like any surprises at work, and 24% did not even think about the possibility of creativity in the workplace, so they do not have an established opinion. Even during the introductory lecture before the survey, it was noticeable that the prospect of constant changes in the profession, the possibility of a situation when it will be necessary to choose another profession, caused students disturbing questions. As a result, it is necessary to consciously introduce a component into the process of obtaining education that allows students to form resistance to stressful situations of changing jobs, to develop an algorithm of actions in any situation of uncertainty.

And another important point that has been analyzed is the awareness on the basis of which we form an opinion about another person and, accordingly, also form an opinion about us. The respondents confidently named two aspects: the appearance of a person (81%) and speech, behavior, and manners (77%). Indeed, the first acquaintance with an unknown person largely depends on these factors. But the answer to the following question made many students think – what are the differences in speech depending on the style used, for many it was difficult to list the styles: 40% of students simply could not do it. Knowing the leading role of speech in creating the image of a person, half of the students have no idea what components should be taken into account when constructing statements in different life situations. It is quite likely that this is manifested by "clip thinking", which is increasingly being talked about by researchers (Papusha, 2020). It does not allow a person's consciousness to suffer from an overload of a large amount of information, but this is

achieved by the fact that the whole picture of the world is broken into separate fragments. Each piece of reality gives limited information about the world, this information is correct, but by changing the semantic content of each "clip" very slightly, we get the opportunity to manipulate consciousness, because it is much more difficult to track the elements of manipulation in a large number of fragments than when you see the whole picture. Accordingly, teaching the younger generation to see the whole picture is the most important task of the education system.

5 CONCLUSIONS

The first decades of the twenty-first century have shown that socio-economic changes have an impact on the entire world community. Changes occur at the ideological level, affecting all spheres of life of society as a whole and an individual.

Such changes always seriously affect the stability of a person in a changing reality. The task of the state and its educational system is to prepare the individual for life in conditions of uncertainty of the consequences of constant changes. These changes are rapid-technological innovations appear several times in the course of a generation. And if the younger generation, due to the openness of consciousness, can still perceive innovations, the older generation often does not have time to comprehend all the innovations. But even young people are not always psychologically and intellectually ready to meet the requirements of the new reality. Our research has shown that by many indicators, about half of the respondents already do not have effective mechanisms for adapting to a changing life.

It is impossible to foresee all possible changes, but it is quite realistic to develop an algorithm of actions in a stressful unfamiliar situation to understand the problem, identify key concepts, collect information on them, process this information in order to use it to resolve the situation, analyze the effectiveness of the actions taken, adjust behavior if necessary. The final stage is the analysis of what happened or failed to do, the identification of the reasons.

The formation of such an algorithm of actions will be facilitated by the purposeful inclusion of the formation of information and communication competence among the tasks of studying various disciplines of the curriculum, the individual components of which are components of a person's readiness to respond to constant changes in the surrounding world. Changing the content of academic

disciplines, in particular, the disciplines of the social and humanitarian block of the curriculum, is the next stage of our work.

REFERENCES

- On the Strategy for the Development of the Information Society in the Russian Federation for 2017-2030. *Decree of the President of the Russian Federation*, 203 of 9.05.2017
<http://www.kremlin.ru/acts/bank/41919>
- Timoshchuk, N., Myakinkova, S. (2018). Professional mobility in the context of the concept of formation of a competitive graduate of a technical university: information and communication aspect, *Modern problems of science and education*, 2, page 107.
- Shlihter, A. (2000). The impact of the Fourth Industrial revolution on the formation of human capital and the evolution of the global labor market. *Society and Economy*, 4:56-72.
 DOI: 10.31857/S086904990009179-8.
- Ayob, A. (2021). E-commerce adoption in ASEAN: who and where? *Future Business Journal*, 7:4.
 DOI: 10.1186/s43093-020-00051-8.
- Korshunau, H., Kroitor, S. (2020). Digital literacy as a key factor in the successful adaptation of individuals and societies to digitalizing reality, *Society and Economy*, 1:38-58. DOI: 10.31857/S020736760008037-9.
- Holgersen, H., Jia, Z., Svenkerud, S.(2021). Who and how many can work from home? Evidence from task descriptions. *Journal for Labour Market Research*, 55:4. DOI: 10.1186/s12651-021-00287-z.
- Zinchenko, Yu., Dorozhkin, E., Zeer, E. (2020). Psychological and pedagogical bases for determining the future of vocational education: vectors of development. *Education and Science*, 3: 11-35. DOI: 10.17853/1994-5639-2020-3-11-35.
- Oleshko, V., Mukhina, O. (2020). Media literacy as a method of countering media manipulation at the household level. *Sign: problematic field of media education*, 2(36): 35-44. DOI: 10.24411/2070-0695-2020-10204.
- Pilipenko, O. (2020). Current problems of higher education in the context of development of knowledge economy management. *Vestnik Voronezhskogo gosudarstvennogo universiteta. Series: Problems of higher Education*, 2: 11-15.
- Pishnyak, A., Khalina, N. (2021). Perception of New Technologies: Constructing an Innovation Openness Index. *Foresight and STI Governance*, 15(1): 39-54. DOI: 10.17323/2500-2597.2021.1.39.54.
- Belyakova, E., Zakharova, I. (2019). Interaction of university students with educational content in the conditions of information educational environment. *The Education and Science Journal*, 3(21):77-105. DOI: 10.17853/1994-5639-2019-3-77-105.
- Somkin, A. (2019). Personally-oriented approach in the system of education in the humanities: From

monologism to dialogical model of teaching. *The Education and Science Journal*, 3(21): 9-28. DOI: 10.17853/1994-5639-2019-3-9-28.

Papusha, I. (2020). Culture of speech in the age of clip thinking. *Actual problems of speech culture*. Materials of the All-Russian Scientific and Practical Conference, pages 3-11.