

**FaR 2021****International Forum “Freedom and responsibility in pivotal times”****SPECIFICITY OF USING ARTIFICIAL INTELLIGENCE IN  
SCIENCE AND EDUCATION**

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**Abstract**

The article analyzes the experience of using mass distance learning technologies (DLT) in the context of the coronavirus pandemic, as well as the specifics of using the artificial intelligence by educators and trainees in the remote pedagogical interaction situation. The psychological, cultural and futurological consequences of the carried out global pedagogical experiment are analyzed in connection with the epidemiological situation emergency. The theses on the irreversible nature of the implemented innovations, as well as the subsequent elimination of the teacher's figure from the structure of the pedagogical process, are substantiated. Assessing the situation that has developed in the field of modern professional education, the authors reasonably assert that the priority is rather a revivalist than reformist "scenario" of the development of events around the problems of artificial intelligence. In our opinion, the supporters of the idea of the development of artificial intelligence have thoroughly underestimated its capabilities, based on the position that the development of certain technologies can lead to the displacement of a person exclusively from the fields of activity related to physical labor, which will allow directing the released human resources into the field of intellectual labor. We have to state that already today the situation is such that artificial intelligence can potentially displace humanity from this sphere of activity. It can be assumed with a high degree of confidence that even texts like the one presented by us may be successfully modeled using appropriate computer programs, as well as other intellectual products, experiments and engineering projects.

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## 1. Introduction

The coronavirus (COVID-19) pandemic, in addition to economic shocks in the global economy and mass culture, has entailed the qualitative and, apparently, irreversible changes in other spheres of public life, including, first of all, education, where for the first time in history, the massive transition to distance learning technologies (DLT) was implemented. It is noteworthy that in the Russian Federation, the use of DLT continued up to October 2020, despite the official of self-isolation cancellation. Paradoxically, the pandemic has activated those social processes that were clearly visible in the educational sphere before it, namely: the ousting of “protein” teachers from this sphere through the spread of technologies is one way or another associated with artificial intelligence. The most obvious examples of this kind are USE and testing as a form of students' knowledge control. In other words, the “protein” teachers, who were still carrying out the educational process, were removed from its final component on the grounds that, unlike a computer program, being subjects, they cannot be completely objective in assessing the knowledge of the students and schoolchildren they teach. In this regard, we recall one of the middle plots in now practically deceased and supplanted science fiction "fantasy" genre of the last century, when the judicial process of the future presupposes a robotic judge who, after listening to the "protein" prosecutor and lawyer arguments, makes the final "objective" decision.

Today, this fantasy has practically acquired the status of reality, although not in the legal sphere, but in the educational one. As the situation with the coronavirus pandemic is still far from final resolution. Its philosophical, pedagogical and psychological comprehension is being pushed back into an uncertain future. However, even today it is possible to summarize some intermediate results, identifying socially significant pain points arising in the process of transition from classical ("protein") educational methods to the latest educational technologies, one way or another associated with the artificial intelligence introduction into the educational process. Of course, our research can be interpreted as premature. Moreover, in spite of the prevailing orientation towards globalization in the modern world, this study accumulates the educational experience of one educational system and one country – the Russian Federation. At the same time, the global processes of our time, reflected in the coronavirus pandemic, equally affect all regions of our planet and, at the same time, do not leave sufficient time for their individual comprehension. This is because in the conditions of the permanently modifying reality, its lagging in phase comprehension is simply turns out to be meaningless, so identifying possible causes can no longer help us if their negative consequences have already been realized.

## 2. Problem Statement

Carrying out an abstract understanding of the historically developed situation, we are trying to logically reconstruct its genetic foundations, which in this particular case brings us to the concept of one of the Western philosophy of science classics, Michael Polany, outlined in his work "Personal knowledge" (Polany, 1985, p. 344), to which another significant representative of the same Western philosophy direction – Karl Popper – responded with the work "Objective knowledge" (Popper, 2002, p. 384). The ideas of the first named thinkers in relation to the context we are examining should be interpreted as a potential rejection of distance education methods, and long before their global spread. While the second of

the named thinkers was potentially a consistent supporter of the named methods, which, in particular, was manifested in the utopia of “abstract society”, which he sketched out (Popper, 1992). However, K. Marx also described the communist ideal in his works in a rather abstract and relatively laconic manner.

### **3. Research Questions**

The empirical basis of the study is the practical experience of teaching using distance learning technologies, obtained by the authors of this study in the second half of the 2019–2020 academic year. The considerations were voiced by their colleagues aged 60+ during the exchange of opinions in private conversations, as well as during meetings of scientists and methodological councils of some Samara Region Universities. At the same time, we were mainly interested in the modality of the corresponding technologies perception, the statistical parameters, the orientation towards which would turn our research from a philosophical and pedagogical to sociological one.

### **4. Purpose of the Study**

The purpose of this study is to identify and methodological analysis of the transition of the Russian educational system to total distance education in the second half of the 2019–2020 academic year. At the same time, we will try to identify not only the psychological, but also the philosophical and cultural consequences of this kind of transition. Moreover, this will, happen not only in relation to students who, to one degree or another, have received significant experience of interacting with artificial intelligence, but also in relation to teachers who have lost physical contact with your audience.

### **5. Research Methods**

The methodological basis of this study is the method of ascent from the abstract to the concrete, which we borrow from the Marxist philosophical tradition, as well as the principle of the historical and the logical unity.

### **6. Findings**

The negative attitude towards modern information technologies and artificial intelligence in relation to Russia has a long history dating back to the period of the of cybernetics start, which is indicated by the publication of the same name work by Wiener (1958). The Stalinist USSR unmistakably identified the danger of this scientific innovation for the "cause of socialism." Indeed, the subsequent development of cybernetics-related technologies has led not only to the "blue collars" number decrease, i.e. industrial workers, whose numerical domination should have led to the "dictatorship of the proletariat" even in the conditions of "bourgeois democracy", but also to the "white collars" mass dismissal, now called "office plankton" in Russia. In other words, the very first experience of the information technologies introducing into the Western production system clearly demonstrated their social consequences, which consist in the massive ousting of “protein” performers from the production sphere. As a result, the proletarians percentage

in the total mass of the industrialized countries population decreased so much that only complete idealists and utopians could speak of the proletarian revolution in the Marxist sense.

Today, the tendency towards the final elimination of the proletariat as a class in order to structure the total and eternal dictatorship of the bourgeoisie as a real alternative to the proletarian dictatorship established within the framework of Marxism is taking on visible outlines. According to futurological prognosis, which there is no real reason to mistrust, by the middle of the XXI century almost all professions, one way or another connected with physical (mechanical) labour, will disappear. They are a driver, builder, loader, salesman, cashier, etc. And in the long term, it threatens to turn the corresponding century into an era of total unemployment. It is the clear awareness of this kind of "bright prospects" of mankind that the current generation of entering life people will feel, in our opinion, generates a new wave of anti-scientism. The largest representative of them in modern Russia is Nizhny Novgorod philosopher Kuttyrev (2016), whose one of the main works has the eloquent title "Gone by Progress" (p. 300).

It is noteworthy that the supporters of the corresponding technologies tried to lull the vigilance of mankind, arguing that the labour resources displacement from the physical labour sphere will lead to their overflow into the sphere of mental labour and, ultimately, to the intellectual progress of mankind. Indeed, artificial intelligence is capable of performing various physical operations, up to driving a car and even an airplane. But it will never be capable of high-quality intellectual activities implementation, such as solving mathematical problems, composing literary and musical works, and finally, research and educational activities.

Alas, this is no longer the case. The first bastion, in the battle for which the mankind officially admitted defeat, has already fallen. Its name is chess. Back in the 70s of the last century, the world chess champion bore the unofficial title of the most intelligent person on the planet. Today titles of this kind no longer make the slightest sense, since advanced chess programs can easily beat any "protein" chess player, including the world chess champion. Taking into account the above, it is quite obvious why the total transition to distance educational technologies was so painfully perceived by the most perspicacious part of the Samara University community. They found in it if not a complete curtailment of the traditional educational system, in which the main role is played by "protein" teachers, and not their "nicknames" and "avatars", but, at least, a historical turn to one (Dudnik, 2020).

In this regard, it is advisable to clarify the background of the philosophical controversy regarding distance educational technologies, which paradoxically took place long before their mass social objectification. We are talking here, first of all, about the aforementioned concept of Michael Polany, within the framework of which the fundamentals of scientific methodology, going back to Cartesian "Discourse on Method" (Descartes, 2017, p. 328). This researcher comes to the conclusion about the fundamental insufficiency of the so-called objective knowledge that is transmitted from person to person exclusively by verbal means. "The goal of successful action", Polany (1985) says, "is achieved by following a series of rules that, as such, are unknown to the actor" (p. 344). They are comprehended not verbally, and not even intuitively, but exclusively operationally, through imitation of successfully acting subject. Then Polany formulates a number of methodological conclusions that fundamentally undermine the foundations of the Cartesian methodology of classical science:

1. The dissemination of scientific ideas is carried out not through the rational persuasion of opponents, but through their emotional infection.

2. Passion and obsession are the main qualities of a scientist.

3. Cartesian doubt extinguishes obsession and therefore the methodology developed by it does not at all increase, but significantly reduces the effectiveness of scientific creativity.

Potentially, Polany acts as a decisive opponent of the upcoming distance learning technologies, and in a lapidary sense brings philosophical grounds under one of the traditional pedagogical maxims (dogmas?), according to which it is impossible to fully learn anything solely from books. The question is why? Why can't a textbook by a highly cited, first-class teacher, usually living in capital cities and teaching at top universities, replace the inarticulate lecture of some his provincial epigones? Polany gives an unambiguous answer to this question: without the presence of a certain emotional field, i.e. without the exchange of psychic energy of the lower order between teachers and students, an effective educational process is impossible. Hence the stable statistics of Russian higher education: full-time education clearly presupposes the release of higher-quality specialists than part-time, and purely distance education, experimentally practiced in some Russian universities before the coronavirus pandemic, on average was significantly inferior in quality, even by correspondence, despite the fact that formally (in hourly labor costs), the curricula of all forms of education are absolutely the same. Only the contact component of educational work is reduced, and in the case of pure remote controllers, it is practically zero.

As noted above, an alternative position on the issue of distance education, moreover, long before its **appearance** on a global scale was occupied by K.R. Popper – Polany's most consistent opponent. In his opinion, any subject-subject interactions lead to the objectivity loss and therefore are dangerous for the scientist. For this reason, personal contacts should be reduced to zero, and not only in cognitive terms, but also in any other spheres of public life. In the abstract society sketched by Popper (Volgin, 2017), which is an alternative to Marxist communism with its total collectivism, physical contacts between people are reduced to an absolute minimum, not to mention physiological contacts, which are tacitly denied altogether.

It is noteworthy that Popper views his abstract society as an empty abstraction of liberal individualism taken to an extreme, which he opposes to the collectivism of communist society, taken to the extreme, also understood by him as an empty abstraction. However, thoughts tend to materialize, and the coronavirus pandemic organically supplemented the permanently increasing alienation between people technologies of remote interaction, transferring interpersonal contacts to the virtual plane of social networks, questioning the very existence of the "criminal crowd" (Siegele, 2011), moreover, not on a local, but on a planetary scale. At the same time, the real-physical crowd, concentrating around a specific physical leader, is displaced by a decentralized virtual crowd, first of all, in the field of economic relations, which is manifested, in particular, in the institutionalization of virtual cryptocurrency (Golofast, 2017).

Let's return, however, to the discussion of distance learning technologies. On the one hand, Popper is consistent in his critical rationalism, which creates a kind of illusion that he is right. On the other hand, statistics from the field of national education testify in favour of Polany, where for a long historical period there was a correspondence form of study that was absent in many other educational systems. Distance learning forms are clearly inferior to traditional ones, and we need to understand why this is happening.

An analysis of the Russian experience of the educational system functioning in the context of the coronavirus pandemic allows us to put forward the following working hypothesis: **distance education transforms the classic interaction of a teacher and student from two-way to one-way**. This is the whole point. Psychologically, this situation is difficult, primarily for the teacher. In the classroom, where there is direct contact with the students, the teacher has the opportunity to effectively respond to the state of the classroom and correct it by making comments to specific violators of the educational process, distracting fellow students around them with conversations on extraneous topics. In the conditions of using distance educational technologies, the teacher does not have such opportunities, and even remotely, since, for example, reading a streaming lecture for 150–200 students excludes visualization even technically, since it risks disabling the system that provides remote communication between the teacher and the students.

Moreover, the main problem that arises, for example, when giving lectures, is that the lecturer **does not see** his audience at all. Discussing distance lecturing and conducting seminars, most of the teachers we interviewed noted that students in the process of conducting lectures online have the technical ability to simply imitate their presence, doing extraneous matters, for example, housekeeping. Of course, a student can do the same in a boring lecture. However, during a classical lecture, the teacher **sees** that his information reaches some part of the audience. In the conditions of the distance form of teaching, a situation may well arise when the teacher speaks for 1.5 hours into a void, because no one really listens to him. Thus, the teacher can only **believe** that his information reaches the addressee, since **knowing** this in advance is impossible in the context of distance learning.

Proceeding from the principle of the historical and the logical unity, it is possible to draw a certain parallel between the transition that is taking place before our eyes from classical education to distance education and the historical transition from mythological consciousness to religious consciousness. Mythology presupposes the endowment of animals, plant and inanimate objects with anthropomorphic properties that they objectively do not possess. Likewise, a teacher may mistakenly endow students with qualities they know to be absent, for example, ascribe to them their own interest in their academic discipline. However, the very fact of interaction with students does not cause the slightest doubt, as well as the fact of the mythological consciousness carriers' interaction with the objects of their mythologization.

The historical transition from mythology to religion was essentially associated with the elimination of this kind of **visualization**. Initially, the Gods appear before people, taking false guises, and not only human ones, but as the religious consciousness developed, the image of God became thinner, up to the complete loss of the image, so that only the voice remained. This periodically appealed to the prophets, but not to ordinary believers for which the only form of interaction with God is **prayer**, which is, in fact, **one-way interaction**. The believer tries to establish contact with God by sending him certain information, but receives nothing in return, so he can only believe that the aforementioned information reaches anywhere. The same can be said about distance forms of interaction between the teacher and students. The analogy between prayer and distance lecture becomes especially tangible when the teacher has to repeat the same lecture material over and over for different groups and streams. Gradually, such speaking into void becomes a kind of analogue of asceticism, which refers us to the technique of Orthodox hesychasm (Sidorova, 2005) with the permanent reproduction of the Jesus prayer (Sergazina, 2008).

Problems of a different kind arise for teachers in the process of conducting remote seminars and monitoring activities – tests and exams. In this case, the contact seems to remain two-way. However, in the overwhelming majority of cases, the teacher interacts not with the student, but with the artificial intelligence mediated through him, to which the corresponding Internet request is sent, initiated by the receipt of random information array, the most accessible of which, lying on the surface, then it is voiced as a response. This is where the early stages of the religion evolution turn around, which had not yet completely separated from mythology, when the Gods took the illusory images of people. The utmost information availability contributes to the fact that people, in this case, students, try on the guises of Gods, refusing to develop the skills of independent thinking, because it is much easier to find the necessary information through a properly organized query in a particular search engine. The latter circumstance allows continuing the semantic inversion further. After all, the wrong request given to the Gods often put the questioner in a critical situation, as happened with King Midas, who expressed a desire to turn everything he touched into gold, which in practice meant an agonizing death from hunger and thirst.

Thus, the obvious downside of students' use of artificial intelligence technologies is the **superficiality** of their training. After all, you can grasp the essence of the material being studied, at least, by reading a textbook on the relevant discipline, but why bother yourself so much if you can solve the educational problem much easier by finding fragmentary information on the Internet (Markov, 2020)? Another feature of distance learning technologies as applied to students is that in this case the opportunity to periodically be distracted from the course of the educational process significantly increases, for example, by moving to another room to do household chores without turning off the speakers and the lecturer's image. Of course, there are distractions in the process of a classical lecture, but there are much fewer of them, since the interaction with the lecturer is two-sided, not one-sided, as in distance learning. In other words, such an important characteristic for the learner as the **ability to concentrate** is gradually lost.

Finally, the last circumstance, also fully manifested in the course of the total transition to distance educational technologies in Russian education due to the coronavirus pandemic. Traditional forms of final control, such as oral tests or exams, turned out to be completely ineffective. So, for example, in one of the educational Institutions of Samara, students were required to take off their headphones, show the surrounding space and stay online during the preparation process. Obviously, the teacher's contemplation of a small picture on the screen did not at all exclude the possibility of cheating answers to exam questions.

We see two alternative ways out of this situation. The first is to interview students throughout the course, without giving them enough time to prepare and even basic sending the required Internet request, so that the student relies solely on his memory and intelligence. However, in this case, most of the students, with the exception of a narrow group of excellent students, will simply fail the final control procedure. That is, with this approach, the requirements for the preparation of students will be clearly **overestimated**, just as it would be strange to demand from a modern scientist the ability to cite sources from memory, on which he bases his reasoning, as it was practiced by participants in the disputes in medieval universities.

The second way out is to shift the final control procedure to artificial intelligence, giving it the form of testing, which makes us recall the well-known USE in Russia. It is clear that in this case, preparation for such a controlling event will have the character of **rote memorization** of questions, typical database on the discipline. This, moreover, must be permanently updated so that it does not lose its effectiveness, which

condemns not only students memorizing to meaningless brain activity, the corresponding test base, but also teachers who must contrive, coming up with such questions on the discipline material that no one has ever thought of before.

## 7. Conclusion

Using the methodology stated in the article, we will now try to identify a general trend that allows us to model the possible future of distance learning technologies and artificial intelligence in education. It seems that the term "one-way interaction" is internally contradictory. After all, at first glance, interaction cannot be one-sided. However, on the other hand, information can spread both in two directions, for example, from the myth-maker to the mythologized object and vice versa, and maybe in one direction – from the praying person to the deity. It is obvious that the second option is one-way interaction, the fundamental incompleteness of which gives rise to doubts not only in the understanding of the object interacting with us, but even in its existence.

The history of the New Time shows that the next step in this direction should consist in a complete interruption of the corresponding contact as illusory, which is historically expressed in the practical atheistic transformation of the overwhelming part of Western humanity and even in the emergence of state atheism as in the USSR or in communist China. In the field of education, this means that **the placement of artificial intelligence between the learner and the educator, as is the case in distance learning technologies, will sooner or later make the presence of the educator in this triad unnecessary**. Similarly, the placement of the priest between man and God, as the only interpreter of the God's will, sooner or later leads to the elimination of the latter, which is expressed in the famous thesis of Nietzsche "God is dead" (Heidegger, 1993). Historically, the realization of this state of affairs entailed, on the one hand, the futuristic pathos of the Renaissance, which was subsequently embodied in the Nietzschean image of a superman who openly speaks from himself, and not from God, and therefore is immoral. On the other hand, this same awareness gave rise to the traditionalist pathos of the Reformation and Protestantism, expressed in the decisive elimination of the priest as the only mediator between God and people in order to directly reconnect God and man and, thereby, return the lost reality to the latter.

With regard to the situation, in the field of modern education, the authors intuitively lean towards Renaissance rather than Reformist scenario. In our opinion, supporters of the artificial intelligence developing idea have significantly underestimated its capabilities, believing that the development of appropriate technologies will lead to the person displacement of exclusively from areas of activity associated with physical labour. This will allow the freed up human resources to be directed into the sphere of mental labour. However, today the situation is such that potentially artificial intelligence is capable of ousting humanity from this sphere of activity too. Moreover, this process will begin precisely from the sphere of education in order to then spread to research science. Soon, texts like the one we have presented will be successfully modelled using appropriate computer programs, as well as experiments and engineering projects.



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