



*XVI international scientific conference
Beijing. China
22-23.07.2025*

SCIENCE IN MODERN SOCIETY

Proceedings of the XVI International Scientific and Practical Conference

22-23 July 2025

BEIJING. CHINA

2025

UDC 001.1

BBC 1

XVI International Scientific and Practical Conference « Science in modern society», July 22-23, 2025, Beijing. China. 40 p.

ISBN 978-91-65424-30-2

DOI <https://doi.org/10.5281/zenodo.16562393>

Publisher: «SC. Scientific conferences»

Main organization: 

Editor: Hans Muller

Layout: Ellen Schwimmer

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The sample of the citation for publication is Gugin Aleksandr, Lisnievska Yuliia ANTI-ADVERTISING IN THE HOTEL BUSINESS // XVI International Scientific and Practical Conference «Modern science: fundamental and applied aspects», July 22-23, 2025, Beijing. China. Pp.9-11, URL: <https://sconferences.com>

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Agricultural sciences

RESEARCH REGARDING THE INFLUENTIAL FACTORS ON CALVING EASE IN SIMMENTAL CATTLE

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Abstract

The aim of the study was to identify and assess the impact of dam and calf related factors on calving ease of Simmental cows. Data were analyzed using Statistica software (StatSoft). Biometrics measurements were expressed as least squares means ($\pm$ standard error) using the Main Effect ANOVA. Differences were assessed using Tukey test. The share of different calves' category in herd structure was investigated using chi square test. A multifactorial regression model was performed to explain the influential level of studied factors. The mean incidence of dystocia in cohort was 19.65%. Calves body weight at birth proved to significantly influence ($p \leq 0.05$) the dystocia incidence. Significant differences ($p \leq 0.01$) were recorded in respect with body weight of calves for eutocya compared with dystocia (34.16 ± 0.28 kg vs. 38.19 ± 0.22 kg). Also, dystocia proved to be favored by the small size of cows' pelvic measurements. In this respect, significant differences ($p \leq 0.05$) were recorded for cows' body weight (672.31 ± 2.38 kg vs. 657.29 ± 8.71 kg) according to eutocya and dystocia). Similar tendencies were obtained related to rump length (52.29 ± 0.17 vs. 50.14 ± 0.31 , $p \leq 0.001$) and width at ilium (54.94 ± 0.22 cm vs. 51.36 ± 0.47 cm, $p \leq 0.01$). The width at the ischial points most influenced the calving ease (36.12 ± 0.34 cm vs. 31.61 ± 0.77 cm, $p \leq 0.001$).

Keywords: cows, dystocia, Simmental, welfare

Introduction

Reproductive and productive indices decline when dystocia is occurring [1]. Dystocia has a major effect on farm productivity given its negative effects on the animals' performance, welfare, and general health. These impacts, which have been defined by significant persistence throughout both reproductive and productive cycles, worsen economic losses. Mollalain (2016) provided a more accurate definition of dystocia, defining it as the incapacity of the cows to expel the calf from the uterus through the birth canal due to problems with the uterus, foetus size, or pelvic deformities [2].

Factors related to the dam-calf coupling, particularly the calves' birth weight at birth and the cows' pelvic area, have been found to have a substantial impact on calving ease. In light of the profound connection between these two factors, the likelihood of dystocia increased in a straight line to the calves' birth weight [3]. A significant relationship between these two characteristics is suggested by the cows' capacity of the pelvic area to limit the body weight of calves at birth and the capacity of cows' body weight to influence the ease of calving, respectively [4].

According to calving ease, the cows' pelvic area was directly linked to the occurrence of dystocia, which proved to be a limiting factor for the calves' birth weight. In this sense, the pelvic area continues to be a reliable predictor of dystocia. Despite the fact that the pelvic area may increase by roughly 15%

at the calving, the antepartum measures have a significant impact on prediction accuracy [5]. The setting up of risk classes based on the pelvic area of cows might serve as a reliable selection criterion to reduce the incidence of dystocia and enhance farm output and animal health. The aim of the current study was to identify and assess the impact of dam and calf related factors on calving ease of Simmental cows.

Material and Methods

Location: The study was carried out in Research and Development Station for Bovine Arad, Romania, livestock (location: 46° 10' 36" N, 21° 18' 4" E, 107 m altitude). Geographically, the experiments were carried out in the Western Plain of Romania.

The confinement system: With a 10 m² space allowance and unrestricted access to food, water, and a walking area, the cows were housed on straw bedding. Three meals a day were provided to the cows. From spring through autumn, a daily feed ration included 40 kilogramme of alfalfa green fodder, 15 kg of corn silage, 7 kg of alfalfa hay and 5 kg of concentrates was administered. In the winter, the ration included 40 kg of corn silages, 7 kg of alfalfa hay and 5 kg of concentrates. They were housed in groups of 80 heads / paddock. After calving, newborn calves are extracted from their dams and housed in separate hutches outside of maternity, which serve as open shelters, for a maximum of 60 days. After 60 days, calves are housed in common stalls (6 heads per stall), where they have unrestricted access to the drinking area (0.20 m / head), the resting area (2 m² / head), and the movement area (5 m² / head). In the first three days of life, dairy diet consisted in colostrum and in the next four days consisted in raw milk from his own dam. From the eighth day, raw milk is administered from the collector tank. The administration of dairy diet is made twice on day, at every 12 hours (6 am, 18 pm). Starting on the fourth day of life, calves were given water, alfalfa hay and concentrated feed on an as-needed basis until they were 40 days old, at which point their access to concentrated feed was limited.

Recording the performance data: Data were collected between January 2023 and March 2025 from 600 lactations provided by an average herd of 320 cows, resulting in a total of 4070 records. The total number of animals included in the study, was represented by 610 heads of Simmental breed, 320 cows and 290 calves derived from the 242 single calving ($n = 242$) and 24 twin calving ($n = 48$). Calves herd was investigated according to calves' gender, and type of calving (singles vs. twins). According to calves herd structure, the incidence of dystocia calving was investigated. Biometric measurements of both calves and dams, have been aiming to: i) calves body weight at birth; ii) cows body weight; iii) rump length, iv) the width of the ilium, v) the width of the ischia, according to calving ease.

Data analyses: The proportion of different calves' category in herd structure was investigated using chi square test of independence. A multifactorial regression model was used to explain the influence level of studied factors. Factorial ANOVA protocol was performed to assess the differences, with categorical factor being "calving ease", while the Tukey's test was used to test the significance of the differences recorded. Data were expressed as least square means and standard error of mean.

Differences were tested using Tukey test [6].

The results were expressed as least square means and standard error of the mean. Statistical processes were carried out using the software package Statistica [7]. The research activities were performed in accordance with the European Union's Directive for animal experimentation (Directive 2010/63/EU).

Results

Calves herd distribution: The share of male and female calves (154 vs. 134 calves) does not differ significantly ($p > 0.05$) based on the gender of the calves, according to the chi square test analysis. Comparing simple calves to twin calves, there were significant differences (242 vs. 48, $p \leq 0.001$). Male and female calves have a similar incidence of dystocia ($p > 0.05$), however twin calving had a greater incidence than single calving ($p \leq 0.001$).

Table 1

Distribution of calves' herd and incidence of dystocia				
Category of calves	Male	Female	Simple	Twins
No. of observations	156 ^a	134 ^a	242 ^a	48 ^b
Incidence of dystocia (%)	22.43 ^a	19.4 ^a	16.94 ^a	37.5 ^b

^{a,b} Rows means with different superscripts differ significantly at $p \leq 0.05$

Calves' body weight at birth and cows' biometric measurements in respect with calving ease: Based on the influencing factors (calving ease), the analysis of the current data revealed considerable discrepancies between the parameters under study. The body weight of eutocyal and dystocial calves showed substantial variations ($p \leq 0.01$). Also, substantial differences ($p \leq 0.05$) were recorded in respect with the body weight of cows with eutocya compared to those with dystocia calving based on calving ease. Rump length data analysis shows significant differences ($p \leq 0.001$) between cows with eutocya vs

those with dystocia calvings. Similar tendencies were obtained in the analyses relating width at ilium ($p \leq 0.01$) and width at ischia ($p \leq 0.001$).

Table 2

Least squares means ($\pm$ standard error) for calves' body weight at birth and cows' biometric measurements according to calving ease

Calving ease	No of observations	Calves body weight (kg)	Cows body weight (kg)	Rump Length (cm)	Width at ilium (cm)	Width at ischia (cm)
Eutocya	233	34.16 $\pm$ 0.28 ^a	672.31 $\pm$ 2.38 ^a	52.29 $\pm$ 0.1 ^a	54.94 $\pm$ 0.2 ^a	36.12 $\pm$ 0.3 ^a
Dystocia	57	38.19 $\pm$ 0.22 ^b	657.29 $\pm$ 8.71 ^b	50.14 $\pm$ 0.3 ^b	51.3 $\pm$ 0.47 ^b	31.6 $\pm$ 0.77 ^b

^{a,b} Column means with different superscripts differ significantly at $p \leq 0.05$

Influential level of factors affecting the calving ease: Using a multifactorial regression model, the degree of influential factors was determined. The dependent variable (calving ease) and the important factors $R=0.206$, $R^2=0.0425$, and Adj $R=0.118$ had a close relationship ($p \leq 0.05$) according to the regression coefficients.

The computed values of $F(6.266)=10.131$ and $p \leq 0.01$ support the validity of the test. The calving ease was significantly influenced by the calves' birth weight ($p \leq 0.05$), the type of calving ($p \leq 0.001$), and the width at the ischia ($p \leq 0.001$), while the calves' sex, the cow's body weight, the rump length, and the width at the ilium had a less significant influence ($p > 0.05$) according to the multifactorial regression model used to explain the variance caused by influential factors

Table 3

Multifactorial regression model for estimation of independent variables influential level on calving ease

Influential factors	b	Std. Err. of b	p-values
Intercept	0.13608	0.217182	0.49166
Calves sex	0.062153	0.034625	0.711247
Calves birth weight	-0.013647	0.003105	0.015426*
Type of calving	0.993471	0.047044	0.000000***
Cows body weight	0.000179	0.000261	0.581463
Rump length	0.002325	0.004111	0.712555
Width at ilium	0.001077	0.018874	0.366477
Width at ischia	0.012693	0.007114	0.000128***

The type of calving (0.29), cow body weight (0.17), rump length (0.17), width at ilium (0.18), and width at ischia (0.31) were all found to have significant correlation coefficients. The calves' body weight at birth (-0.08) and sex (-0.07) did not significantly correlate.

Discussion

According to calving ease, there was a significant difference ($p \leq 0.01$) in respect with the calves' birth weight. Body weight at birth is especially significant for calves. It has a significant impact on the viability and postpartum survival rate and is one of the determinants of calving ease. Furthermore, the viability of calves is directly impacted by this trait. Overweight calves were more likely to experience a dystocia deliveries, which had detrimental impacts on their viability, appetite, and level of colostral Ig absorption [8]. Excessive birth weights of calves may increase the likelihood of dystocia by causing differences in colostrum intake and immunoglobulin absorption. This can result in morbidity, which frequently affects the calves' performance in succeeding productive cycles [9]. Greater body weight calves during birth have a greater rate of illness and mortality in the first 72 hours after delivery, which results in more losses for the age group as well as for the individual's future reproductive and productive life. Low birth weight can lead to morbidity in calves, especially in the winter, since it disrupts thermoregulatory systems. In order to ascertain the gravimetric thresholds that calves body weight at birth imposes on the risk of dystocia, previous research examined the relationship between it, gender of calves, and calving ease [10]. Using precision cattle farming to estimate calving time [11] and new insights into prevention [12] and prediction [13] can further reduce the incidence of dystocia. Sexed semen or applying selection pressure to bulls for lower calves' body weight at birth produced good outcomes [14].

Studies conducted by Nix (1998) discovered that every additional kilogramme of body weight increased the dystocia incidence by 0.23% [15], while [16] reports an upward tendency in the risk of dystocia range between 1 and 15% for calves weighting between 20 and 50 kg, Johanson and Berger (2003) found a higher value (+13% for 1 kg of extra CBWb) associated with an increase in dystocia risk [4]. The current study recorded an increased risk of dystocia by 4.03% for every kilogramme of additional calves' body weight.

The type of calving, the dam's width at ischia, and the calves' birth weight have a significant impact on calving ease. Although calves' sex did not directly affect calving ease, it did become an influential factor due to the substantial link with birth weight. The percentage of dystocial calves varied significantly ($p \leq 0.05$) by calves' gender (22.43% vs. 19.4% for male and female calves, respectively) and by calving type (16.94% for single calving vs. 37.5% for twin calving, $p \leq 0.001$). Male calves that are born with higher body weights are far more likely to have dystocia and, indirectly, to experience morbidity and mortality. Similar investigations support the findings. According to some research, male calves are 4 to 6 times more likely than female calves to develop dystocia, and the risk increases with the age of the cow-mother. The relationship between a calves' sex, birth weight, and calving type may raise their likelihood of developing dystocia. Linden (2009) also discovered that the risk of death was 4 and 8 times higher [17].

Dystocia could result from a limited pelvic area. An increased calves' birth weight and a narrow dam's pelvic area are associated with varying degrees of severity [18]. The rump length, the width at the ilium, and the width at the ischia are indicators of the pelvic surface, which is closely related to the cow's body weight. Nonetheless, the calving ease was not substantially impacted by the dams' body weight [19]. The initial size of the pelvic area, determined by antepartum measures, is still a criterion for predicting the probability of dystocia calving, even if the surface has the morphological potential to enlarge by 10-15% at the time of parturition [20]. Compared to multiparous cows, primiparous cows had a smaller pelvic surface area because their soma is still developing. The risk of dystocia calving closely followed this pattern. The cows' biometric measurements have an impact on the calving ease. In this regard, the current study suggests analysing the biometric features of cows. There is a strong correlation ($r 0.3-0.7$) between the size of the bone segments supporting the pelvic area and the cows' body weight [21]. The pelvic area's dimensions and the newborn calves' body weight restrict the ease of calving, which has a significant impact on their survivability.

There are notable differences ($p \leq 0.05$) in body weight between cows having dystocia and eutocya calving. Although the influence is indirect, cows with low body weights are more likely to experience dystocia calving. The primary effect is a high correlation between the dimensions of the pelvic area and the weight of the cow.

Cows with dystocia calving, which have low values for this measure, have significantly different rump lengths ($p \leq 0.001$) from cows with eutocya calvings, which is a limiting factor for calving ease. When comparing cows with dystocia to those with eutocya, it was discovered that the width at the ilium was smaller. The similar tendency was recorded in respect with width at ischia. This trait was significantly smaller for cows with dystocia. The size of the pelvic area has been thought to have an impact on the calving ease in a number of previous studies. The heritability coefficient of this particular trait is high, ranging from 0.5 to 0.7, which explains the concern of many studies on it. There is a high correlation between the exterior and internal pelvic region measures used in this study [22]. The benefit of measuring the bone segments that define the pelvic area externally is that it may be used to determine how they affect the ease of calving. The application of a multifactorial regression model revealed that while there was no discernible effect of rump length and width at the ilium, there was a significant effect at the width at the ischia.

The association between pelvic region features and calving ease can be explained by the considerable differences observed for these dimensions based on calving ease. The values of the pelvic dimensions are considerably lower in cows with dystocia compared to cows with eutocya. Its evaluation, work selection, and breeding herds were encouraged by the high heritability coefficient for the width at ischia, which ranged from 0.5 to 0.7, and the substantial impact it had on the calving ease and the newborn calves.

Conclusion

The cows' pelvic measurements, particularly the width at the ischia, have the highest impact on calving ease. Breeding programs are encouraged to evaluate and use the width at ischia for selection because to its high heritability coefficient (0.5 to 0.7) and considerable influence ($P < 0.001$) on the calving ease and the new-born calves welfare.

Acknowledgement

This work was supported by the Research and Development Station for Bovine Arad under a self-funded research program 4481/01.10.2018, aimed the influential factors on calving ease and calves' welfare.

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Chemical sciences

SILVER SULFATE AS PRECURSOR FOR SILVER NANOPARTICLE PREPARATION

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Recently, the issues of waste-free production have become increasingly important. It is also impossible to overestimate the role of nanotechnology in the modern world. The most important direction of which is the production and study of materials on a nanoscale. The importance of the unique properties of silver nanoparticles is difficult to overestimate, so the interest in studying their production methods does not decrease. As a result, it is very important to improve the methods for producing metal particles by making them more environmentally friendly.

Traditionally, silver nitrate, which is highly soluble in water, is used as a precursor of silver nanoparticles. The use of poorly soluble silver compounds is poorly understood. However, in production, silver-containing anode sludge, which are sulfate salts, has long been used to extract silver as a by-product.

The purpose of our work was to compare the efficiency of using silver sulfate and nitrate as precursors.

The synthesis of nanoparticles was carried out by the sol-gel method using 50% hydrogen peroxide as a reducing agent. For stabilization, 2% starch and/or gelatin solutions were used. When using silver sulfate, calcium nitrate was used to convert it into soluble nitrate.

Visually, the resulting solutions do not change for a month, which indicates the absence of active aggregation and stability of the resulting solutions.

In the optical absorption spectra of aqueous solutions of silver sols, we recorded clear maxima corresponding to a wavelength of 470 nm in both experiments, when using silver nitrate. This corresponds to isolated and weakly interacting particles of silver nanoparticles of about 70 nm in size. In the case of silver sulfate, the maximum was slightly shifted to the left and was recorded at 400 nm, which is apparently due to some change in the particle size.

When using silver sulfate as a precursor, the resulting optical spectrum had additional peaks corresponding to calcium ions, which is apparently explained by incomplete metathetic exchange. The method we proposed undoubtedly requires additional revision. However, this does not diminish its advantages since it promotes waste-free use of natural resources and makes the process more environmentally friendly.

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Economic sciences

CHANGING THE STRUCTURE OF EMPLOYMENT AND PROFESSIONAL QUALIFICATION REQUIREMENTS IN THE ERA OF DIGITALIZATION OF THE ECONOMY

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Abstract

The article examines the consequences of the digitalization of the economy for the labor market and the personnel training system. It is shown that under the current conditions, we can talk about the cardinal nature of transformations in the professional and educational spheres. At the same time, the main problem is the unprecedented high rate of change. The labor market has been experiencing a decline in manufacturing professions and an increase in the service sector for a long time, but recently the situation has been aggravated by the rapid decline of "traditional" professions with the simultaneous emergence of new ones. At the same time, even for the remaining professions, the qualification requirements for employees have undergone significant changes. This situation has created corresponding challenges for the education system, which in its current form has proved unable to cope with the tasks assigned to it. Today, the Kazakh education system needs to solve two problems simultaneously: to organize streaming training of specialists whose competencies meet the changed needs of the market, and to modernize technologies and teaching methods in accordance with new trends. At the same time, those educational institutions and people who are unable or unwilling to restructure their activities to meet modern requirements will soon have no place in the educational environment.

The modern economy is increasingly moving towards digitalization – the widespread introduction of advanced technologies of the latest generation (information, communication, robotics, artificial intelligence, etc.) into business activities, completely changing the usual business processes. It can be argued that digitalization is a key factor in the transformation of the social structure of almost every country in the world, affecting all spheres of economic and social life. In this regard, the question arises how its consequences will manifest themselves in the future, how deep they will be for both states and the average person. Among the many aspects of this issue, an assessment of the impact of digitalization on the labor market and the personnel training system deserves special attention. At the moment, the situation is developing in such a way that we can talk about the cardinal nature of the changes taking place in the professional and educational sphere.

Keywords: *professional qualification, education system, globalization, labor market, competition, employment, digital learning technologies.*

Introduction

There is an active decline in employment in the industrial sector, the globalization of the labor market and increased competition, and a sharp increase in people engaged in remote work. Many professions are simply disappearing at the moment. Moreover, the list of "disappearing" professions is replenished by those that previously seemed eternal. The new areas of work that have emerged as the digital economy has developed, although they are mostly original, are still unable to compensate for job losses in terms of the number of personnel involved. Digitalization has a significant impact on the functioning of the education system, the form and content of the educational process.

Today, both secondary and higher education are under the influence of two powerful factors at the same time: on the one hand, it is a rapid change in the system of professions and qualifications, on the other, the introduction of fundamentally new digital learning technologies.

It should be noted that the current stage of the scientific and technological revolution, including the phenomenon of digitalization, demonstrates a completely different scale, speed and depth of change compared to all previous ones. Changes today undoubtedly cover all spheres of economic and social life in most countries of the world. At the same time, these changes have a strong impact on the education system, which is one of the fundamental factors of long-term economic growth.

Accordingly, the purpose of the study is to analyze the impact of the digitalization of the economy on the labor market and the professional training system. At the same time, due to the fact that the effects of digitalization have increased significantly recently, it is also necessary to consider the latest trends in professional qualification requirements for graduates.

Material and method

During the research, both theoretical and empirical materials and methods were used, as well as theoretical and applied materials contained in the works of domestic and foreign scientists and specialists.

The analysis of scientific papers allows us to conclude that the issue of the relationship of scientific and technological progress with the structure of employment and the education system has always been given sufficient attention. So, back in 1998, Hannah D. first drew attention to the challenges created by digitalization for higher education [1]. Later, T. Clark pointed out the importance of the field of education for the formation of the knowledge economy and showed the deep contradictions between the modern economic system, the economic structure and technological challenges [2]. Olssen M. and Peters A. The mechanism of the influence of technological changes on the forms and methods of education has been revealed [3]. Khas U. She reviewed the latest trends in the transformation of the labor market under the influence of digitalization [4].

Among the domestic and foreign researchers working in this area, it is necessary to single out such authors as Tebaev J.J., Zagiparov N.G. [5], Baganova A.A., Umirzakov S.Y., Nurpeisova A.A. [6], Shatilo Yu.E. and Kopkova E.S., who studied the impact of digitalization processes on employment and unemployment in the economy [7], as well as Bodrunov S.D., Demidenko D.S. and Plotnikov V.A., who studied the impact of automation and the resulting reduction in employment on the professional training of specialists [8]. Later Belyaev G.Yu. He analyzed the threats facing the education system of Kazakhstan in the context of digitalization [9], and Ivanov V.G., Kaibiyainen A.A. and Miftakhutdinova L.T. considered the problems of education reform in the context of digitalization [10].

In addition, the work used the results of university monitoring conducted by the Committee for Quality Assurance in Education of the Ministry of Education of the Republic of Kazakhstan, as well as the authors' own research on the issue of employment of graduates of economic specialties [11].

A characteristic feature of this issue is that it is very difficult to isolate the changes that are primary in relation to all others. In other words, the processes of digitalization are so all-encompassing that fundamental transformations are simultaneously taking place in all segments of the economy. At the same time, the most important changes from a social point of view are taking place in the labor market.

The rapid transformation of the labor market in most countries, which can be observed today, is the most significant and significant factor in relation to all the transformation processes that occur under the influence of digitalization. The following main directions of transformation can be distinguished:

- a steady decline in the manufacturing sector with a simultaneous increase in the number of people employed in the service sector;*
- the intensification of globalization processes, the spread of remote work practices (including cross-border);*
- significant changes in qualification requirements in most "traditional" professions;*
- a significant reduction (up to the complete disappearance) of some "traditional" professions with the simultaneous appearance of new ones.*

The penetration of digital technologies inevitably leads to a revision of professional competencies in almost all fields of activity. At the same time, changes in qualification requirements in professions, which are now taking place everywhere, pose the most serious challenge both for government policy on the labor market and for the social sphere as a whole.

Digitalization entails a change in many basic technologies and all spheres of life. For example, such an important and all-encompassing area of the economy as banking has undergone drastic changes due to digitalization. Previously, the payment infrastructure required a lot of work and the mandatory presence of a professional operator. Now, employment in this area has decreased significantly in relation to the number and volume of operations. Now every second person has a smartphone in their hand, through which it is already possible to perform all the operations necessary for the average person. There are

already banks in Kazakhstan that use 100% remote communication channels with their customers (for example, Kaspi Bank JSC, Halyk Bank of Kazakhstan JSC, etc.).

With regard to the requirements specifically for professions, similar processes can be observed. Almost every workplace has changed over the past decade, using digital technologies to one degree or another. In addition, the use of digital technologies has often shown that many production processes do not require human presence. New information and communication technologies combined with robotics and automation technologies have made the human presence unnecessary in a variety of technological processes. Thus, digitalization entails the mass disappearance of professions.

The fact of reduced employment due to mechanization and automation is not new in itself. A distinctive feature of digitalization (and related processes) is the massive penetration of information and communication technologies into all spheres of economic activity and public life, which entails a radical reduction in the number of employees. In the context of the digitalization of the economy, the release of a large number of people is inevitable and will necessarily entail serious social consequences.

Results and discussion

Industrial employment has been declining over the past few decades. In developed countries, the growth of the share of people employed in manufacturing stopped back in the early 1960s. Previously, this was called "formation of a post-industrial society". Now it is obvious that we are talking about a deeper and more serious process. Previously, job losses in industry were offset by their growth in the service sector. However, now job cuts are also being observed here. The development of neural networks and artificial intelligence technologies make it possible to completely eliminate the human presence at the desktop. A lot of tasks that previously could only be performed by a human, now occur without his participation. In addition, the emergence of industrial equipment, which does not provide for the availability of workers, has become a new challenge for working professions. Only an operator is needed who will nominally control the production process.

According to an analytical report by the Mackenzie company, between 400 and 800 million people may be out of work in the near future [12]. However, unlike in previous periods, when job cuts were not so widespread, when laid-off workers had a chance to stay working at the same enterprise (in the same organization), or at least in the same industry, now the reduction is increasingly irreversible. The most striking example of such an impact in the Republic of Kazakhstan can be the development of electronic taxi ordering services (InDrive, etc.), which in large cities today have actually killed the profession of taxi dispatcher. Other examples include the professions of a librarian, a typist, a bookstore employee, as well as activities related to printed publications. A lot of people working in these fields don't have any career prospects today. The scale and speed of change is such that retired employees often have no alternative but to change their qualifications.

On the other hand, the emergence of new technologies is accompanied by the emergence of new professions. Although today the number of jobs created as a result of digitalization is not yet comparable to the number that disappears as a result of the same process, this phenomenon in itself is very significant. At the same time, it has a number of distinctive features from similar processes that took place earlier.

The main distinguishing feature is that previously, as some industries disappeared and new ones appeared, the number of jobs created in the "new" areas of production was more or less comparable to the number of "old" jobs in industries that had disappeared due to scientific and technological progress (that is, those laid off from their jobs). Companies in the mining industry or from metallurgical plants could try themselves as employees of automobile plants, now if an employee is dismissed from an industrial enterprise, there is a risk, that he was being fired from the manufacturing sector forever.

The generation gap particularly clearly shows the impact of digitalization on economic development. In previous periods, it was possible to talk about the transfer of the profession "from father to son". Due to the current pace of digitalization, there is simply nothing to transmit. Even within the same profession today, in a very short period of time – the period of life of one conditional generation – there is a complete disappearance of some competencies and their replacement by others.

Every working person is currently faced with the need to constantly update their professional competencies. A few decades ago, it was possible to say that a person could get an education and a profession at the age of 22-25 and live and work safely throughout his life. However, today the speed of technology change is such that every employee is in a "risk zone" to one degree or another. The speed with which the technological basis of production and management processes is changing has led to the fact that the relevance of the education received has become very limited in time. Almost every profession that currently exists may either disappear altogether or change significantly in the near future.

Digitalization has also coincided with a process that has been observed before: a reduction in the manufacturing sector and an increase in the number of people working in the service sector. However, if earlier a similar process in developed countries took place largely due to the transfer of production to the "third world" countries, now the number of workers in industry is inexorably decreasing due to the fact that production technologies require fewer and fewer workers. Because of this, in the European Union and the United States, the proportion of industrial workers in large cities is already less than one percent. At the same time, in the current situation, the process of reducing the number of industrial workers is accompanied by such a phenomenon as long-term unemployment, that is, when a person loses a job and for a long time cannot find it at all. This is primarily due to the fact that job losses are taking on a scale that affects entire industries.

The processes of globalization have a significant impact on the labor market, which is reflected in the emergence, at least in some professions, of a global labor market and the spread of such practices as remote work. Digital technologies allow each person to establish communication with all parts of the world for minimal means and work equally effectively both for a customer who is located in the same city and for a customer who is located several time zones away. However, on the other hand, in such a system, every employee inevitably faces increased competition. Previously, only those candidates who could physically get to their workplace every day could apply for a workplace, but this factor does not play a role at all when working remotely. All this leads to the fact that, in addition to the traditional profession, a person also needs to possess a number of universal skills that can be called mandatory in the digital age.

The education system is a mechanism that meets the needs of the labor market. However, the situation is developing in such a way that the education system itself is currently experiencing a period of peculiar crisis caused by the processes of digitalization. In the vast majority of countries, education systems were formed in previous technological structures, and for this reason, structurally, functionally and ideologically meet the requirements and challenges of that time. Nowadays, education in its traditional form is becoming less and less in demand.

Aware of the challenges posed by digitalization, leading countries are taking the necessary measures to improve their educational systems. For example, in the United States, improving education has been one of the priorities of public policy for more than fifteen years [13]. It should be noted that in Kazakhstan this issue received attention only in 2017 [14].

The speed of the changes is an important factor. Digitalization and the introduction of new technologies accelerate all processes without exception. However, the education system often remains excessively inert, which leads to its lagging behind in the context of adapting to new conditions. The direction of progress is such that more and more operations, actions and procedures are performed almost instantly. In a developed society, this is becoming an unspoken standard. In this light, the "classical" educational system turns out to be too slow. And if in the early 1950s, when the formation of the higher education system in its current form took place (in the USA and European countries), the duration of study periods was fully justified, now the period of four years (bachelor's degree) or six years (bachelor's + master's degree) is proving to be too long. For some sectors of the economy and fields of activity, six years means a complete change of technology. The education system is changing much more slowly than the external business environment, which eventually generates a global bias - an excess of unclaimed specialists in the labor market, while at the same time there is a shortage of qualified personnel in enterprises.

Summarizing the above processes that occur in the market structure, we can outline the following challenges for the education system (Table 1).

Table 1

Consequences of the digitalization of the economy and challenges for the education system

<i>The consequences of digitalization</i>	<i>Challenges for the education system</i>
<i>Overall acceleration of management and production processes, movement of goods and provision of services</i>	<i>The time cycles that the existing education system lives by are proving to be too long</i>
<i>Uncertainty of technology development: it is difficult to definitely predict what production technologies will be in ten years.</i>	<i>The difficulty in predicting technological development leads to the fact that it is difficult to make prospective requirements for learners</i>
<i>The widespread use of such a format as remote work destroys the usual ideas about the profession and workplace.</i>	<i>The modern education system (higher and secondary) is strictly tied to the "classical" concepts of work and profession</i>
<i>Changing the structure of the economy, a decrease in industry and an increase in the service sector</i>	<i>Reducing the need for vocational education in previously sought-after specialties</i>
<i>The emergence of new professions and the expansion of the list of skills of average workers</i>	<i>The need to organize advanced training and professional re-training</i>

The educational phenomenon generated by digitalization is as follows. On the one hand, over time, everyone will increasingly need constant professional development, obtaining a sought-after profession, and access to high-quality information. Almost any employee at the moment is faced with the need to constantly improve their qualifications, learn, and acquire new skills. On the other hand, "classical" educational formats will become less and less in demand. This contradiction can be compared to what every average person consumes (and produces) every year. There is an increasing amount of information, and at the same time, printed books and regular publications are becoming virtually unclaimed. Nowadays, every man in the street reads news portals, social media posts, and watches videos every day, but he has practically abandoned such classic genres as the novel, novella, and poem.

Such a discrepancy between the demands of society and the proposal that the education system can form is well understood in the scientific and professional environment. Already, many educational institutions both in the Republic of Kazakhstan and abroad are in a state of searching for the right solution, constantly experimenting with the form and content of education. There is no doubt that the existing education system in modern conditions needs to be radically reformed. The only question that causes discussion is how and in what direction these reforms should take place.

Conclusions

In general, it is safe to say that the need for each person to maintain their level of competitiveness creates a stable demand for high-quality educational services. Education must meet, first of all, the criterion of perspective. The content and format of training in a particular specialty should be such that, upon graduation, the acquired knowledge remains in demand for some time. It is necessary to be aware that there are entire areas of activity that, due to digitalization, basically have no prospects. At the moment, many educational institutions in the Republic of Kazakhstan are training students in professions that will soon be in little demand on the labor market.

The following areas can be identified in which education system reforms should be implemented in the context of the digitalization of the economy:

- updating the list of specialties and introducing a mechanism for quick editing of this list in the future;
- reduction of training time in specialties that have felt the strong impact of digitalization;
- mandatory teaching of key digital competencies;
- development of distance education;
- modularity of training.

The modern education system should be built as a multi-level structure aimed at training leaders in their competencies by providing students with an up-to-date set of theoretical and applied knowledge. It is extremely important that the education system is developed by educational organizations in cooperation with leading companies. In fact, basic education today should be developed on the basis of corporate programs and be focused on the practical application of acquired knowledge. However, the realities of today are such that no more than 6% of university graduates demonstrate good practical skills in their specialty [15]. This situation can be corrected by increasing the participation of business representatives in the educational process. For example, in some foreign universities, the proportion of teaching practitioners reaches 50%. However, this in turn raises the question of changing the remuneration system in educational institutions.

The development of distance education should be a priority. At the same time, at the initial stage, distance learning programs may not have the character of a full-fledged higher education, but rather be formed in the form of applied online learning courses that ensure that students receive the narrow-profile

knowledge and skills necessary for employers. A system of online courses and lectures from teachers of leading universities has already successfully proved itself abroad. At the same time, according to experts, the number of people using various online resources for education and professional development has doubled over the past year. In the Republic of Kazakhstan, a number of large universities also provide distance education services, but this format is not widespread. Although the Government is working purposefully to remove restrictions that hinder the development of distance education, this area needs additional legal regulation. It should be noted here that distance learning requires specific skills from the teacher: from knowledge of modern information technologies to the ability to "hold yourself in front of the camera".

The processes in society and the economy initiated by digitalization cannot be reduced only to negative or only to positive effects. The impact of digitalization is complex. It is obvious that the changes that are already taking place in the labor market may completely change its structure and appearance in the near future. There is no clear assessment of how quickly the transformation of the employment sector will take place and what its scale will be today. However, it is already necessary to be prepared for possible significant changes. In particular, this is already reflected in the world of work by reducing the number of jobs and increasing demands on employees. It is also extremely important to provide adaptation and social support programs for the staff being released.

In the education system, digitalization is expressed, on the one hand, in an increased need for high-quality educational services, and on the other, in a decline in the popularity of traditional education formats. The education system, instead of being a mechanism by which it will be possible to resolve the current situation, today itself has been heavily influenced by digitalization and needs to be reformed. The situation is significantly complicated by the fact that the speed of ongoing transformations and, consequently, the necessary speed of response to them is so great that a fundamental change can occur over a time period lasting one political cycle. It can be argued that there have been no precedents for such a challenge yet. The depth and scale of the changes are such that it is time to talk about a complete revision of the very model of the organization of the education system. Nevertheless, the future of our country depends on the quality of the response to the challenges of the digital age – the efficiency of its economy, the quality of life of the population, etc.

The modern education system is going to undergo such rapid and drastic changes that those people (institutions) who cannot (or do not want to) rebuild will simply have no place in the educational environment. The upcoming changes are a serious challenge for government agencies and education professionals. At the same time, it is also impossible to ignore existing challenges. Hypothetically, each country has the opportunity (depending on available reserves) to "preserve" the current state of affairs through direct and indirect government support for ineffective educational institutions, subsidizing training in specialties that will not be in demand on the market. This model of public policy in the educational sphere has a number of extremely negative consequences. Firstly, the later the education system is reformed, the more significant the consequences of such transformations will be. Secondly, such a "conservative" educational field will constantly train graduates who have no prospects in the labor market. Thus, the success of the "restructuring" of the education system in the era of digitalization largely depends on how quickly such a "restructuring" will occur.

One of the mandatory elements of the state social policy is the fight against unemployment. Until today, the main instrument of such a policy has been the constant desire to create additional jobs. In the current conditions, the main goal of public policy should be a new information policy in the field of employment and education – a full and comprehensive awareness of people about really sought-after professions and skills (in strict accordance with the volume of reasonable, proven demand for these professions in the future) will be the main mechanism that will bring the relations in the triangle into balance "education system – labor market – people".

Acknowledgments

This article was published within the framework of the grant project AP19676438 "Mechanism for ensuring balanced interaction of the labor market and the education system in the context of digitalization of the economy" – Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan).

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STRATEGY FOR OVERCOMING THE US-CHINA CONFLICT OF INTEREST AND REDUCING THE NEGATIVE EFFECTS OF THE TRADE WAR

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СТРАТЕГИЯ ПРЕОДОЛЕНИЯ КОНФЛИКТА ИНТЕРЕСОВ США-КНР И СНИЖЕНИЯ НЕГАТИВНЫХ ЭФФЕКТОВ ТОРГОВОЙ ВОЙНЫ

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В настоящей работе предложена стратегия преодоления конфликта интересов США-КНР и снижения негативных эффектов торговой войны (далее – Стратегия). Суть Стратегии сводится к долгосрочной институционализации механизма разрешения конфликта интересов США-КНР на основе концепции «прокси-соперничества». Предлагаемая Стратегия включает следующие 4 наиболее приоритетных элемента с соответствующими им содержательными характеристиками.

1. Создание условий невраждебной внешней среды. В рамках среднесрочной стратегии Китая необходимо уменьшение напряженности в отношениях с США, укрепление связей с соседями, углубление связей с Россией и стимулирование дальнейшего движения Европейского Союза к стратегической автономии. По мнению китайских властей такие действия критически важны для преодоления стратегии США по сдерживанию Китая. Также китайские лидеры для формирования положительного общественного мнения о своей работе исходят из того, что для нивелирования проблем внешнего характера, влияющих на экономическое развитие КНР, требуется сфокусировать свое внимание на устранении внутрикитайских проблем, связанных с бедностью населения страны, загрязнением окружающей среды, а также минимизации коррупционной составляющей в деятельности, прежде всего, государственных органов управления.

2. Признание тенденции к снижению зависимости мировой экономики от экономики США при одновременном увеличении ее зависимости от экономики Китая. В ответ на возможность быть отрезанными или ограниченными в доступе к американским цепочкам поставок, китайские лидеры в последние годы усилили меры по диверсификации экономических связей и укреплению самодостаточности. Они также формировали необходимые условия по вовлечению стран Азиатского региона в такие торгово-экономические отношения с Китаем, которые бы обеспечивали их всестороннюю торговую и не только зависимость от страны. На внутреннем рынке реализовывалась «стратегия двойного обращения». Данная стратегия направлена на снижение зависимости от иностранных поставщиков за счет внутреннего цикла производства, распределения и потребления наряду с отдельным циклом внешней торговли товарами и услугами.

Отдельно необходимо отметить, что Китай под руководством Си Цзиньпина планомерно на всех уровнях управления государством проводит научно-техническую политику, обеспечивающую ему относительную самостоятельность и самодостаточность в сфере высоких технологий. Китай активно инвестирует в инновационный сектор для продвижения Китая к технологической независимости. Основные направления инвестирования включают разработку и производство полупроводников и сложных технологических схем, технологическую инфраструктуру нового поколения, искусственный интеллект, биотехнологии, аэрокосмическую промышленность и ряд других секторов передовых технологий. В этих секторах стратегии Китая в сфере технологий подразумевают применение следующих мер: закрытие внутреннего рынка от вывоза технологий, бюджетное субсидирование национальных высокотехнологических компаний, активное приобретение прав

на интеллектуальную собственность, стратегические инвестиции в организации в Кремниевой долине и других инновационных площадках.

3. Расширение влияния Китая за рубежом с учетом применения конкретных форм и инструментов. За последние годы китайское правительство существенно активизировало свои действия, направленные на расширение своего влияния за пределами страны. Китайские организации инвестировали большие суммы в иностранные медиа-платформы в соответствии с мандатом центрального правительства по усилению дискурсивной власти Китая. Власти Китая стремятся позиционировать страну на международной арене как стабильное государство, поставщик глобальных общественных благ, противник геополитических интриг и сторонник региональной и глобальной безопасности [1, с. 132].

Для минимизации последствий конфликта и создания условий для его деэскалации Китаю необходимо при формировании стратегии своего развития обратить внимание на решении ряда проблем и сосредоточить свои усилия в следующих областях:

Во-первых, Китай должен усиливать взаимное политическое доверие и расширять свою открытость для международного сообщества. Для достижения этих целей также потребуются активно снижать торговые и инвестиционные барьеры, уменьшая соответствующие издержки, что является необходимым условием для повышения привлекательности страны для международной торговли и производственной деятельности.

Во-вторых, Китаю необходимо и дальше сосредотачивать на себе региональное торговое и торгово-экономическое пространство, ориентируя его на китайские интересы. Подписание соглашения о Всеобъемлющем региональном экономическом партнерстве (ВРЭП) и Всеобъемлющего и прогрессивного соглашения о Транстихоокеанском партнерстве (СРТПП) позволяют существенно активизировать процессы, связанные с региональной экономической интеграцией, обеспечить необходимый уровень либерализации в области торгово-экономических и инвестиционных отношений, упростив избыточные процедуры и устранив барьеры, снижающие уровень деловой и инвестиционной активности. Подобный подход будет иметь положительное влияние не только на возможности Китая на торгово-экономическую экспансию страны, но и создает благоприятные условия для стимулирования развития мировой экономики в целом. Особого внимания заслуживают решения Китая по реализации со многими странами мира совместного проекта «Один пояс, один путь», который направлен на формирование дополнительных, а зачастую и альтернативных, потоков товаров и услуг, активизируя торговые отношения, способствующие росту китайской и мировой экономики.

В-третьих, Китай требуется и далее формировать такие производственные и поставочные цепочки, которые обладали бы высокой степенью инновационности и ценности, а также были бы устойчивы к турбулентности на внешних рынках и к геополитической напряженности. В свете стремления США создать технологические и поставочные альянсы, которые бы минимизировали участие Китая в формировании высокотехнологических производств и торговых отношений со странами инновационными лидерами, особого внимания требуют создание зависимых от страны в политическом и торгово-экономическом плане соответствующих отношений.

В-четвертых, китайское правительство должно стимулировать компании к более активному вовлечению в международное разделение труда, улучшать их способности к глобальному распределению ресурсов и восхождению на вершину цепочки ценности. Китай и страны АСЕАН в рамках инициативы «Один пояс, один путь» должны рассмотреть возможности сотрудничества в области инноваций и устойчивого развития; укреплять сотрудничество в области инноваций в цифровой экономике, электронной коммерции, умных городах, больших данных, 5G и других областях; формировать научно-технические инновации и партнерства в области цифрового сотрудничества.

4. Переход от конфронтационной формы торговой войны к «прокси-соперничеству». Следует подчеркнуть, что некоторые эксперты высказываются о нереализуемости успеха торговой войны между КНР и США [2]. При этом можно выделить как минимум четыре основания, почему войну между этими странами можно предотвратить.

Во-первых, любые военные столкновения между ними быстро превратятся в ядерные. Так, США оказались в аналогичной ситуации, как и ранее в отношении СССР. Тайвань может стать «проблемой века», подобно «Фульдскому коридору» в Германии во время холодной войны. Однако, динамика «гарантированного взаимного уничтожения», которая характеризовала ограниченный конфликт между США и СССР, также применима к отношениям США и Китая.

Международное сообщество будет прилагать все усилия, чтобы предотвратить возможный ядерный конфликт, учитывая, что его последствия будут иметь транснациональный характер и, в отличие от климатических изменений, будут немедленными.

Во-вторых, следует учесть, что Китай исторически предпочитает долгосрочную стратегию. Несмотря на то, что военная мощь Китая значительно увеличилась, она все еще уступает США по большинству ключевых показателей. И хотя Китай инвестирует большие средства в асимметричные средства уравнивания (ракеты против кораблей и гиперзвуковые ракеты дальнего действия, военные кибернетические приложения и т.д.), он не может сравниться с США в традиционных средствах, таких как самолеты и крупные корабли. Личная конфронтация с США, таким образом, была бы слишком рискованной для Китая на текущем этапе его развития. Если бы такой конфликт все-таки произошел, у Китая было бы немного вариантов, кроме как применить ядерное оружие. Поэтому, рассматривая основные сценарии, следует уделить меньше внимания любому сценарию, в котором китайцы намеренно провоцируют военную конфронтацию с Америкой. Однако американские военные склонны планировать наихудшие сценарии и в настоящее время сосредоточены на потенциальном прямом конфликте с Китаем, что напоминает динамику американо-советских отношений.

Третий аргумент в пользу того, что серьезный торговый конфликт между Китаем и США вполне можно избежать, связан с тем, что Китай уже добивается успехов в глобальной борьбе за применение мягкой силы. Несмотря на утверждения о том, что Covid-19 ушел из вирусологической лаборатории в Ухане, Китай справился с пандемией намного быстрее, чем США. Благодаря его Инициативе «Один пояс, один путь», которая финансирует развитие инфраструктуры по всему миру, Китай предлагает геополитическую альтернативу для расширения своего влияния, которое возникло в результате уменьшения влияния США во время четырехлетнего президентства Дональда Трампа. Китайские лидеры уверены, что они следуют правильной стратегической дорожной карте.

В качестве основной целевой инициативы нами предложена концепция **прокси-соперничества** – это альтернативная торговой войне форма отстаивания конфликтующих национальных экономических интересов; в этом случае вовлеченные страны формулируют и открыто заявляют свои внешнеэкономические претензии в количественной форме; после этого процесс переговоров принимает характер циклического торга. Предложенная концепция прокси-соперничества имеет глубокие методологические основания в теории кооперативных и некооперативных игр и теории экономических механизмов Гурвица-Мейерсона [3, с. 40; 4, с. 33].

Таким образом, прокси-соперничество – это:

- альтернативная торговой войне форма отстаивания конфликтующих национальных экономических интересов;
- в этом случае вовлеченные страны формулируют и открыто заявляют свои внешнеэкономические претензии в количественной форме;
- после этого процесс переговоров принимает характер циклического торга.

Как уже было сказано, с точки зрения теории экономических механизмов, переход от торговых войн к прокси-соперничеству можно представить себе как реализацию прямого механизма (в смысле Гурвица), участники которого в равновесном состоянии заинтересованы сообщать правдивую информацию. При этом следует отметить, что слово «прокси» (англ. proxy) означает «посредник». В последнее время получил распространение термин «прокси-война», означающий войну посредством вовлечения третьих стран. Мы хотим вернуться к изначальному смыслу этого слова, имея ввиду безличного «посредника» в лице согласованного сторонами прямого механизма или института (в смысле Гурвица-Мейерсона) здорового соперничества вместо взаимных угроз торговой войны, подразумеваемых арбитражной схемой Нэша с параметрами переговорной силы.

Суммируя сказанное выше, предложенная Стратегия подразумевает последовательную реализацию следующих составляющих:

- 1) создание условий невраждебной внешней среды;
- 2) согласование количественных индикаторов, обеспечивающих симметричную информационную базу для переговоров;
- 3) признание как объективной тенденции снижения зависимости мировой экономики от экономики США при одновременном увеличении ее зависимости от экономики Китая;
- 4) расширение влияния Китая за рубежом на уровне конкретных форм и инструментов;
- 5) переход от конфронтационной формы торговой войны к «прокси-соперничеству».

Далее, чтобы соответствовать понятию «стратегия» в данном контексте, необходимо задать временное структурирование составляющих реализации стратегии. Лучше всего это делать на основе методики диаграммы Ганта, которая позволяет задать во времени не только начало, конец и протяженность каждой составляющей реализации Стратегии, но и учесть более глубокие соотношения между данными компонентами, а именно:

- соотношение «завершение-начало», когда составляющая-последователь начинается после завершения составляющей-предшественника;
- соотношение «начало-начало», когда составляющая-последователь не может начаться ранее начала составляющей-предшественника;
- соотношение «завершение-завершение», когда составляющая-последователь не может быть завершена ранее завершения составляющей-предшественника.

Возможен случай простого параллельного осуществления отдельных составляющих, не связанных указанными тремя соотношениями с какими либо-другими составляющими процесса реализации Стратегии.

На основе проведенных исследований, мы предлагаем следующее временное структурирование составляющих реализации стратегии на период 2026–2028 годов (таблица).

Таблица – Составляющие Стратегии и их структурирование во времени

Составляющие предложенной стратегии	2026 г.		2027 г.		2028 г.	
	1 пол.	2 пол.	1 пол.	2 пол.	1 пол.	2 пол.
Создание условий невраждебной внешней среды						
Согласование количественных индикаторов, обеспечивающих симметричную информационную базу для переговоров						
Снижение зависимости мировой экономики от экономики США, подтвержденное количественными индикаторами ¹						
Увеличение зависимости мировой экономики от экономики Китая, подтвержденное количественными индикаторами ¹						
Расширение влияния Китая в третьих странах на уровне конкретных форм и инструментов						
Переход от ситуационной конфронтационной дипломатии к прокси-соперничеству						

¹ как предмет компромисса для симметричного понимания переговорной силы (bargaining power)

Примечание – Источник: разработка автора [3, с. 41].

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Pedagogical sciences

MONITORING EDUCATION QUALITY BASED ON MODERN DIGITAL TECHNOLOGIES

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Abstract

This article examines the implementation of modern digital technologies in the monitoring of education quality. It discusses the conceptual frameworks and practical applications of digital tools such as big data analytics, artificial intelligence, and online assessment platforms in enhancing the accuracy and efficiency of quality monitoring processes. The study analyzes how these technologies contribute to real-time data collection, continuous evaluation, and informed decision-making in education management.

Keywords: *Digital technologies, education quality, quality monitoring, artificial intelligence, big data analytics, online assessment, education management.*

Introduction

The quality of education has long been recognized as a cornerstone for sustainable social and economic development. In the contemporary knowledge-driven global economy, ensuring high standards in education systems is paramount to fostering human capital, innovation, and competitiveness. Consequently, monitoring education quality has become a central concern for policymakers, educators, and researchers worldwide. With the rapid advancement and proliferation of digital technologies, the traditional paradigms of education quality assurance are undergoing transformative changes, creating new opportunities and challenges in the field. Historically, education quality monitoring relied heavily on periodic assessments, manual data collection, and subjective expert evaluations, often leading to delays in feedback and limited responsiveness to emerging educational needs. However, the integration of modern digital technologies such as artificial intelligence (AI), big data analytics, cloud computing, and interactive digital platforms has ushered in a paradigm shift, enabling real-time, data-driven, and scalable quality monitoring processes. This transition supports continuous improvement cycles, personalized learning pathways, and evidence-based policy making. The global education landscape increasingly embraces digital transformation as a strategic priority. According to UNESCO's 2023 report, over 70% of countries worldwide have initiated digital education strategies focused on enhancing quality, equity, and inclusiveness. Countries such as Finland, South Korea, and Singapore exemplify the successful incorporation of sophisticated digital monitoring frameworks that harness AI algorithms to analyze student performance data, predict learning outcomes, and optimize teaching methodologies[1]. These systems facilitate a more granular understanding of educational effectiveness, moving beyond traditional standardized testing towards adaptive and formative assessments. Despite these advancements, challenges persist. Data privacy concerns, infrastructural disparities, algorithmic biases, and the digital divide pose significant barriers to equitable implementation. Moreover, there is an ongoing debate about the balance between automated digital monitoring and the irreplaceable human elements of pedagogical judgment and contextual understanding. Ensuring that digital tools augment rather than supplant the professional autonomy of educators remains a critical issue. Methodologically, contemporary research in this field adopts multidisciplinary approaches, combining educational theory, data science, and system design principles. Quantitative analyses of large-scale educational datasets are complemented by qualitative insights from classroom observations and stakeholder interviews. The development of robust digital monitoring frameworks necessitates integrating these diverse data sources to generate actionable intelligence for educational leadership. Furthermore, the COVID-19 pandemic has accelerated the adoption of digital education technologies globally, highlighting the urgency of effective quality monitoring mechanisms in remote and hybrid learning environments. The abrupt shift to online platforms exposed systemic weaknesses but also demonstrated the potential of digital tools to maintain educational continuity and quality under adverse conditions. In light of these developments, this article aims to critically examine the conceptual and practical dimensions of education quality monitoring grounded in modern digital technologies. It explores current technological solutions, evaluates their impact on educational outcomes, and

identifies best practices drawn from international experiences. The article also discusses methodological considerations for implementing digital monitoring systems within varied educational contexts, emphasizing scalability, inclusivity, and sustainability[2]. By synthesizing empirical evidence and theoretical perspectives, this study contributes to the growing body of knowledge on digital transformation in education. It offers policymakers, educational managers, and researchers a comprehensive understanding of how digital technologies can be leveraged to enhance the reliability, efficiency, and responsiveness of education quality assurance processes. Ultimately, this work seeks to inform strategic decisions that foster resilient and adaptive education systems capable of meeting the demands of the 21st century.

In today's rapidly evolving global landscape, the significance of effectively monitoring education quality has become more pronounced than ever before. The acceleration of digital transformation across all sectors, including education, has reshaped traditional paradigms and necessitated innovative approaches to ensure that educational institutions deliver high-quality learning experiences that meet the demands of the 21st century. One of the key drivers underscoring the contemporary importance of education quality monitoring is the increasing complexity and diversity of educational ecosystems. The proliferation of digital tools, remote learning platforms, and hybrid educational models has expanded access but also introduced new challenges related to maintaining consistent standards. In this context, quality monitoring is not merely a bureaucratic formality but a critical mechanism to ensure equity, effectiveness, and relevance in learning outcomes. Moreover, the COVID-19 pandemic has acted as a catalyst, accelerating the adoption of digital technologies in education worldwide. As traditional classroom settings were replaced by online and blended learning environments, the need for real-time, data-driven monitoring systems became urgent. Institutions faced the challenge of tracking student engagement, academic progress, and pedagogical effectiveness remotely, which highlighted gaps in existing quality assurance frameworks[3]. This global disruption emphasized that robust monitoring systems, underpinned by digital innovation, are essential to sustain educational continuity and quality under adverse conditions. Statistical data further emphasize this relevance. According to a UNESCO report in 2023, more than 80% of countries have incorporated digital quality monitoring tools within their national education policies, aiming to enhance accountability and transparency. These tools include learning analytics dashboards, AI-powered assessment systems, and automated feedback mechanisms that enable educators and administrators to identify learning gaps promptly and tailor interventions accordingly. Additionally, the demands of the modern labor market have shifted, requiring not only foundational knowledge but also critical thinking, digital literacy, and lifelong learning competencies. Education quality monitoring systems, when integrated with digital platforms, provide insights into the development of these competencies, facilitating the alignment of curricula with evolving economic and social needs. This alignment is crucial for preparing learners to navigate complex challenges and contribute effectively to innovation-driven economies[4]. Furthermore, digital quality monitoring enhances the inclusivity of education systems by providing tools to track and address disparities among different student populations. For instance, data disaggregated by gender, socio-economic status, and geographic location enable policymakers to design targeted programs to close achievement gaps and promote social justice. However, the contemporary relevance of this field also involves addressing emerging ethical and technical challenges. Issues such as data privacy, algorithmic bias, and the digital divide must be carefully managed to ensure that technology-enhanced monitoring does not inadvertently exacerbate inequalities or undermine trust in educational institutions. In conclusion, the contemporary relevance of education quality monitoring in the digital era is anchored in its capacity to provide dynamic, evidence-based insights that support effective decision-making, foster equitable learning opportunities, and drive systemic improvements. As education systems worldwide continue to embrace digital transformation, the development and implementation of sophisticated monitoring mechanisms remain imperative for realizing the vision of inclusive, high-quality education for all.

In recent years, education systems worldwide have undertaken comprehensive reforms aimed at enhancing the monitoring and assurance of education quality through the integration of digital technologies. These reforms reflect a recognition that traditional quality assurance mechanisms, often characterized by periodic evaluations and manual data collection, are insufficient for the dynamic and complex demands of contemporary education. One significant aspect of these reforms is the development and deployment of digital quality monitoring platforms. Governments and educational authorities have invested heavily in creating centralized information systems that enable the collection, analysis, and reporting of real-time data on student performance, teacher effectiveness, and institutional management. For example, many countries have introduced Learning Management Systems (LMS) integrated with analytics tools that provide educators and administrators with actionable insights to support targeted

interventions[5]. Another key reform has been the incorporation of artificial intelligence (AI) and big data analytics into quality assurance processes. AI algorithms are increasingly utilized to analyze large datasets, detect patterns, and predict student outcomes, enabling proactive measures to address learning gaps. These technologies also facilitate personalized learning experiences by adapting content and assessments to individual learner needs, thereby contributing to improved educational outcomes[6]. Policy reforms have also emphasized transparency and accountability by mandating the public disclosure of education quality indicators through digital dashboards and portals. Such initiatives promote stakeholder engagement, including students, parents, and the wider community, fostering a culture of continuous improvement and trust in the education system. International organizations such as UNESCO, OECD, and the World Bank have played pivotal roles in guiding and supporting these reforms through frameworks and funding. For instance, UNESCO's Global Education Monitoring Report (GEM Report) advocates for leveraging digital tools to achieve Sustainable Development Goal 4 (SDG4) on quality education. Similarly, the OECD's PISA assessments have incorporated digital literacy as a core competency, influencing national reform agendas to include digital skills monitoring. Moreover, reforms have targeted capacity building and professional development for educators and administrators to effectively utilize digital monitoring tools. Training programs focus on data literacy, interpretation of analytics, and ethical considerations related to data privacy and security, ensuring that technological advancements translate into meaningful pedagogical improvements. The COVID-19 pandemic accelerated the pace of reforms by exposing gaps in remote learning quality assurance and prompting urgent adoption of digital solutions. Many countries launched emergency digital monitoring systems to track student engagement and well-being during school closures, which have since evolved into permanent components of education quality frameworks[7]. Despite progress, reforms face challenges including infrastructural inequalities, resistance to change, and concerns over data privacy and algorithmic biases. Addressing these issues requires integrated policy approaches that balance innovation with ethical standards and equitable access. In conclusion, reforms in education quality monitoring driven by digital transformation are reshaping education governance, making it more responsive, data-informed, and learner-centered. These changes hold promise for enhancing educational effectiveness globally, provided that they are implemented inclusively and sustainably.

The ongoing digital transformation of education quality monitoring has sparked intense scholarly debate, with varying perspectives on its efficacy, challenges, and implications. Two prominent foreign researchers, Dr. Michael Fullan and Dr. Sugata Mitra, have contributed significantly to this discourse, presenting contrasting yet insightful viewpoints that underscore the complexities of integrating digital technologies into education quality assurance systems. Dr. Michael Fullan, a renowned expert in educational change and leadership, advocates for a cautious but strategic adoption of digital monitoring tools. He emphasizes that while digital technologies offer unprecedented opportunities for data-driven decision-making and personalized learning, their implementation must be grounded in robust pedagogical frameworks and ethical considerations. Fullan argues that over-reliance on quantitative data and automated assessments risks marginalizing the human aspects of teaching, such as relational trust and professional judgment, which are critical to educational quality. He stresses the importance of blending digital tools with collaborative practices among educators to interpret data meaningfully and enact effective interventions. According to Fullan's 2021 study, schools that integrate digital monitoring within comprehensive professional development frameworks demonstrate improved student outcomes and teacher satisfaction, highlighting the necessity of human-centered approaches alongside technological innovation. In contrast, Dr. Sugata Mitra, a pioneer in educational technology and self-organized learning environments, takes a more optimistic stance regarding the transformative potential of digital tools in education quality monitoring. Mitra argues that the application of artificial intelligence and big data analytics can democratize education by providing scalable, real-time insights into learning processes that were previously unattainable. He posits that digital monitoring systems enable adaptive learning experiences tailored to individual student needs, thereby enhancing equity and inclusion. In his landmark "Hole in the Wall" experiments and subsequent research, Mitra demonstrates how minimally supervised, technology-driven learning environments can lead to significant improvements in learner autonomy and achievement[8]. He envisions a future where education quality monitoring is largely automated, freeing educators to focus on mentorship and creativity rather than routine assessment tasks. The debate between Fullan and Mitra encapsulates key tensions in the field. Fullan's concerns about ethical implications, data privacy, and the risk of dehumanizing education underscore the need for critical oversight and contextual sensitivity[9]. Meanwhile, Mitra's vision highlights the possibilities of leveraging cutting-edge technologies to overcome traditional limitations in access and scalability. Both scholars agree, however,

on the necessity of integrating technology thoughtfully and ensuring that it serves pedagogical goals rather than dictating them. Statistical evidence adds nuance to this debate. For instance, recent meta-analyses indicate that schools combining digital monitoring tools with teacher-led interventions achieve higher learning gains compared to those relying solely on automated systems. Moreover, surveys reveal that educators express apprehension about data-driven accountability measures that lack transparency or exclude their professional input, supporting Fullan's emphasis on collaborative data use. In summary, the polemics between Dr. Fullan and Dr. Mitra highlight that digital transformation in education quality monitoring is not a panacea but a complex, multifaceted endeavor[10]. The successful integration of digital technologies requires balancing automation with human expertise, ethical governance, and context-aware implementation strategies. This scholarly dialogue continues to shape policy and practice, guiding stakeholders toward more effective and equitable education quality assurance in the digital age.

This thesis has examined the methodological foundations and practical approaches to improving the management system of education quality control in the context of digital transformation. The study highlights that integrating modern digital technologies and artificial intelligence into monitoring processes significantly enhances the accuracy, efficiency, and responsiveness of education quality assurance. Furthermore, adopting a balanced approach that combines technological tools with human expertise is essential for achieving sustainable improvements. The findings provide valuable insights for policymakers and education managers aiming to develop effective, data-driven, and inclusive quality control systems that meet the demands of contemporary education.

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THE POSITIVE SOLUTION OF UNSKILLED INTERPERSONAL CONFLICTS IN EDUCATIONAL INSTITUTIONS AS AN INDEX OF HIGH LEVEL OF PEDAGOGICAL SKILL OF TEACHERS

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ПОЛОЖИТЕЛЬНОЕ РАЗРЕШЕНИЕ МЕЖЛИЧНОСТНЫХ УЧЕНИЧЕСКИХ КОНФЛИКТОВ В ОБРАЗОВАТЕЛЬНЫХ УЧРЕЖДЕНИЯХ КАК ПОКАЗАТЕЛЬ ВЫСОКОГО УРОВНЯ ПЕДАГОГИЧЕСКОГО МАСТЕРСТВА УЧИТЕЛЯ

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Abstract

The given article is dedicated to one of the actual problems of pedagogues - to forming of high level of pedagogical skill of teacher of secondary school. In the article is emphasized that high level of pedagogical skill helps teachers positive solve interpersonal conflicts in an unskilled collective. In the article are shown reasons of appearance interpersonal conflicts among of pupils. In the article are analyzed reasons of interpersonal conflicts and ways of their positive solution. In the article are given necessary recommendations to improvement of teachers work with pupils in interpersonal conflicts.

Аннотация

Статья посвящена вопросам становления педагогического мастерства учителей средней школы. В ней подчёркивается, что высокий уровень профессионализма педагога предполагает умение эффективно разрешать межличностные конфликты в ученическом коллективе. Рассматриваются формы и методы взаимодействия педагогического коллектива с учащимися, направленные на создание благоприятной образовательной среды. Особое внимание уделяется анализу причин возникновения межличностных конфликтов среди школьников. В статье предлагаются условные формы и практические методы работы, способствующие конструктивному разрешению конфликтных ситуаций в школьной среде и формированию позитивного климата в ученическом коллективе.

Keywords: pedagogical skill, interpersonal conflicts, unskilled collective, pedagogical collective, secondary school, social institutions of society

Ключевые слова: педагогическое мастерство, межличностные конфликты, ученический коллектив, педагогический коллектив, средняя школа, социальные институты общества

Повышение уровня социальной зрелости подрастающего поколения, обретения им высоких показателей духовно-интеллектуального потенциала, активное участие во всех процессах общества и позиционирование себя как действенной-созидательно-конструктивной силы этого общества – невозможно без активного участия образовательных учреждений в этом процессе. Именно образовательные учреждения (в данном случае средняя общеобразовательная школа) выступают той мощной духовно-интеллектуальной и социально-творческой базой, которая способствует превращению вчерашних молодых людей в специалистов высокой профессиональной подготовки, активно участвующих в процессах дальнейшего развития и формирования фундаментальных основ демократического общества. Такая сложная, многогранная работа образовательных учреждений должна базироваться на высоких показателях профессионально-педагогического мастерства всего педагогического коллектива. Педагогическое мастерство, по словам учёных-исследователей, занимающихся вопросами воспитания, развития, формирования и образования подрастающего поколения – это сложное, гармоничное взаимодействие педагогического и ученического коллективов средней школы.

Взаимодействие учителей и учащихся в процессе учебно-воспитательной работы школы представляет собой множество различных форм делового, межличностного общения, организацию высокоэффективной воспитательно-формирующей деятельности, ставящей перед собой очень важную социальную задачу – формирование социально активной, общественно позитивно направленной личности. Взаимодействие учителей и учеников средней школы, способствующей поэтапному достижению главной цели образовательного учреждения – эффективной социализации молодых людей, наряду в высшей степени позитивными формами работы, к сожалению, встречается также с проблемой возникновения в учебно-воспитательном процессе такого явления, как межличностные конфликтные ситуации. И это вполне естественно, так как средняя школа является большим социальным организмом, где присутствие, возникновение и разрешение межличностных ученических конфликтов всегда будет акцентировано на дальнейшее повышение общей эффективности социально-психологической и творчески-педагогической жизни школьного коллектива в целом. «Высокий уровень педагогического мастерства учителя представляет собой овладение и профессиональное использование навыков и умений управления возникающими комплектами среди учащихся, их предупреждение и организацию высокоэффективной профилактической работы» (7, 12).

Понятное дело, что в процессе учебно-воспитательной работы школы могут возникнуть различные виды конфликтов, вплоть до конфликтов учителей школы с администрацией этой же школы. Однако специалисты профессионально-педагогического труда и учёные-исследователи (Н.В. Жутикова, Е.Н. Ильин, Н.В. Кузьмина, Н.В. Кухарёв, Л.М. Лузина, А.В. Мудрик, Б.Э. Вульф, С.Н. Батракова, Л.Н. Лесохина и др.) подчёркивают, что наибольшее количество конфликтов всё же наблюдается среди ученического коллектива, особенно среди подростков. Межличностные конфликты в ученической среде, как правило, представляют собой столкновение позиций, отношений к какому-то явлению конкретного человека, взглядов, круга интересов, склонностей и т. д. Все эти составляющие своеобразных причин возникновения межличностных конфликтов в ученической среде, должны быть чётко поняты, детально проанализированы учителями.

Всё это необходимо для того, чтобы своевременно суметь повлиять на конфликт в самом его начале, быть строго объективным при разрешении его и, по возможности, проводить такую работу с учащимися фигурантами конфликта, чтобы не только сам учитель, который призван разрешить конкретный конфликт, но и сами учащиеся сознательно стремились к скорейшему разрешению конфликта. Специалисты считают такое разрешение конфликта, когда и учитель, и сами учащиеся-фигуранты конфликта стремятся как можно быстрее завершить негативное общения с другим человеком и не способствовать переходу конфликта в довольно затяжной процесс, проявлением высшего пилотажа профессионально-педагогической деятельности. «Будет совершенно правильным также стремление учителя средней школы привлечь к разрешению какого-либо межличностного конфликта родителей фигуранта этого конфликта» (4, 27). Почему именно практика привлечения родителей к разрешению конфликта среди их детей так широко приветствуется специалистами педагогического труда – тому есть несколько причин:

1) В некоторых случаях именно родители выступают теми авторитетными людьми, слово которых с благодарностью и пониманием принимается подростками;

2) Иногда подростки довольно часто конфликтуют между собой, чтобы привлечь внимание к себе со стороны своих же родителей. Когда родители таких подростков вовлекаются в процесс конфликта, у фигурантов спорного процесса не остаётся каких-либо серьёзных факторов, чтобы искусственно продолжить конфликт;

3) Иногда можно наблюдать и такой процесс – мальчики конфликтуют между собой, учителя испытывают трудности в разрешении определённых конфликтов, а позвав родителей в школу и привлекая их к разрушению конфликта его можно очень легко потушить.

На наш вопрос одному ученику-подростку: «Зачем же нужно было привлекать своих родителей в школу, чтобы разрешить конфликт?» - Ответ: «Пусть мои родители знают, что их сын не перед кем не опускает голову». Звучит, конечно же, очень наивно, однако такие факты имеются. Очень важно добиться такого состояния, когда между учениками и учителями существуют правдивые отношения, в которые не примешаны необъективность, вранье, непрофессионализм, формальность исполнения работы.

Следует особо подчеркнуть, что на практике мы встречались с учителями (в основном, это были молодые учителя), которые считали, что любой конфликт разрешается очень легко по той самой причине, что у всех конфликтов, если детально и глубоко разбираться, в принципе, одни и те же причины. Такое поверхностное представление о причинах возникающих конфликтов, конечно же, очень поверхностное, более того, очень непрофессиональное и, по большому счёту, даже вредное. Такого просто не может быть, все конфликты имеют в своей основе разные причины и к каждому конфликту необходимо подходить индивидуально.

Конечно, на практике бывают конфликты, которые очень схожи по своему составу и может сложиться представление, что их разрешение требует от учителя использования одного и того же комплекса профессионально-педагогического инструментария. Однако, это можно назвать профессиональной иллюзией, которая может существенно осложнить работу учителей при разрешении конфликтов. «Следует очень хорошо запомнить, особенно молодым учителям, что учебно-воспитательный процесс в средней школе – это очень сложный динамический процесс со своими составляющими» (2, 38). Вся сложность этого процесса заключается, прежде всего в том, что его участниками являются живые люди, ученики, учителя со своими интересами, представлениями о жизни, со своим уровнем мировоззрения и широты кругозора.

Практика показывает, что при работе с живыми материалами, не должно быть никакой ложной, надуманной универсальности подхода и использования одного и того же профессионально-педагогического инструментария. Принимая учебно-воспитательный процессы в средней школе как многофакторный, динамический процесс, необходимо помнить, что ему, как, собственно и другим социальным процессам в обществе, присущи многочисленные противоречия, выражающиеся в многоаспектности представляемой проблемы. В этой связи особенно надо подчеркнуть важность обладания учителями образовательных учреждений высоким уровнем профессионально-педагогической подготовки.

Высокий уровень профессионально-педагогической подготовки, личностная харизма учителей, их мобильность в работе с ученическим коллективом, особенно подростковым, будет способствовать тому, что можно будет со всей ответственностью говорить о высоком уровне профессионально-педагогического мастерства учителей. Конечно же, уровень профессионально-педагогического мастерства учителей средней школы не определяется исключительно их умением положительно разрешать ученические межличностные конфликты. Здесь необходимо говорить и о воспитательных, образовательных, развивающих, формирующих аспектах всей работы учителей, и это будет совершенно справедливо.

Однако, действительно высокий уровень профессионально-педагогического мастерства, проявляющийся именно в спорных ситуациях, где определённые противоречия между фигурантами спорного процесса могут существенно повлиять на успешность учебно-воспитательного процесса в школе, весьма наглядно демонстрирует творческий подход учителей к своей профессии. При работе с ученическим подростковым коллективом учителя должны в обязательном порядке принимать во внимание несколько сложных параметров. Творческий подход к разрешению ученических конфликтов, учёт всего комплекса сложных личностных и социальных параметров, неизменно будет способствовать дальнейшему профессионально-педагогическому самосовершенствованию самих учителей.

В нашей статье мы очень коротко покажем эти факторы, которые играют большую роль в работе с учениками:

а) необходимо всячески поощрять стремление учеников хорошо учиться, поднимать уровень их мотивации, создавать необходимые условия для их личностно-социального развития. Будет большой профессиональной ошибкой учителя, который видя активное стремление конкретных учеников-подростков улучшить свои учебные показатели, делать вид, что ничего особенного не происходит и, более того, говорить классу, что это их прямая обязанность хорошо учиться.

Такой учитель должен вспомнить, что существует такой эффективный метод работы, как поощрения усилий конкретных людей (в данном случае, учеников). Игнорирование этого метода не с хорошей стороны может характеризовать профессиональную подготовку учителей;

б) «Учителям (особенно молодым) необходимо помнить, что есть интересы личностные, и есть интересы коллективные – и тот и другой вид интересов очень важен и нельзя насильно подчинять проявление какого-либо интереса другим» (6, 41).

Личностные интересы учеников-подростков очень важны для них, это, по существу, одно из важных составляющих их внутреннего духовного мира – это очень крепко необходимо запомнить и всегда придавать этому большое значение. Если учитель из благих намерений пытается починить личностные интересы коллективным интересам класса, но действует при этом очень непрофессионально, буквально «ломает» учеников – то следует отметить, что такой учитель явно остановился в своём профессионально-преподавательском росте и ему следует серьёзно пересмотреть своё отношение к вопросам такого характера.

К примеру, если одни ученики-подростки увлекаются джазовой музыкой, а учитель делает все от него зависящее, чтобы погасить их интерес к джазовой музыке и перенаправлять их личностные интересы в сторону коллективных, где преобладают коллективные интересы класса к специфической музыке, такой шаг учителей должен быть оценен как явно некорректный;

в) учителя должны очень профессионально оценить свои творческие возможности, учитывать их уровень в работе с учениками-подростками. Как мы уже отмечали выше, ученики подросткового возраста довольно чуткие молодые люди, которые мгновенно чувствуют фальшь, формализм, механическое исполнение учителями своих профессиональных обязанностей. Если у конкретных учителей творческие возможности остаются на посредственном уровне, и он хочет обычными проводимыми ими мероприятиями заполнить эту нишу, ничего хорошего не получится.

Учитель может быть хорошим исполнителем, грамотным, человечным, но это никоим образом не свидетельствует о том, что он специалист с очень большими творческими возможностями. К слову сказать, конечно же, не все, даже очень хорошие учителя обязательно проявляют широкие творческие возможности. Поэтому организовывая какую-либо работу с учениками-подростками, разрешая их межличностный конфликт, необходимо со всей ответственностью понять, сумеет ли конкретный учитель на очень высоком творческом уровне претворить в жизнь какую-нибудь форму работы. Почему это так важно, потому что ученики-подростки сразу же увидят явное несоответствие творческих возможностей учителя с характером его требований к ученикам. В результате у учеников может сложиться весьма неблагоприятное представление о духовном мире учителя. Этого состояния необходимо избегать и проводить работу с учениками подростками в соответствии со своими профессионально-творческими возможностями.

Очень важно при работе с конфликтующими часто учениками-подростками не пользоваться шаблонными методами профессиональной работы – узнать причину конфликта, прочитать молодым людям нотации об обязательном хорошем поведении в стенах образовательного учреждения, где-то поругать их в том, что они занижают общеклассные показатели, что руководство учреждения будет недовольно ими. Этот стремительный набор методов работы с конфликтующими сторонами, как показывает практика, практически уже не работает и коэффициент его полезного действия приближается к нулю. «Специалисты отмечают, что таким стереотипным набором методов работы с конфликтующими учениками обычно пользуются учителя, которые в общем-то не очень сильно заинтересованы в скорейшем разрешении конфликта» (5, 58). Такие учителя очень часто стремятся к тому, чтобы класс не создавал для них каких-то серьёзных проблем, делают всё, чтобы погасить какие-то стремления молодых людей, руководствуясь очень нежелательной формулировкой: «Лишь бы было в классе спокойно, не нужно мне их стремления, которые, не ровен час, могут привести к каким-то конфликтам».

Понятное дело, стремление учителей не видеть и не созерцать в классном коллективе каких-то межличностных процессов, по человечески вполне понятно, однако здесь кроется большая профессиональная ошибка – такие учителя тормозят и причём активно, творческий, личностно-социальный рост как всего классного коллектива, так и отдельных его учеников. Относительное спокойствие в классе для таких учителей прежде всего, они не заинтересованы в активном проявлении своего внутреннего духовного мира своих учеников. Как говорил с нами в разговоре один молодой учитель, весьма профессионально подготовленный, но не обладающий ещё большим профессионально-педагогическим опытом «класс, классный коллектив должен быть для учителя в высшей степени удобным, не представляющий его профессиональному имиджу никаких проблем».

Мы очень надеемся, что этот молодой учитель, повторимся, обладающий хорошей профессиональной подготовкой, в дальнейшем, по мере набора опыта профессионально-

педагогической деятельности, в корне изменит своё поверхностное суждение о классном коллективе и возможности работы с ними. Мы надеемся, что в скором времени такие молодые учителя прекрасно поймут, что удобный класс, удобные ученики – это, своего рода эффект стагнации в педагогическом процессе и что тот классный коллектив и те ученики, которые находятся в постоянном поиске разрешения своих личностно-социальных стремлений будут представлять в будущем коллектив очень перспективный, заряжённый большим чувством оптимизма.

В заключении можно сказать, что стремление любого образовательного учреждения иметь педагогический коллектив, прекрасно подготовленный с точки зрения профессионально-педагогического развития, обладающего высоким уровнем педагогического мастерства, является в высшей степени важной социальной составляющей общей высокоэффективной работы всех социальных институтов общества с подрастающим молодым поколением. Прекрасно подготовленное и социально активное подрастающее молодое поколение в будущем будет позиционировать себя как важная конструктивно- созидательная сила в построении высокоразвитого демократического общества

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Philological sciences

COGNITIVE-PRAGMATIC ANALYSIS OF INDUCTIVE MODALITY AND MEANS OF ITS EXPRESSION IN A LANGUAGE

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Abstract

Modality is a multidimensional category that has different ways of expression and functioning in language. Within the framework of the communicative-pragmatic approach, modality is considered in inextricable connection with the utterance, the speech act and the communicative situation as a whole. The article is devoted to the study of the category of incentive modality. The definition of the category of modality is given and defines the main means of expressing modality.

Аннотация

Модальность — многоаспектная категория, имеющая различные способы выражения и функционирования в языке. В рамках коммуникативно-прагматического подхода модальность рассматривается в неразрывной связи с высказыванием, речевым актом и коммуникативной ситуацией в целом. Статья посвящена изучению категории побудительной модальности. Дано определение категории модальности и определяет основные средства выражения модальности.

Keywords: category, modality, sentence, modal words, modal verbs, inclination.

Ключевые слова: категория, модальность, предложение, модальные слова, модальные глаголы, наклонение.

To understand the modern state of a language, its grammatical forms, its phonetic structure, the structure of its vocabulary, it is necessary to consider each phenomenon of a modern language as a known result of a long historical development, as a result of a number of changes and transformations that took place during more or less long periods of time. Of a long historical development, as the result of a number of changes and transformations that have taken place over a more or less long period of time. The problem of the evolution of modality in different languages is of particular importance at the present stage of linguistic development, since modality is a central linguistic category and has a universal character. Of particular interest is the diachronic and synchronic analysis of means of expressing modality, in particular modal words and modal verbs, since they express the modal meanings of possibility and necessity, which is of great importance in communicative terms. No less significant at the present stage of language development is the analysis of pragmatics and modality at different linguistic levels, namely at the lexical level and at the level of the text [1].

Linguistics has come a long way in the study of modality. The first definition of modality is found in the linguistic dictionary of O.S. Akhmanova, who considers modality as a conceptual category with the meaning of the speaker's attitude to the content of an utterance and the attitude of the content of the utterance to reality, expressed by various lexical and grammatical means, such as form and inclination, modal verbs, modal words, etc. Zainullin M.V. in his book "Modality as a functional-semantic category" calls the following types of modality: modality of necessity and oughtness (debilitative modality); modality of possibility and impossibility (potential modality); presumptive (hypothetical) modality; inductive (imperative) modality; modality of intention (intensional modality); desirable (optative) modality [2].

The validity modality means that the content is expressed from the speaker's point of view, corresponds to objective reality: the subject perceives the reported as a real and reliable fact.

The modality of invalidity, on the contrary, means that the content of the reported does not correspond to objective reality, the subject perceives the reported as not real, i.e. as possible, desirable, presumptive, doubtful, etc.

The pragmatic component of a sentence reveals the communicative purpose of an utterance, introducing certain facts of extra-linguistic reality, fixed by propositional modality, into the speaker's consciousness. The inductive modality, uniting the circle of certain linguistic phenomena having the meaning of inducement, is included in the pragmatic (in other terminology, epistemological, communicative)

modality. These linguistic phenomena must have common differential features which, on the one hand, organize them into a certain modal system and, on the other hand, distinguish this system from similar modal systems. Semantic features characterize the inducement modality from the point of view of semantic analysis, in which the semes necessary for the existence of inducement meanings are determined.

Motivational modality, representing a fragment of epistemological modality and characterizing the pragmatic (communicative) aspect of a sentence, does not appear in isolation, but, "combining in specific utterances with propositional modality, qualifying their nominative aspect. At the nominative level, the construction captures phenomena, processes of non-linguistic reality and expresses the meanings of objective modality, which forms a kind of "semantic x" complicating and at the same time deciphering objective modality" [3].

According to Sh. Bally, "modality is the soul of a sentence; like thought, it is formed mainly as a result of the active operation of the speaking subject". Based on this statement, we can conclude that any thought is modal to a greater or lesser extent [4].

In Western European linguistics, the most widespread concept of modality is that of Bally. In his opinion, in any utterance one can distinguish the main content (dictum) and its modal part (modus), which expresses the intellectual, emotional or volitional judgment of the speaker. Bally considered modality, first of all, a syntactic category, in the expression of which modal verbs plays a primary role.

A special priority in the study of the category of modality belongs to V. V. Vinogradov. It is he who is considered the founder of the theory of the category of modality. He defines the category of modality as a category of sentence: "Each sentence includes as a known constructive feature modal meaning, i.e. it contains an indication of the attitude to reality. Any integral expression of thought, feeling, impulse is clothed in one of the existing intonational schemes of the sentence and expresses one of those syntactic meanings which in their totality form the category of modality" [5].

Appealing to modality, scholars distinguish logical modality, conceptual modality and linguistic (functional-semantic) modality. Logical modality stems from judgment as a form of thinking. Within the framework of logical modality, the relationship between the content of the statement and objective reality is studied". Logical modality is a philosophical category. It constructs the facts of objective reality through thought operations, determining the conditions of their existentiality (necessity, possibility, validity, predetermination), axiological value, falsity/truthfulness. The conceptual category of modality is an integral element of the conceptual picture of the human world. It represents "the category of evaluation in the broad sense of the word, interpreted as the participation of the subject of cognition in the evaluation of perceived events and phenomena".

Linguistic, or functional-semantic, modality affects primarily the elements of a sentence in spoken or written discourse.

Linguistic modality can be objective or subjective. Objective modality is "the expression of the attitude of a judgment to reality from the point of view of the speaker or writer".

Subjective modality is "the attitude of the author of an utterance to the meaning of the message".

There is an opinion that the main content of modality is assigned to the objective modality, which "establishes the nature of the relationship between the content of sentences and extra-linguistic reality: whether the event is real under given conditions (was, is, will be) or unreal (hypothetical, expedient, etc.)". In other words, objective modality exists in two forms: modality is either real or unreal.

Real modality is the correspondence of the content of an utterance to a fact of reality. For example, *It is raining, Sherlock Holmes was a famous English detective.*

Irreal modality functions in utterances in which supposed events are presented rather than those that have actually occurred. For example, *He might come. I wish it were Sunday today.*

Three types of irreal modality can be distinguished: inducement modality, invalidity modality, and presupposition modality.

Statements in which we find an inducement to action (direct or indirect) are characterized by the inductive modality. For example, *Come and see! You must be here tomorrow at six.* In statements where events are interpreted not as real, but only as assumed or desired, the modality of invalidity is present. For example, *If it were raining, I wouldn't leave home.*

In statements with the modality of supposition events are presented as possible or probable from the speaker's point of view. For example, *Perhaps I shall help you tomorrow.*

As we can see, in all these three types of statements, reality is represented as a non-fact.

So, objective modality is a reality-unreality opposition, with reality being semantically intensive and unreality being semantically extensive and including invalidity, inducement and presupposition. Traditionally, the modality of an utterance is directly connected with the category of inclination. In all (at least

European) languages, three inclinations are distinguished: the indicative, the imperative and the subjunctive, although A.I. Smirnitsky adds to them the presumptive and conditional inclinations, these two types, in our opinion, are varieties of the subjunctive inclination [6].

The inclinations as a morphological means of expressing the meaning of modality are usually distinguished on the basis of contrasting such labeled meanings of imaginary events as inducement (imperative inclination) and hypotheticality (subjunctive inclination) with the unlabeled meaning of the indicative inclination. The main lexical means of expressing modal meaning, first of all, include modal words — lexemes used either in the structure of the sentence itself or outside it, but semantically related to the sentence, which correlate the content of the statement with real reality.

So, modality is a universal category. It expresses different types of attitude of an utterance to reality, as well as different types of subjective evaluation of the reported. The category of modality expresses the speaker's attitude to the relation that is established by him/her between the content of the given statement and reality. Therefore, it is closely related to pragmatics, studying issues related to the speaker and listener, their interaction in various situations of communication.

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TYPOLOGICAL STUDY OF LANGUAGES AS A LINGUISTIC BASIS

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Abstract

The article emphasizes the mandatory use of the results obtained after conducting a typological study of the student's native language and the language being studied, which will form the linguistic basis for teaching Russian pronunciation. The article provides a brief description of the phonological and morphological (using inflectional languages as an example) classifications of languages.

Keywords: pronunciation teaching, typological studies, phonological classification, morphological classification.

When working on pronunciation, it is necessary to take into account the difference in the organization of the word (in particular, the sound), which exists in the native language of the students and in the language being studied. These differences (we are talking primarily about them) can be studied using the comparative method, relying on existing typological classifications of languages.

It is known that any features of the language system can be used as the basis for the typological classification of languages: phonological (including prosodic), morphological, syntactic, semantic. To analyze the sound organization of a word, closely related to the grammatical, it is important to have an idea of the phonological and morphological classifications.

The phonological classification of languages is based on the nature of the basic unit of the phonological level. In most languages of the world, such a unit is the phoneme, so such languages are usually called phonemic. However, in a language, the basic unit of the phonological level can also be a syllable. Thus, the second group of languages is made up of syllabic languages, which include languages that are isolated by their morphological structure.

Languages with a phonemic structure include agglutinative, inflectional and incorporating languages. In such languages, it is the phoneme that represents the "material" necessary for constructing units of higher levels of language (primarily morphemes as the minimum significant unit of language), and allows us to distinguish between units of higher levels.

In other words, in languages with a phonemic structure, the phoneme performs a constitutive (i.e., organizing from the point of view of the speaker and identifying from the point of view of the listener) and distinctive (i.e., distinguishing meaning) function. Languages with a phonemic structure do not have a special system of syllables, which is present in syllabic languages. In languages with a phonemic structure, the boundaries of a syllable and a morpheme may not coincide. The syllable itself is meaningless unless it is a representative of other units. In languages with a phonemic structure, re-syllabification is possible, i.e., the displacement of syllable boundaries in the flow of speech, which is absent in languages with a syllabic structure. All this determines the absence of clear criteria for syllabification in a number of languages with a phonemic structure.

For typological studies, both quantitative and qualitative characteristics of the phonological system of a language are important: the number and quality of phonemes (i.e. the composition of phonemes); the "bundle" of features in the structure of a particular phoneme; differential features of phonemes; distribution of phonemes (i.e. the combinability properties of a phoneme); frequency of use of phonemes; functions performed by a phoneme in a word. Languages of phonemic structure are divided into consonantal and vocalic. This division is based primarily (although not the most important) on a

quantitative feature. However, for determining the type of language, the question of the nature of sound chains in the language is more important.

For this, it is important to know: the types of syllables in the language; the possibility or impossibility of consonances and vocal combinations; the nature of the beginning and end of a word; the type of stress inherent in the language; the nature of the reduction (if this is inherent in the language) of unstressed vowels in a word of a given language; the functions performed by vowels and consonants in a word (whether a certain, for example, grammatical function is assigned to certain sounds in the language). Having received answers to all of the above questions, the researcher will be able to classify the language either as a consonantal or a vocalic language.

In the framework of phonological typology, it is customary to speak of supersegmental classification, which is based on the characteristics of the supersegmental level of language: what means of the supersegmental level participate in the organization of language units (the unification of lower-level units into higher-level units), contribute to their integral formation, recognition and isolation in the sound chain. If we talk about the sound organization of a word, then it is necessary to consider the question of the supersegmental characteristics of a word.

According to this classification, languages are contrasted with each other as accentual and anaccentual. Accentual languages are those in which stress acts as the "phonetic cement" of a word (as, for example, in Russian). Anaccentual languages are those in which word stress is not represented as a phonological category with constitutive and distinctive functions. Among the anaccentual languages, French (as well as Bengali), tonal and synharmonic languages are discussed separately.

In synharmonic languages, which are usually agglutinative, the word is formed by a certain synharmonic model (their number in the language is limited, they are regular and easily reproduced).

The essence of the phenomenon of synharmonism comes down to the combination of certain "series" of segmental units (vowels and consonants) of both phonetic and phonological levels within the word.

Synharmonism performs a constitutive function, i.e. a certain homogeneous timbre must be preserved in the word. Violation of such timbre leads to violation of the structure of the word and, accordingly, to the destruction of the word as a unit of language. The word-recognition function is manifested in the fact that even if the meaning of the word is unknown, the word itself will be perceived as correctly constructed if a certain homogeneous timbre is preserved in it. Synharmonism also performs a delimitative function (i.e., delimiting): the change of syn-harmonic timbres with the help of which words are formed allows us to determine the boundaries between words.

There are two opposing points of view regarding the presence of word stress in vowel-harmonic languages. Some researchers are of the opinion that such languages do not have word stress, since the functions that word stress can perform are performed by vowel harmony in vowel-harmonic languages. V.B. Kasevich makes an interesting remark: "...the disintegration of vowel harmony, as in the Uzbek language, entails the development of the category of stress."

Other researchers believe that in vowel-harmonic languages there is a word stress that is weakly centered, evidence of which is the fact that native speakers have difficulty determining its presence or absence in a word (this, in turn, proves the subordinate nature of word stress to vowel-harmonic in agglutinative languages).

In its position in the word, stress is fixed: it is assigned to the initial syllable of the root, and it is the root that expresses the lexical meaning of the word. Stress can perform delimitative, constitutive, and weakly culminative (i.e., peak-forming) functions. This is explained by the fact that in the flow of speech, words of the same vowel harmony model can follow one another, which makes it difficult to single out the word. In such cases, one should rely on the lexical meaning, semantics of the word, and primarily the semantics of the root, for the purpose of highlighting which stress is used.

Accentual languages (a large number of languages in the world belong to them) include those languages in which the organizer of the word at the supersegmental level is word stress. It is possible to further classify accentual languages into groups depending on what feature is used as the basis for classification: for example, the phonetic nature of stress (languages are divided into languages with dynamic stress, quantitative or musical); the degree of stress expression (languages with weakly centered stress and with strongly centered stress); the phonological nature of stress (languages with bound or free stress) or the morphophonological nature of stress (languages with mobile or fixed stress); the functions performed by stress.

Within the framework of morphological classification, languages can be grouped depending on the similarity of the grammatical structure, and the focus is again on the word: in this case, the word is considered as a unit of the grammatical level of the language (morphological and syntactic).

The following features form the basis of morphological classification:

- 1) the complexity of the morphological structure of the word;*
- 2) a set of certain grammatical affixes that are used in a particular language to express a certain grammatical category;*
- 3) ways of expressing syntactic relations between units of language. The first two features relate to the field of morphology, the third feature to the field of syntax.*

When talking about the morphological classification of languages, traditionally, languages are distinguished as isolating, inflectional, agglutinative, and incorporating. However, it should be especially noted that if isolation is understood as a way of connecting words in a sentence, in which the word does not express the relationship of one word to another word using a certain grammatical indicator, which means the absence of expression of the syntactic function of the word, then all languages can be divided primarily into two groups: isolating languages and non-isolating languages. And the basis of such a division is a syntactic feature.

Understanding isolation as a grammatical way of connecting words in a sentence does not allow us to consider isolating, inflectional, agglutinative and incorporating languages in the same row, since such phenomena as fusion and agglutination (i.e. ways of connecting morphemes in a word) characterize a word from the point of view of its morphological structure. In other words, fusion and agglutination can be found in both isolating and non-isolating languages.

Another issue is that grammatical indicators can be of two types: some express only grammatical meanings, others indicate syntactic relations between words. In isolating languages, grammatical indicators, regardless of whether they are fusional or agglutinative in nature, express only grammatical meanings; in non-isolating languages, they express grammatical meanings and indicate syntactic relations.

Thus, in isolating languages the morphology is "poorer" than in non-isolating languages, which is manifested, for example, in the absence of case forms of the name and personal verb forms in isolating languages.

From the point of view of the morphological structure of the word, non-isolating languages are usually divided into inflectional, agglutinative and incorporative. And, as was indicated above, in non-isolating languages grammatical indicators express not only grammatical meaning, but also indicate syntactic relations between words.

From the point of view of the nature of the expression of grammatical meanings, non-isolating languages are divided into synthetic and analytical, and languages should be considered taking into account these two components (morphological and syntactic), since in any language both morphology and syntax coexist inseparably from each other.

Let us briefly consider, as an example, the morphological structure of a word in inflectional languages.

Inflectional languages are characterized by the integrity of the word, which is achieved through the fusional connection (i.e., close fusion) of morphemes in a word, and are also characterized by possible phonemic change of morphemes (i.e., the presence of internal inflection or unconditioned by phonetic laws alternation of vowels or consonants, which expresses a certain grammatical meaning), a clear opposition of the word to the morpheme and the phrase.

Examples of internal inflection can be found in many inflectional languages: in the English words (we) run — (he) ran, (I) choose — (he) chose (expressing the meaning of the present and past tense), a man — men, a goose — geese (expressing the meaning of the singular and plural), when different grammatical meanings are conveyed by alternating consonants or vowels, i.e. morphological alternations accompany word inflection.

Since morphological typology pays special attention to the methods of connecting affixes with root morphemes and the nature of the expression of grammatical meanings by affixes, a brief description of affixes in inflectional languages is given below.

*1. Affixes are non-standard, i.e. the same grammatical meaning can be expressed by different, unpredictable affixes. In other words, affixes can "compete with each other in expressing the same grammatical meaning". For example, in Russian, *журнала*, *мемпаду* express the meaning of the genitive case singular; *журналов*, *мемпадеу* express the meaning of the genitive case plural; in English, *pens*, *oxen**

express the meaning of the plural; in German, *der Tisch-die Tische, die Batterie-die Batterien, das Foto-die Fotos* express the meaning of the nominative case plural.

2. Affixes are polysemantic, i.e. one and the same affix can simultaneously express several grammatical meanings. For example, in Russian, *чумаю*, where -y simultaneously expresses the meaning of the indicative mood, present tense, 1st person, singular; in English, *boys' book*, where -s simultaneously expresses the meaning of the plural and possessive case.

3. Affixes are homosemic, i.e. affixes that sound the same actually express different grammatical meanings. For example, in Russian, *book*, where -a expresses the feminine gender; *table*, where -a expresses the genitive case; *sea*, where -a expresses the plural; in English, *He washed*, where -ed expresses the past tense, and *a washed plate*, where -ed expresses the passive voice.

The root in inflectional languages is characterized by the following features:

1) the root is not always equal to the base;

2) the root cannot exist without an affix (the presence of a zero affix is characteristic of inflectional languages);

3) phonetic and phonemic changes in the root are possible.

Affixes can occupy different positions in relation to the root: affixes are divided into prefixes, i.e. those standing before the root; suffixes, inflections, standing after the root; less often, infixes, standing inside the root.

The above-mentioned features of affixes (both root and non-root) can be expressed partially (to a greater or lesser extent), since there is no inflectional language that is completely devoid of agglutination features. For example, in Russian, cases of agglutination are found in prefixation, since these affixes are, as a rule, standard, unambiguous, and since assimilation by place of formation and by method of formation is less common at the junction of root and prefix than at the junction of root and suffix.

From the point of view of the nature of the expression of grammatical meaning and syntactic relations between words, inflectional languages are usually divided into inflectional languages of the synthetic type, in which synthetic methods of communication are widely represented, and of the analytical type, in which analytical methods of communication are widely represented.

This classification of languages affects not so much the morphological level of language as the syntactic level, since we are talking about the relationships between words (another issue is that these relationships can have not only an external expression, but also an internal one, i.e. within the word).

Thus, synthetic languages necessarily present word inflection by cases: a case form is a morpheme, which consists of a certain sound series. This morpheme, in combination with the root, gives a new specific meaning to the word. With the help of these forms, the relations between words in a phrase and then in a sentence are expressed. In analytical languages, word inflection by cases is absent, since there are no cases in analytical languages; however, there are meanings that are expressed in synthetic languages with the help of case forms. Then we can say that in analytical languages the expression of such meanings is assigned to one or another preposition.

The number of cases varies in different languages. Moreover, as researchers note, there is a certain inverse pattern in the prepositional-case system of a language: the greater the number of cases in a language, the fewer prepositions the prepositional system is represented by; and vice versa, the fewer the number of cases, the more prepositions are represented.

It should be noted that analyticism is more common in the name (which is manifested primarily in the absence of inflection by case). However, analyticism is also possible in the verb: grammatical meanings are expressed by combining the so-called auxiliary verb and the semantic one (the auxiliary verb conveys the grammatical meaning, and the semantic one conveys the lexical one).

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Physical sciences

POSSIBILITY IN ACCORDANCE WITH THE LAWS OF PHYSICS OF BRINGING BACK TO LIFE PEOPLE WHO HAVE DIED AS A RESULT OF ACCIDENT AND OTHER CAUSES BY TIME TRAVELS USING TIME ZONES ON EARTH¹

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Abstract

In the article it is suggested that due to the fast (faster than the Earth rotates) movement on the Earth through time zones to carry out accessible to people travelling (for example, by plane) both in the past and in the future time. An example of realisation of such time travel routes is given, allowing to bring back to life people who died as a result of an accident or criminal humans activity.

Keywords: *arrow of time, corrected version of the special theory of relativity, anti-time, internal time, external time, time zones, time travels*

1. Introduction

The title of the article may be perplexing. What can physics have to do with bringing a person back to life? Especially not in science fiction, but in serious science? But, it turns out, it can, although this serious science itself does not agree with this opinion.

The fact is that it is possible to bring a person back to life by travelling through time. But the possibility of travelling in time, except for some purely theoretical situations - in the twin paradox of the special theory of relativity (SRT), as a result of teleportations in quantum mechanics and in some other exotic theoretical situations - in practical human activity is denied by physics even in the distant future.

However, this article provides descriptions of useful new human activities that are physically already feasible on Earth now using time travel to the past and into the future.

2. Proof of the physical reality of time travel on Earth is already in the present day

Here are a couple of quotes that illustrate the current state of understanding of the problem of time. "Time is the most frequently used word in the English language and the third most frequently used word in Russian. It is also frequently used in all other languages, too, because synchronizing actions in time is as important as coordinating them in space. Without knowing the exact time, it is impossible to organize your life and plan it in advance. If in ancient times you could rely on natural cycles and an internal sense of time, then in our days you must constantly have a watch or a phone with you. Time is the most important of the abstract concepts that we pronounce every day. Every thinking person has thought about the problem of time at least once in his life. And a huge amount of philosophical and scientific literature has been written on this topic. Nevertheless, no one can say with certainty even what time is." [1]

And here is what Stephen William Hawking writes about this [2]: "In ordinary life, there is a huge difference between moving forward and backward in time. Imagine that a cup of water falls from a table and breaks into pieces. If you film this fall, then when you watch the film, it will immediately become clear whether the film is running forward or backward. If it is running backward, then we will see how the fragments lying on the floor suddenly come together and, having formed a whole cup, jump onto the table. And you will be able to claim that the film was running backward, because in ordinary life this does not happen. Otherwise, all the faience factories would have to be closed."

This phenomenon, known as the 'arrow of time', is one of the most surprising problems in physics. The name 'arrow of time' was proposed by the British physicist Sir Arthur Stanley Eddington in the early XX century [3]. And all our life experience, as it would seem, confirms the truth of this concept.

But the corrected version of SRT [4]-[12], in which a new concept of 'anti-time' has appeared, induces this life experience to be corrected. Indeed, if we assume that soon travelling through the expanses

¹ This is reprint of the article "Antonov A. A. 2025. How the laws of physics can be used to bring back to life a person who has died as a result of an accident or crime. Norwegian Journal of development of the International Science. № 160."

of universes and antiverse of the hidden Multiverse will become possible for people on Earth, then time travel [13] will also become possible, both in the past and in the future.

Moreover, time travel on Earth is already not only possible now, but also exists, although it is not used [14]-[25]. And since they are much easier and cheaper than in space, we will consider them. At the same time we will need two new concepts - internal (or biological) time of a human being and external time of his environment. And these two times have different properties. Human biological time cannot flow backwards. That is, a person cannot return to his youth or childhood. But the situation in the external environment in which a human being is, as a result of human activity, can change in the most incredible way. And in this external environment it is already possible to move both to the future and to the past time. And even short-term movements in time can be very useful. For example, if you get an opportunity to look into the future time for a short time, you can make a better choice in the present². Or by travelling to the past, it is possible to correct something in the present time³.

And such external time for people on Earth exists. It's known to everyone. These are 24 time zones, which are caused by the Earth's rotation around its axis. Moving through them in space, people also move in time. And depending on the direction of movement in space - to the west or to the east - they can move both to the past and to the future time. This is well known to everyone, but it has not been used in creative human activity so far.

But this is a free resource presented to us by nature to solve the problem of time travel, which is not difficult to use if you have an aeroplane (because you need to travel faster than the Earth rotates). Indeed, to travel 24 hours into the past, for example, you only need to move westwards by 24 time zones. To move into the future, you would have to do the same thing, but only by travelling east. All this is not difficult to do. It is also necessary to take into account that the closer to the pole - it does not matter which one, northern or southern - the transport route of time travelers will run, the less biological time will be required to cross one time zone. Therefore, it is more advantageous to lay it closer to the poles (for example, at a distance of 100-1000 km from the pole around the pole). But since the internal biological time in ordinary human activity for almost all people (who do not fly) flows much faster than external time, external time is usually not taken into account by people. Such a concept is still not even present in colloquial speech. And although millions of people are already travelling through time by flying planes, it has never occurred to anyone until now that there is any benefit to be gained from time travel. But it turns out that it is possible.

3. How the laws of physics can be used to bring a person who died as a result of a crime back to life.

Let's consider one of these situations. And from the analysis of this situation it will become clear how to act in other situations.

For example, let's assume that in one of the South American countries (this option will be convenient to explain, since this country is located near the South Pole) the president is killed. This situation is illustrated by Fig. 1, which shows the trajectories of movement in time:

- the President of this country;*
- the head of the security service;*
- and all the other people – both those who saw the assassination attempt on the president and those who did not.*

² Similarly, if we had known in advance about the future accident at the Chernobyl nuclear power plant, we could have cancelled the experiment planned there.

³ Or, after the accident at the Chernobyl nuclear power plant, it would have been possible to go back in time and change the experiment being conducted there.

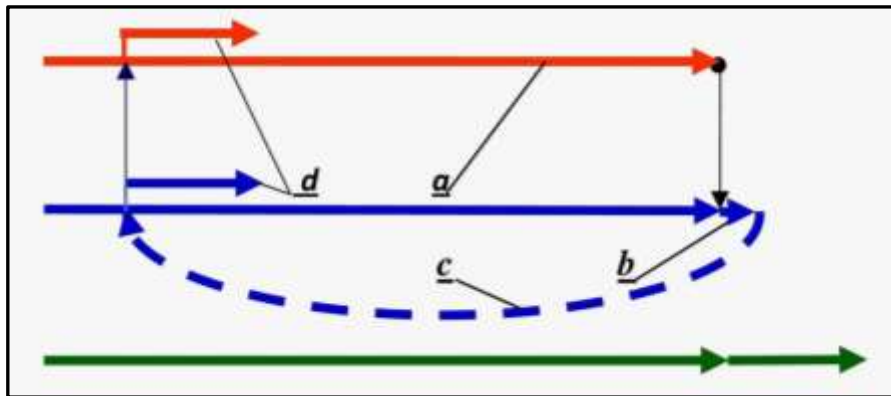


Fig. 1. Time travel routes of the President (in red) and the head of the security service (in blue), ensuring the return of the President to life after an assassination attempt on him, as well as the rest of the inhabitants of the Earth (in green). Solid lines show their movements on the surface of the Earth, and dotted lines show the movements of the head of the security service on an airplane through time zones.

Therefore, the temporal trajectory of the President's life ("a" in Fig. 1) ends with this murder (this moment is shown by a large black dot). And upon seeing this (shown by the thin black arrow), the head of the security service ("b" in Fig. 1) begins to act – he organises the President's delivery to the nearest military hospital, organises security, instructs him to report to the press that the President is alive, and instructs his staff to strictly prevent any leakage of information that the President has already died.

Then the head of the security service gets on an aeroplane ("c" in Fig. 1) and, having flown around Antarctica through 24 time zones, lands in the past time at the same aerodrome from which he took off in the present time. Outside time for him has changed into the past by 24 hours, and the internal biological time of his space-time journey, i.e. the flight time, has changed, for example, by 10 hours. Consequently, the head of the security service flew back in time 14 hours before the assassination attempt on the President. And therefore, during the remaining time ("d" in Fig. 1) he has time to take the necessary measures to save the President and neutralise the criminal (or criminals). And so for this country, its President - a real living President at that - could be saved⁴.

However, as Figure 1 shows, the situation is still unresolved. Firstly, after the assassination attempt, which was witnessed by many people, the President in this situation turns out to be not only alive but also fully healthy as a result of the activities of the head of the security service. However, even Presidents do not recover so quickly. And to explain to the people how the President was brought back to life is to be inexpedient, as it is not known how it will be perceived by them. However, this can be remedied: the President will simply have to stay out of public view for the duration of his alleged treatment. Secondly, the President with the head of the security service and the rest of the citizens have so far found themselves existing on Earth in different times. And this circumstance is already more difficult to overcome.

And there can be only one way out of this situation – the President and the head of the security service, in order to return to the same time in which the rest of the people of the Earth are, need to make a journey into the future (see Fig. 2).

Therefore let's continue. After the President and the head of the security service have solved all their issues in the past time ("d" in Fig. 2), they get on a plane and fly around Antarctica in the opposite direction ("e" in Fig. 2). And thus in 24 hours they return from the past to the present

⁴ Perhaps President Kennedy could have been saved in a similar fashion

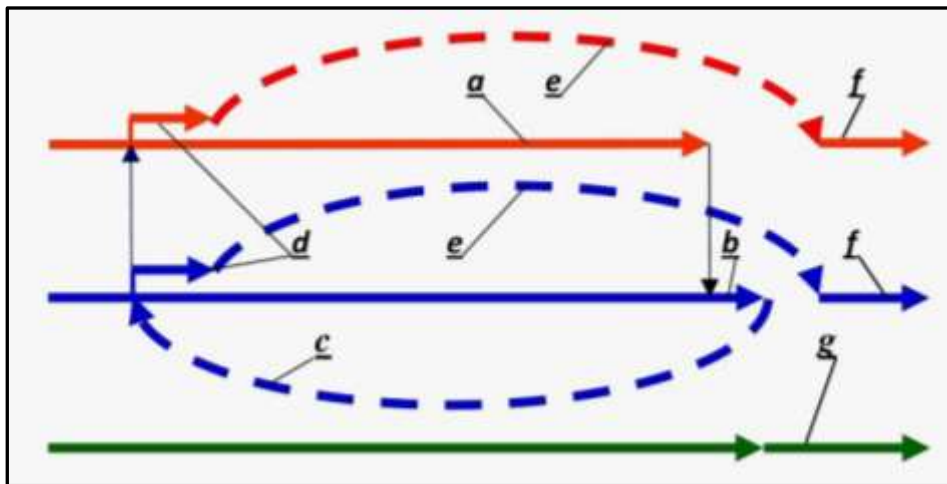


Fig.2. Time-travelling routes of the President and the head of the security service, ensuring the President's return to life after the assassination attempt, as well as the rest of the Earth's inhabitants. The solid lines represent their movements on the surface of the Earth, and the dotted lines represent the movements of the President and the head of security by aeroplane across time zones.

("d+e" in Fig. 2). And while they are flying, they have time to discuss their problems of the future. And after the plane arrives in the present, the President, together with the head of the security service, secretly gets into a car and leaves for a place of stay chosen on board the plane for the duration of his alleged treatment. And after the completion of this 'healing' ("f" in Fig. 2), the President already appears in his residence. And since the conditions $a + b = g$ and $d + f = h$ were met in such a time travel (see Fig. 2) then, eventually, the President and the head of the security service returned to the same time in which all the other people of the Earth were.

This is how, presumably, the problem of bringing back to life people who have died as a result of an accident or someone else's criminal activity can be solved. But it is not excluded that during the realisation of the solution to this problem, additional circumstances may arise that will require their own solution. And which, hopefully, will turn out to be solvable.

4. Conclusion

The above are just assumptions that need to be verified experimentally. Moreover, these verification experiments are simple, easy to implement and quite convincing. But you need an airplane. And having flown around the North or South Pole through 24 time zones and having made sure that they actually got to the past or future time, the experimenters will get an answer to their question of whether they can actually travel in time. And after that, they can return to their present time in the manner described above. And if such an experiment confirms the assumptions made in the article, then the above-described and other travel routes to the past and future can be used to solve other problems. For example, simply by asking a passer-by what the date and time are, or by using your iPhone for this purpose. And the knowledge gained in this way can also be used to create more comfortable time machines.

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