Intellectual Archive

Volume 8 Number 3

July - September
2019

IntellectualArchive, Volume 8, Number 3

Publisher : Shiny World Corp.
Address : 9200 Dufferin Street
P.O. Box 20097
Concord, Ontario
L4K 0C0
Canada

E-mail : support@IntellectualArchive.com
Web Site : www.IntellectualArchive.com
Series : Journal
Frequency : Every 3 months
Month : July - September 2019
ISSN : 1929-4700
DOI : 10.32370/IA_2019_09
Trademark : **IntellectualArchive™**

Intellectual Archive

Volume 8 **Number 3** **July/September 2019**

Table of Contents

continued

Table of Contents (continued)

Toronto, July/September 2019

DOI 10.32370/IA_2019_09_1

THE GÖEDEL THEOREM AND THE LORENTZ CONTRACTION

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August 29, 2019

Abstract

The power spectral formula of the Čerenkov radiation of the system of two equal charges is derived in the framework of the field theory. The distance between charges is supposed to be relativistically contracted which manifests in the spectral formula. The knowledge of the spectral formula then can be used to verification of the Lorentz contraction of the relativistic length. A feasible experiment for the verification of the Lorentz contraction is suggested.

PACS numbers: 03.30.+p, 41.60.Bq

1 Introduction

It is well known that the basis of every physical theory is the systems of axioms. From it are drawn the conclusions which are compared with the experiments. Inasmuch in this comparison agreement is found between the messured and the calculated values, the initial system of axioms is considered correct. If no agreement is found, there is good reason for the axioms to be subjected to analysis and corrected.

However, from the theoretical point of view theyselves can be reason for analysis and correction of axioms in themselves. We can ask for their independence, indisputability, for completeness of the syste, or directly for the ideological content of the axioms. From the viewpoint of the ideo-logical content the axiom of the constant light velocity related to the length contraction in the special relativity theory appears to be very important. However such analysis can be incomplete because of the existence of so-called Göedel theorem which is as follows: **Göedel theorem**:

In any consistent and rich enough formal structure, based on afinite number of first principles and inference rules, there will always be propositions that may be formulated within this formal system but are undecidable. Such a theory cannot be both consistent and complete. (Ben-Yaacov, 2019). So, let us look on the length contraction and simultaneity from the viewpoint of Euclidean geometry.

So, Let us have two inertial systems S and S' of which S' moves in the positive direction of axis x so that $x \equiv x'$. Let us assume that on each of the x-axes of both systems lies a solid rod represented by the abscissa AB in the syste S and $A'B'$ in S' and for their resting length $(AB)_0$, $(A'B')_0$ holds $(AB)_0 \equiv (A'B')_0$.

Theorem: If $(AB)_0 \equiv (A'B')_0$ in the rest system of S and $v = 0$, then it is $(AB)_0 \equiv (A'B')$, when $v \neq 0$. **Proof**: The identity of two rods is timeless and non-kinematical notion and it means that the identity of length is timeless and it is only geometrical one. At the same time we can define the simultaneity at points A and B. Namely: if $(A \equiv A')$, at time T then, $(B \equiv B')$ at time T. This definition of simultaneity differes from the Einstein definition as can be seen in the next text.

A remark: There is a possibility that our statement is undecidable because the Euclidean geometry involves no information on the geometry of moving rod.

2 The Einstein physical resolution of the Gödel theorem

Let us write the text, which is identical with the Einstein text (Einstein, 1916; 1919).

On the Idea of Time in Physics: Lightning has struck the rails on our railway embankment at two places A and B far distant from each other. I make the additional assertion that these two lightning flashes occurred simultaneously. If I ask you whether there is sense in this statement, you will answer my question with a decided "Yes." But if I now approach you with the request to explain to me the sense of the statement more precisely, you find after some consideration that the answer to this question is not so easy as it appears at first sight.

After some time perhaps the following answer would occur to you: "The significance of the statement is clear in itself and needs no further explanation; of course it would require some consideration if I were to be commissioned to determine by observations whether in the actual case the two events took place simultaneously or not." I cannot be satisfied with this answer for the following reason. Supposing that as a result of ingenious considerations an able meteorologist were to discover that the lightning must always strike the places A and B simultaneously, then we should be faced with the task of testing whether or not this theoretical result is in accordance with the reality. We encounter the same difficulty with all physical statements in which the conception " simultaneous " plays a part. The concept does not exist for the physicist until he has the possibility of discovering whether or not it is fulfilled in an actual case. We thus require a definition of simultaneity such that this definition supplies us with the method by means of which, in the present case, he can decide by experiment whether or not both the lightning strokes occurred simultaneously. As long as this requirement is not satisfied, I allow myself to be deceived as a physicist (and of course the same applies if I am not a physicist), when I imagine that I am able to

attach a meaning to the statement of simultaneity. (I would ask the reader not to proceed farther until he is fully convinced on this point.)

3 The Čerenkov effect

The fast moving charged particle in a medium when its speed is faster than the speed of light in this medium produces electromagnetic radiation which is called the Čerenkov radiation.

The prediction of Cerenkov radiation came long ago. Heaviside (1889) investigated the possibility of a charged object moving in a medium faster than electromagnetic waves in the same medium becomes a source of directed electromagnetic radiation. Kelvin (1901) presented an idea that the emission of particles is possible at a speed greater than that of light. Somewhat later, Sommerfeld (1904) proposed the hypothetical radiation with a sharp angular distribution. However, in fact, from experimental point of view, the electromagnetic Čerenkov radiation was first observed in the early 1900's by experiments developed by Marie and Pierre Curie when studying radioactivity emission. In essence they observed the emission of a bluish-white light from transparent substances in the neighborhood of strong radioactive source. But the first attempt to understand the origin of this was made by Mallet (1926; 1929a; 1929b), who observed that the light emitted by a variety of transparent bodies placed close to a radioactive source always had the same bluish-white quality, and that the spectrum was continuous, with no line or band structure characteristic of fluorescence. Unfortunately, these investigations were forgotten for many years. Cherenkov experiments (Čerenkov, 1934) was performed at the suggestion of Vavilov who opened a door to the true physical nature of this effect (Bolotovskii, 2009).

This radiation was first theoretically interpreted by Tamm and Frank (1937) in the framework of the classical electrodynamics. The source theoretical description of this effect was given by Schwinger et al. (1976) at the zero temperature regime and the classical spectral formula was generalized to the finite temperature situation in the framework of the source theory by author (Pardy, 1989). The similar problems was solved and published by author in plenty articles (Pardy, 1983; 2000; 2002; 2004).

The question arises, what is the relation of the Čerenkov radiation to the relativistic length. The relativistic length can be formed by the system of charges of the linear chain, or, only by the two charges of the rest distance l. The problem of the radiation of the composed systems of charges is not new and it was defined for the first time in the pioneering work of Ginzburg (1940). Later by Frank (1942; 1946), it was given the solution of the problem of the Čerenkov radiation of the electrical and magnetical dipoles oriented parallelly and perpendicularly to the direction of motion. While the parallel orientation gives no surprising result the situation with the perpendicular orientation gives special anomaly which has been frequently discussed in the physical journals. In year 1952 was published the article discussing the Čerenkov radiation of the arbitrary electrical and magnetical multipoles (Frank, 1952). The review of the problems of the Čerenkov radiation of the magnetic and electrical multipoles was given by Frank (1984). The extensive work concerning the radiation by uniformly moving sources is eleborated (Ginzburg, 1986). However, the problem of testing the Lorentz contraction by Čerenkov effect is here considered for the first time (Pardy, 1997; Cavalleri, 2000).

While the original articles on the Čerenkov radiation involve only determination of the spectral formulae, it is possible interest the question on the relationship between the spectral formula and the Lorentz contraction of the length of some linear object. The specific situation forms the system of two equal or opposite charges of the rest distance l. Then, we can expect that the spectral formula of the Čerenkov radiation involves the Lorentz contraction which follows immediately from the Lorentz transformation for coordinates between systems S' and S:

$$x' = \gamma(x - vt); \quad \gamma = \frac{1}{\sqrt{1 - v^2/c^2}}, \tag{1}$$

where x are coordinates in the system S and x' are corresponding coordinates in the system S' which is moving with velocity v relative to the system S. If the left and right points of the moving rod are x_1, x_2 in the system S and x'_1 and x'_2 in the system S', then from equation (1) we have:

$$x'_2 - x'_1 = \gamma(x_2 - x_1), \tag{2}$$

which can be transcribed in the form

$$a = l\sqrt{1 - v^2/c^2}, \tag{3}$$

where l is the rest length of the rod and a is the length of the moving rod.

The formula (3) is well known and there was general belief since the formulation of the special theory of relativity by Einstein that the so called Lorentz contraction (3) should be visible to the eye. Also Lorentz stated in 1922 that the contraction could be photographed. Similar statements appear in other references concerning the special theory of relativity.

However, the special theory of relativity predicts that the contraction can be observed by a suitable experiment with the nuance that there is distinction between observing and seeing. The situation was analysed for instance by Terrell (1959) and Weisskopf (1960) and others (Dreissler, 2005), who proved that the photograph obtained by an observer depends only on the place and time of taking the picture and is independent of the relative motion of observer and object photographed.

It would be incorrect to state that we see the length contraction, or, that the length "appears" to be contracted by the factor $\sqrt{1 - v^2/c^2}$. As first pointed out by Lampa (1924) and later by Penrose (1959), Terrell (1959) and Weisskopf (1960) what one sees and how an object appears are very different from what is given by the Lorentz contraction. The reason is that various parts of the object are different distances from the observer, and in order for the light rays from the various parts to arrive at the observer at the same time, they must have left the object at different times. It follows from the special theory of relativity that the length contraction is the result of the measurement procedure and the time dilation is also the measurement procedure as was shown by Fok (1961) and author (Pardy, 1969).

In other words, an observation of the shape of a fast moving object involves simultaneous measurement of the position of a number of points on the object. If done by means of light, all the quanta should leave the surface simultaneously, as determined in the observer position at different times. In such observation the data received must be

corrected for the finite velocity of light, using measured distances to various points of the moving object. In seeing the object, on the other hand, or photographing it, all the light quanta arrive simultaneously at the eye having departed from the object at various earlier times. In such a way this should make a difference between contracted shape which is in principle observable and the actual visual appearance of a fast-moving object. The photograph of a relativistically moving object with a camera using, instead of photons, particles moving much faster than the velocity of light, eliminates the non-desired optical effects and the film would show the object shortened by a factor of $\sqrt{1-v^2/c^2}$. in the direction of motion. However, such a camera is not physically possible, and we can ask how to correct for the optical effects so that only the relativistic effects will be observed on a photograph taken by an ordinary camera.

In this paper we refer to new approach the measurement of the Lorentz contraction. We use the synchrotron spectrum of the rigid two-body system in such a way, the we read the information on the Lorentz contraction from this spectrum as the proof of the Lorentz contraction.

Obviously, the Čerenkov radiation of the charged two-particle system involves the Lorentz contraction of their rest distance. We will consider the system of two equal charges e which have the mutual rest distance l. The Lorentz contraction will be involved in the power spectral formula for this linear system.

In this article we evaluate in source theory the power spectral formula of the Čerenkov radiation of the two-charge system moving with velocity v in the dielectrical medium. Radiative corrections to this two-body Čerenkov radiation are considered too. In conclusion, a feasible experiment is suggested for the verification of the Lorentz contraction.

4 The field formulation of the problem

Source theory (Schwinger, et al. 1976; Schwinger, 1970; Dittrich, 1978) is the theoretical construction which uses quantum-mechanical particle language. Initially it was constructed for description of the particle physics situations occurring in the high-energy physics experiments. However, it was found that the original formulation simplifies the calculations in the electrodynamics and gravity where the interactions are mediated by photon or graviton respectively.

The basic formula in the source theory is the vacuum to vacuum amplitude (Schwinger, et al. 1976):

$$< 0_+|0_- >= e^{\frac{i}{\hbar}W(S)}, \tag{4}$$

where the minus and plus tags on the vacuum symbol are causal labels, referring to any time before and after space-time region where sources are manipulated. The exponential form is introduced with regard to the existence of the physically independent experimental arrangements which has a simple consequence that the associated probability amplitudes multiply and corresponding W expressions add (Schwinger, 1970; Dittrich, 1978).

The electromagnetic field is described by the amplitude (4) with the action

$$W(J) = \frac{1}{2c^2}\int (dx)(dx')J^{\mu}(x)D_{+\mu\nu}(x-x')J^{\nu}(x'), \tag{5}$$

where the dimensionality of $W(J)$ is the same as the dimensionality of the Planck constant $\hbar$. J_μ is the charge and current densities. The symbol $D_{+\mu\nu}(x-x')$, is the photon propagator and its explicit form will be determined later.

It may be easy to show that the probability of the persistence of vacuum is given by the following formula (Schwinger, et al. 1976):

$$| < 0_+|0_- > |^2 = \exp\{-\frac{2}{\hbar}\mathrm{Im}\, W\} \stackrel{d}{=} \exp\{-\int dtd\omega \frac{P(\omega,t)}{\hbar\omega}\}, \tag{6}$$

where we have introduced the so called power spectral function (Schwinger, et al. 1976) $P(\omega,t)$. In order to extract this spectral function from $\mathrm{Im}\, W$, it is necessary to know the explicit form of the photon propagator $D_{+\mu\nu}(x-x')$.

The electromagnetic field is described by the four-potentials $A^\mu(\phi,\mathbf{A})$ and it is generated by the four-current $J^\mu(c\varrho,\mathbf{J})$ according to the differential equation (Schwinger, et al. 1976):

$$(\Delta - \frac{\mu\varepsilon}{c^2}\frac{\partial^2}{\partial t^2})A^\mu = \frac{\mu}{c}(g^{\mu\nu} + \frac{n^2-1}{n^2}\eta^\mu\eta^\nu)J_\nu \tag{7}$$

with the corresponding Green function $D_{+\mu\nu}$:

$$D_+^{\mu\nu} = \frac{\mu}{c}(g^{\mu\nu} + \frac{n^2-1}{n^2}\eta^\mu\eta^\nu)D_+(x-x'), \tag{8}$$

where $\eta^\mu \equiv (1,\mathbf{0})$, μ is the magnetic permeability of the dielectric medium with the dielectric constant ε, c is the velocity of light in vacuum, n is the index of refraction of this medium, and $D_+(x-x')$ was derived by Schwinger et al. (1976) in the following form:

$$D_+(x-x') = \frac{i}{4\pi^2 c}\int_0^\infty d\omega \frac{\sin\frac{n\omega}{c}|\mathbf{x}-\mathbf{x}'|}{|\mathbf{x}-\mathbf{x}'|}e^{-i\omega|t-t'|}. \tag{9}$$

Using formulae (5), (6), (8) and (9), we get for the power spectral formula the following expression (Schwinger et al., 1976):

$$P(\omega,t) = -\frac{\omega}{4\pi^2}\frac{\mu}{n^2}\int d\mathbf{x}d\mathbf{x}'dt' \frac{\sin\frac{n\omega}{c}|\mathbf{x}-\mathbf{x}'|}{|\mathbf{x}-\mathbf{x}'|}\cos[\omega(t-t')]\times$$

$$\times\left\{\varrho(\mathbf{x},t)\varrho(\mathbf{x}',t') - \frac{n^2}{c^2}\mathbf{J}(\mathbf{x},t)\cdot\mathbf{J}(\mathbf{x}',t')\right\}. \tag{10}$$

Now, we are prepared to apply the last formula to the situations of the two equal charges moving in the dielectric medium.

5 The Čerenkov radiation of the two-charge system

It is usually supposed that the Čerenkov radiation in electrodynamics is produced by uniformly moving charge with the constant velocity. Here we consider the system of two equal charges e with the constant mutual distance $a = |\mathbf{a}|$ moving with velocity $\mathbf{v}$ in dielectric medium. We follow the author articles (Pardy, 1997; 2007).

In this situation the charge and the current densities for this system are given by the by the following equations:

$$\varrho = e[\delta(\mathbf{x} - \mathbf{v}t) + \delta(\mathbf{x} - \mathbf{a} - \mathbf{v}t)] \tag{11}$$

$$\mathbf{J} = e\mathbf{v}[\delta(\mathbf{x} - \mathbf{v}t) + \delta(\mathbf{x} - \mathbf{a} - \mathbf{v}t)]. \tag{12}$$

where $\mathbf{a}$ is the vector going from the left charge to right charge with the length of $a = |\mathbf{a}|$ in the system S.

Let us suppose that $\mathbf{v} \parallel \mathbf{a} \parallel x$. Then, after insertion of eq. (11) and (12) into eq. (10), putting $\tau = t' - t$, and $\beta = v/c$, where $v = |\mathbf{v}|$, we get instead of the formula (10) the following relation:

$$P(\omega, t) = 2P_1(\omega, t) + P_2(\omega, t) + P_3(\omega, t), \tag{13}$$

where

$$P_1(\omega, t) = \frac{1}{4\pi^2}\frac{e^2\mu\omega}{c^2}v\left[1 - \frac{1}{n^2\beta^2}\right]\int_{-\infty}^{\infty} d\tau \frac{\sin n\omega\beta\tau}{\tau}\cos\omega\tau \tag{14}$$

$$P_2(\omega, t) = \frac{1}{4\pi^2}\frac{e^2\mu\omega}{c^2}v\left[1 - \frac{1}{n^2\beta^2}\right]\int_{-\infty}^{\infty} d\tau \frac{\sin n\omega\beta|\frac{a}{v} + \tau|}{|\frac{a}{v} + \tau|}\cos\omega\tau \tag{15}$$

$$P_3(\omega, t) = \frac{1}{4\pi^2}\frac{e^2\mu\omega}{c^2}v\left[1 - \frac{1}{n^2\beta^2}\right]\int_{-\infty}^{\infty} d\tau \frac{\sin n\omega\beta|\frac{a}{v} - \tau|}{|\frac{a}{v} - \tau|}\cos\omega\tau. \tag{16}$$

The formula (14) contains the known integral:

$$J_1 = \int_{-\infty}^{\infty} d\tau \frac{\sin n\omega\beta\tau}{\tau}\cos\omega\tau = \begin{cases} \pi; & n\beta > 1 \\ 0; & n\beta < 1 \end{cases}. \tag{17}$$

Formulae (15) and (16) contain the following integrals:

$$J_2 = \int_{-\infty}^{\infty} d\tau \frac{\sin n\omega\beta|\frac{a}{v} + \tau|}{|\frac{a}{v} + \tau|}\cos\omega\tau \tag{18}$$

and

$$J_3 = \int_{-\infty}^{\infty} d\tau \frac{\sin n\omega\beta|\frac{a}{v} - \tau|}{|\frac{a}{v} - \tau|}\cos\omega\tau. \tag{19}$$

Using the integral (17) we finally get the power spectral formula P_1 of the produced photons:

$$P_1(\omega, t) = \frac{e^2}{4\pi}\frac{\mu\omega}{c^2}v\left[1 - \frac{1}{n^2\beta^2}\right]; \quad n\beta > 1 \tag{20}$$

and

$$P_1(\omega, t) = 0; \quad n\beta < 1. \tag{21}$$

Using transformations

$$\frac{a}{v}+\tau=T,\quad \frac{a}{v}-\tau=T, \tag{22}$$

we get after evaluations of the corresponding integrals J_2, J_3 the corresponding spectral formulas P_2, P_3:

$$P_2(\omega,t)=\frac{e^2}{4\pi}\frac{\mu\omega}{c^2}\cos\left(\frac{\omega a}{v}\right)v\left[1-\frac{1}{n^2\beta^2}\right]=P_3;\quad n\beta>1 \tag{23}$$

and

$$P_2(\omega,t)=P_3(\omega,t)=0;\quad n\beta<1. \tag{24}$$

The sum of the partial spectral formula form the total radiation emitted by the Čerenkov mechanism of the two-charge system:

$$P(\omega,t)=2(P_1+P_2)=\cos^2\left(\frac{a\omega}{2v}\right)\frac{e^2}{4\pi}\frac{\mu\omega}{c^2}v\left[1-\frac{1}{n^2\beta^2}\right];n\beta>1 \tag{25}$$

and

$$P(\omega,t)=0;\quad n\beta<1. \tag{26}$$

The zero point of function $P(\omega,t)$ are as follows:

$$\omega_0=0;\quad \frac{\omega_n a}{2v}=\frac{(2n-1)}{2}\pi;\quad n=1,2,3,\ldots. \tag{27}$$

From the last equation follows

$$a=\frac{(m-n)2\pi v}{(\omega_m-\omega_n)}=l\sqrt{1-\frac{v^2}{c^2}}, \tag{28}$$

or,

$$l=\frac{2\pi v}{\sqrt{1-\frac{v^2}{c^2}}}\frac{(m-n)}{(\omega_m-\omega_n)}. \tag{29}$$

If we know the n-th and m-th zero points with the corresponding ω-s and velocity of the charges we can exactly determine their rest distance. Then, the rest distance determined by the formula (29) can be compared with the rest distance of the charges obtained by direct measurement and in such a way we can verify the Lorentz contraction.

6 A feasible experiment

With regard to the situation in laboratories where the great accelerator works for instance in Grenoble, DESY, CERN and SLAC we can suggest a feasible experiment for the verification of the Lorentz contraction. The experiment must be based on the definition of the length. Instead of two electrons we can consider two bunches with 10^{10} electrons in volume 300μm $\times$ 40μm $\times$ 0,01 m with the rest distance $l=1$m. After acceleration

of the considered bunches the distance of the two bunches is the relativistic length a and it can be determined by the Čerenkov spectrum derived in our article. However, during the acceleration the motion of particles in storage rings is influenced by various kinds of perturbations. It is necessary to consider phenomena such as the ground motion, power supply ripple, noise caused by the quantum emission of synchrotron radiation and noise in the radiofrequency (rf) system and so on. Therefore it is necessary to include the stochasticity caused by these effects in the calculation of the beam dynamics. The stochastic forces can change the distance of the bunches. So instead of the determination of the rest length at the beginning of the experiment, it is more suitable to determine the rest length immediately after the determination of the Čerenkov spectrum.

We can slow down the velocity of bunches by the simultaneous deceleration of every bunch in order to get the final nonrelativistic velocity v_f instead of the relativistic velocity v in the spectral formula. It can be performed by switching the electric field or by the sufficiently intensive laser field of photons moving in the opposite direction of motion of the bunches. The simultaneity is the inevitable condition in order to conserve the length during deceleration.

If a particle is accelerated in the system S by the constant acceleration w, then the law of its motion with the initial conditions $x(0) = 0, v(0) = 0$ is as follows:

$$x_1(t) = \frac{c^2}{w}\left[\sqrt{1 + \left(\frac{wt}{c}\right)^2} - 1\right] \tag{30}$$

and in case of the initial condition $x(0) = l, v(0) = 0$, we have for the law of its motion

$$x_2(t) = x_1(t) + l \tag{31}$$

So, in case of acceleration of the free two-body system we get:

$$x_2(t) - x_1(t) = l \tag{32}$$

and the observer in the system S observes the distance of the the electrons is equal to l. In case the acceleration is replaced by the deceleration, the final result is the same. Or, the observer in the system S finds that the distance of the two electrons or bunches does not change during the deceleration. In case of application of the laser field the simultaneity is broken with the difference $l/c \approx 10^{-9}$ s in the system of bunches, for the distance $l =$ 1m. However, such deviation from the simultaneity is sufficiently small in order not to influence substantially the result of experiment. It is evident that in order the experiment to be meaningful it will be necessary to respect the law of of deceleration motion from which eq. (32) follows.

Our situation does not represents the rigid motion considered by Rindler (1977). He shows that for so called rigid motion at every instant $t = constant$ the two points are separated by a coordinate distance dx inversely proportional to their γ-factor, and consequently the element bounded by these points 'moves rigidly'.

The two bunches impinge into detector with the time difference $\Delta t = l/v_f$. This time difference can be determined by the scintillation detector with the sufficient time resolution. The scintillation detectors or counters consist of scintillationg materials, usually a doped plastic, that emit light in response to molecular excitation by the passage of a

charged particle. The scintillation light can be detected with photomultipliers or photodiodes. The light yield in a plastic scintillator is usually sufficiently large. The scintillation counters range is size from very small to very large a few square meters. The important feature of scintillation counters is their speed which is in nanosecond range. So they can accurately measure the time of arrival of a charged particle and therefore the speed of a particle (Kleinknecht, 1977).

The rest length measured by the scintillation detector $l = \Delta t v_f$ can be compared with the formula (29) in order to verify the Lorentz contraction. For velocity $v_f = 10^4$ m, we have the $\Delta t \approx 10^{-4}$ s with the assumption that the Lorentz contraction corresponding to this velocity can be neglected. To our knowledge the detectors have better time resolution than the calculated Δt. So, the verification of the Lorentz formula is in principle possible.

7 Discussion

We have demonstrated that in case of the system of two equal charges, the Lorentz contraction can be determined from the spectral formula of the Čerenkov radiation. Obviously this effect can be involved into the group of the classical relativistic effects. In case of the system of opposite charges, or, in other words, of the dipole we have instead of $\cos(\omega a/2v)$ function $\sin(\omega a/2v)$ in the final formulae. To our knowledge the determination of the Lorentz contraction using the Čerenkov effect was not considered in theory and in experiment. After performing the experiment with the Čerenkov radiation of the system of the two charges it will be definitely confirmed the Lorentz contraction.

While the simultaneous acceleration of the system of the two equal charges can be performed immediately in every laboratory with the circle accelerator, the simultaneous acceleration of the system of two opposite charges can be performed only with the laser accelerator. In this equipment the opposite charges are accelerated at the same acceleration as a result of the Compton effect.

The experiment suggested by us is feasible in the sense that the bunches of charges are prepared in every circle accelerator and therefore it is not necessary to prepare substantially new arrangement of equipments for verification of the Lorentz contraction. We hope that sooner or later such experiment will be performed.

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DOI 10.32370/IA_2019_09_2

Diffraction experiment demonstrates photon's path

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June 22, 2019

Abstract

Wave models of light suggest the waves from a slit expand like a fan and interfere with other waves through the slit. A photon model of light with a computer simulation suggests the photons through a slit cross to the other side of centerline to reach the screen. A diffraction experiment is performed with a light filter that reduces the intensity of light on one side of a slit. This experiment demonstrates that the reduced intensity caused by the filter appears on the side of the image opposite to the side with the filter. Therefore, the crossing pattern predicted by a photon computer simulation is supported and the traditional wave models are rejected.

keywords: diffraction, light, photon

1 INTRODUCTION

A model was formed to explain the observations of cosmology (Hodge 2018). A Universal Equation was developed.

The application of the universal equation to galaxy redshift and discrete redshift suggested light is photons (Hodge 2006). The photon concept was expanded and a computer simulation was developed using the Universal Equation (Hodge 2012). The model suggests photons have a definite position and direction at all times and the photon's movement causes waves in a plenum (ether, spacetime, quantum vacuum, etc.). These waves are the pilot waves of the Bohm Interpretation of quantum mechanics. The simulation was applied to a single photon (Hodge 2015) and an experiment performed that rejected wave models of light (Hodge 2019).

Figure 1 shows the simulated path followed for a single photon at a time through a single slit. A notable feature of the photon's path is that the path's cross. The photons through the slit at the top are redirected to the bottom of the screen. Those photons through the slit at the bottom are redirected to the top of the screen. Traditional wave models suggest the light spreads out like a fan from the slit (Jenkins and White 1957).

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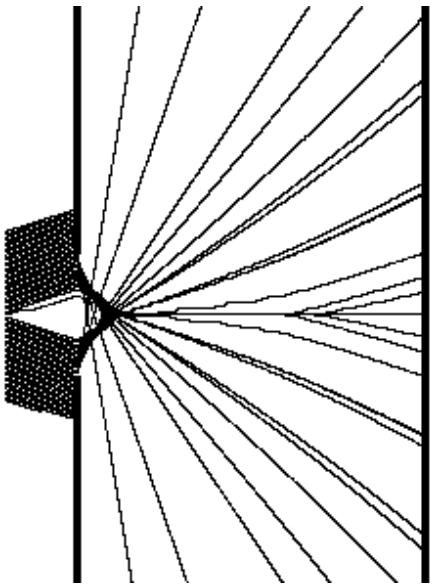

Figure 1: Plot of the trace of the paths of a single photon at a time through a single slit mask using the computer simulation. [Reprinted from Hodge (2015, Figure 2:) with permission of the copyright holder.]

This Paper suggests a test for the screen pattern that the photon simulation predicts. The description of the experiment is in section 2. The Discussion and Conclusion are in section 3.

2 THE EXPERIMENT

The diagram in Figure 2 shows the experimental setup.

The laser was from a 5 mW, 635nm pointer. The mask was 15 cm from the laser. The first mask slit was 0.508 mm wide as determined by feeler gauge and was 0.33 mm thick aluminum sheet. The screen was 6.6 m from the mask.

Figure 3a is a photograph of the image on the screen of the laser light through the slit without the filter.

The filter was a 0.2 mm thick red plastic. Light on one side of the slit passed through the filter then through the slit. Light on the other side passed through the slit. The filter reduced the light intensity slightly. The filter was attached to one side of the mask to make the mask assembly. It was positioned to leave a 0.254 mm gap as determined by feeler gauge.

Figure 3b is a photograph of the image on the screen of the laser light through the mask assembly with the filter on the right side. Note the weaker intensity on the left of the image on the screen.

The mask assembly was then turned to position the filter on the left side

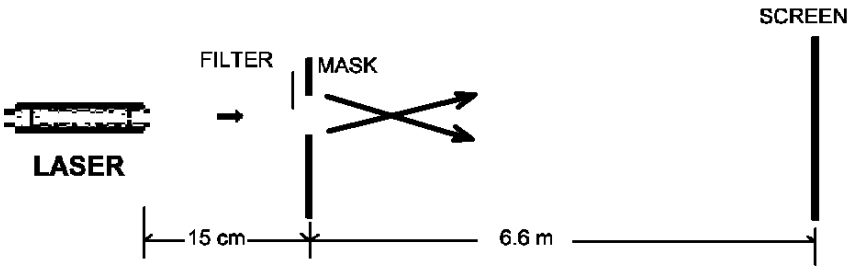

Figure 2: Diagram of the experimental fixtures.

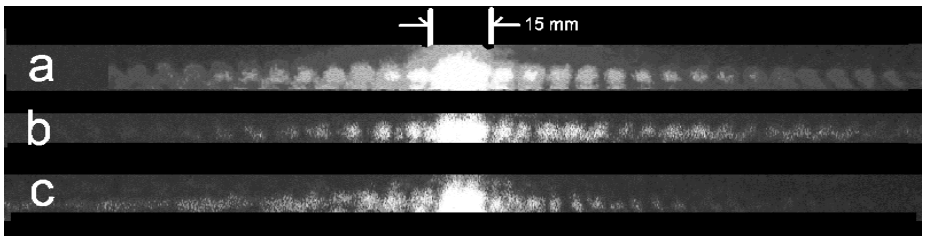

Figure 3: The photographs of the screen images in grayscale for printing: (a) The screen diffraction pattern without the filter. (b) The screen pattern with the filter on the right side of the slit. (c) The screen pattern with the filter on the left side of the slit.

the slit. Figure 3c is a photograph of the image on the screen of the laser light through the mask assembly with the filter on the left side. Note the weaker intensity on the right of the image on the screen.

3 DISCUSSION AND CONCLUSION

This experiment should be repeated with a photon counter.

An experiment was performed with a light filter that reduces the intensity of light on one side of a slit. This experiment demonstrated that the reduced intensity caused by the filter appeared on the side of the image opposite to the side with the filter. Therefore, the crossing pattern predicted by the photon computer simulation was supported and the traditional wave models were rejected.

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DOI 10.32370/IA_2019_09_3

Magnetic field evolves to gravity field part:1 Repulsion

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August 9, 2019

Abstract

Current research enquiry has sought a more primitive explanation for gravity. The STOE suggests gravity emerges from magnetic effects of hods in matter structures. Four experiments are done to examine the repulsive magnetic force characteristics. Different relations of force to distance were found. A speculation that gravity may be the sum of the poles at the side of photons is formed.

keywords: magnet, gravity

1 INTRODUCTION

The gravitational field surrounding matter had been presumed to be a fundamental force field since Newton. Current research enquiry has sought a more primitive explanation for gravity. Several researchers have noted the similarity between Coulombs Law for electric charges and Newton's Law for gravity. Therefore, they suggest that electric effects form gravity.

The Scalar Theory of Everything (STOE) rejected the Biot-Savart Law and suggested two types of magnetic effects (Hodge 2018b,c). One type emanates from magnets, the other from electric currents.

Michaud (2013) noted the force of repelling magnets has a zone wherein the force is proportional to the inverse cube of the distance d between them. This observation was taken to suggest the existence of magnetic monopoles.

The Scalar Theory of Everything (STOE) posits the universe is composed of hods and plenum which emerge to form all in the universe (Hodge 2016b). The hods have the plenum highest density on one side and zero density on the other (Hodge 2018e, figure 3.1). That is, the hod is fundamentally a magnet with North and South poles and magnetic monopoles are nonexistent. Electric effects are vortices formed in the plenum by the movement of hods through the plenum (Hodge 2018a). The STOE suggests the self-similarity principle that posits small size scales are similar to our everyday size scale. Accordingly, disk

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magnets were used to model photons and leptons (Hodge 2016a). According to the STOE, gravity must be an emerged property of the plenum similar to the magnetic effects of hods and not from an electric current.

The plenum around a hod can be high (positive divergence) or low (negative divergence). The magnetic field of magnets can be attractive or repulsive. How can the plenum become a field of plenum with only a negative divergence from assemblies of hods (matter)? How can the magnetic force appear to be so much stronger than the gravitational force?

This Paper describes four experiments using disk magnets to represent hods to begin the enquiry into the properties of the plenum that emerge into the gravitational field. The description of the experiments is in section 2. The Discussion and Conclusion are in section 3.

2 THE EXPERIMENT

The diagram in Figure 1 shows the experimental setup. Disc magnets (1.82 cm diameter X 0.2 cm thick) are used as in Hodge (2016a). The magnets are glued to the wood supports. The wood supports are constrained to allow free movement vertically. The horizontal movement allowed is ± 2 mm. The bottom wood support rests on a scale that measures force in gram weight (gw). The measurements taken are the weight W and the perpendicular distance d between the magnets. The top wood support is lowered to change the d.

The scale (AWS-100, Digital scale) has a tolerance of ± 0.02 gw. (see Fig. 1). A calibration 20 gram mass weighed 19.99 gw. By repeatedly assembling a measurement setup, the scale read ± 0.4 gw for small forces. This is attributed to the tolerance of the wood support being poor for small forces.

The scale is "zeroed" by weighing the lower assembly without the top magnet in position. The weight measured W is with the top magnet in position. Therefore, the W is the force exerted by the top magnet on the bottom magnet.

(All measurement are $\pm 10\%$ unless otherwise stated).

2.1 EXPERIMENT 1

The bottom support has one magnet with its face toward the one top magnet as seen in Fig. 1. The poles of the magnets are arranged such that the W is repulsive which increases the scale measurement. Several runs were taken. Each run consisted of a magnet attachment and complete setup of the apparatus. First the North Poles face each other, then the next run had the South Poles facing. This sequence was repeated three times and the results analyzed. All runs used the same two magnets. Figures 2 through 5 graphically present an example of the data obtained for all six runs.

The longest distance L of the magnet surface perpendicular to d is the width of the disk magnet - $L \approx 18$ mm. The W versus d plot as seen in Fig. 2 appears to have distinct regions labeled "zones". Zone 1 has $d < L$, zone 2 has $d > 2L$,

Figure 1: Diagram of the experimental fixtures.

Table 1: Zone 1 (d^{-1}).

	NORTH		SOUTH	
run No.	No. pts.	W (gw)	No. pts	W (gw)
1	7	$(0.67 * 1000/d - 19.0) \pm 0.7$	5	$(0.8 * 1000/d - 17.9) \pm 1.2$
2	3	$(0.97 * 1000/d - 40.0) \pm 0.8$	5	$(0.7 * 1000/d - 29.8) \pm 0.5$
3	4	$(0.8 * 1000/d - 37.0) \pm 0.8$	3	$(0.7 * 1000/d - 21.5) \pm 0.1$
all[a]	14	$(0.70 * 1000/d - 21) \pm 5$	13	$(0.7 * 1000/d - 13) \pm 2.7$

[a]The points in the Zone from all the runs plotted on one graph.

and zone 3 has $L < d < 2L$. Each of these zones have a different relation of W to d as noted in the graphs of Figs. 3 through 5 and of Figs. 6 and 7.

Tables 1 through 3 lists the linear regression equations with one standard deviation uncertainty.

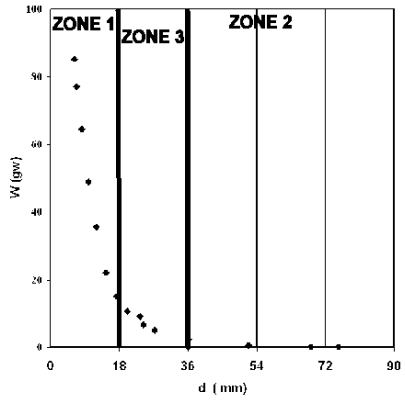

Figure 2: Plot of the W versus d for the first experiment. 1 disk is in the lower support and 1 disk is in the upper support (Experiment 1).

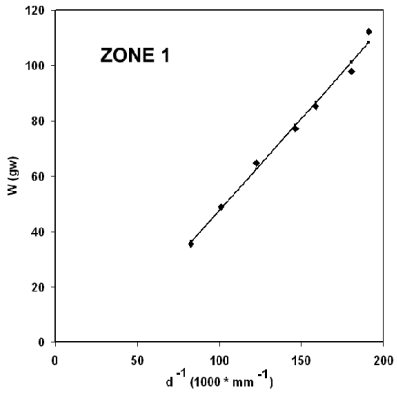

Figure 3: ZONE 1: Plot of the W versus d^{-1}.

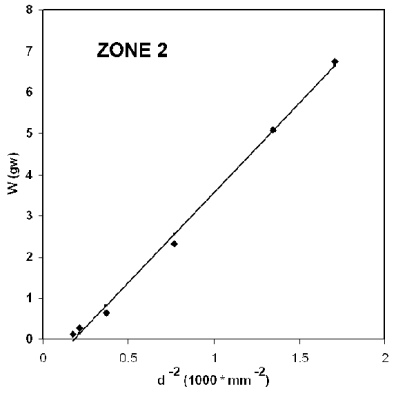

Figure 4: ZONE 2: Plot of the W versus d^{-2}.

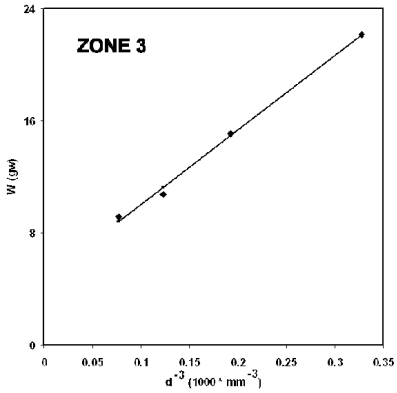

Figure 5: ZONE 3: Plot of the W versus d^{-3}.

Table 2: Zone 2 (d^{-2}).

	NORTH		SOUTH	
run No.	No. pts.	W (gw)	No. pts	W (gw)
1	6	$(4.36 * 1000/d^2 - 0.79) \pm 0.02$	3	$(6.34 * 1000/d^2 - 1.76) \pm 0.04$
2	3	$(5.70 * 1000/d^2 - 1.71) \pm 0.03$	4	$(8.3 * 1000/d^2 - 3.1) \pm 0.2$
3	6	$(4.3 * 1000/d^2 - 0.7) \pm 0.2$	6	$(5.5 * 1000/d^2 - 2.0.) \pm 0.2$
all[a]	15	$(4.35 * 1000/d^2 - 0.74) \pm 0.17$	13	$(6.1 * 1000/d^2 - 1.8) \pm 0.8$

[a]The points in the Zone from all the runs plotted on one graph.

Table 3: Zone 3 (d^{-3}).

	NORTH		SOUTH	
run No.	No. pts.	W (gw)	No. pts	W (gw)
1	4	$(53.2 * 1000/d^3 + 4.7) \pm 0.2$	5	$(125.6 * 1000/d^3 + 0.9) \pm 0.2$
2	0	no data[b]	0	no data[b]
3	1	no data[b]	2	no data[b]
all[a]	5	$(51.0 * 1000/^3 d + 5.5) \pm 0.7$	7	$(44 * 1000/d^3 + 6) \pm 2$

[a]The points in the Zone from all the runs plotted on one graph.
[b] require at least 3 points.

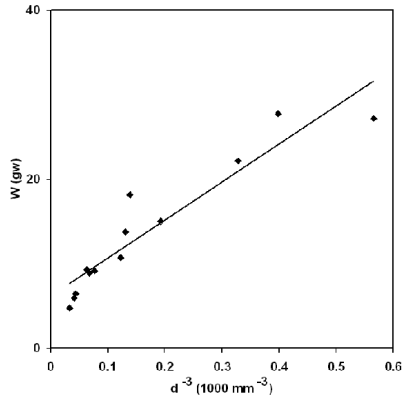

Figure 6: Plot of the W versus d^{-3} with a trend line of $W = (45.0 * 1000/d^3 + 6.2) \pm 1.7$ gw for Zone 3 of the first experiment.

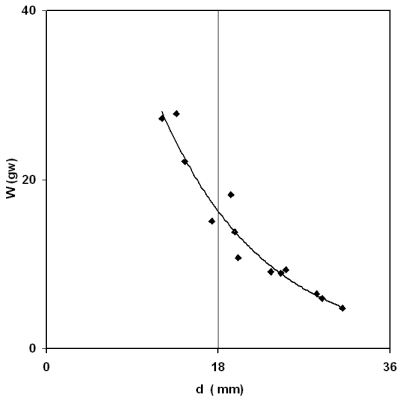

Figure 7: Zone 3 with the trend line of $W = 85.4e^{-0.09d} \pm 1.4$ gw.

Table 4: Zone 3 ($\exp^{-d}$).

	d^{-3}		$\exp^{-d}$	
run No.	No. pts.	W (gw)	No. pts	W (gw)
North	5	$(51.0 * 1000/^3d + 5.5) \pm 0.7$	5	$75.7e^{-0.09d} \pm 0.6$
South	7	$(44 * 1000/d^3 + 6) \pm 2$	7	$99.4e^{-0.1d} \pm 1.5$
all[a]	13	$(45.0 * 1000/d^3 + 6.2) \pm 1.7$	13	$85.4e^{-0.09d} \pm 1.4$

[a]The points in the Zone from all the runs plotted on one graph.

An alternative for modeling Zone 3 is shown in Table 4 and Figs. 6 and 7. The exponential function may be preferred over the d^{-3}.

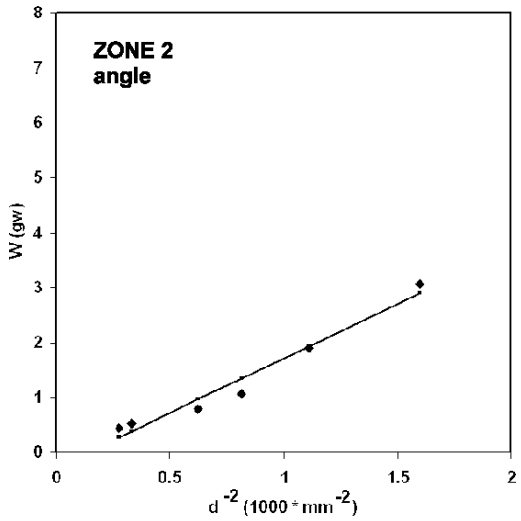

Figure 8: ZONE 2: Plot of the W versus d^{-2} for Experiment 2.

2.2 EXPERIMENT 2

This experiment is similar to the first with the bottom magnet placed at a 45° angle relative to the top magnet. Figure 8 shows the resulting plot of W versus d^{-2}. Compared to Fig. 4, Fig. 8 shows a smaller slope and less W but starting at approximately the same distance.

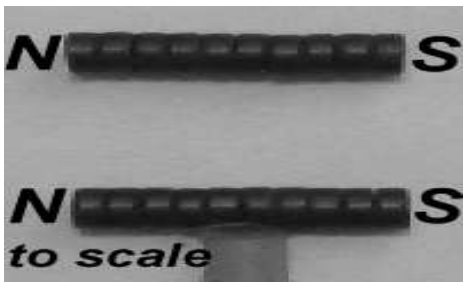

Figure 9: Photo of the magnetic disk arrangement for the third experiment.

2.3 EXPERIMENT 3

This experiment examines how a photon (bar magnet) repels another photon. The orientation is seen in Fig. 9.

The equations are:
Zone1: $W = (2.0 * 1000/d - 28.5) \pm 0.6$ gw
Zone2: $W = (16.2 * 1000/d^2 - 0.2) \pm 0.008$ gw
Zone3: $W = 47.4\, e^{-0.033d} \pm 0.4$ gw
Zone3: $W = (1746 * 1000/d^3 - 0.09) \pm 0.04$ gw

During the course of this experiment, the tendency of the bar was to rotate and translate away from the repulsive orientation to an attractive orientation.

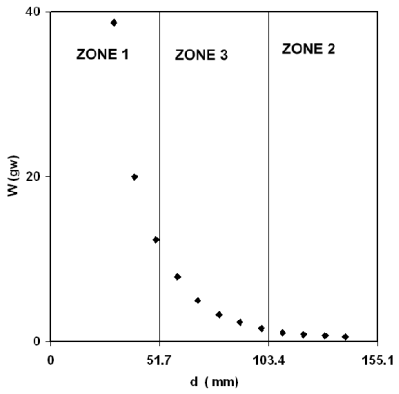

Figure 10: Plot of the W versus d for 10 disks in the lower support and 10 disks in the upper support oriented on their side so that the force is repulsive. This is shown in the Fig 9.

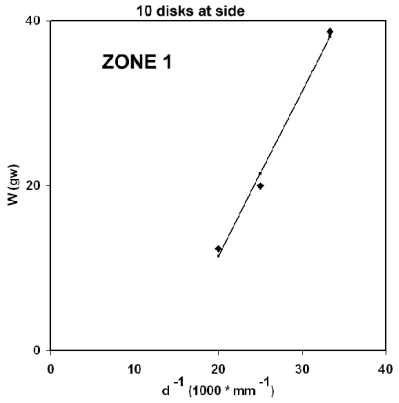

Figure 11: ZONE 1: Plot of the W versus d^{-1}.

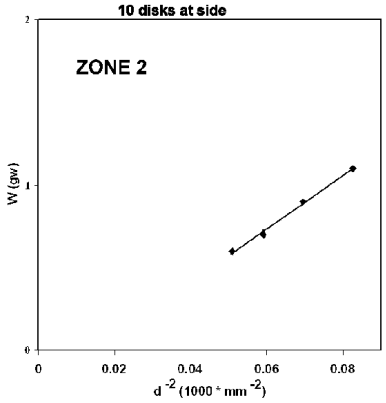

Figure 12: ZONE 2: Plot of the W versus d^{-2}.

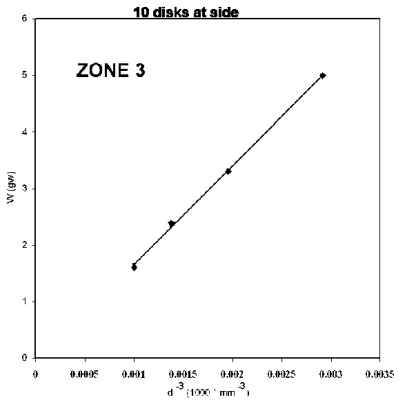

Figure 13: ZONE 3: Plot of the W versus d^{-3}.

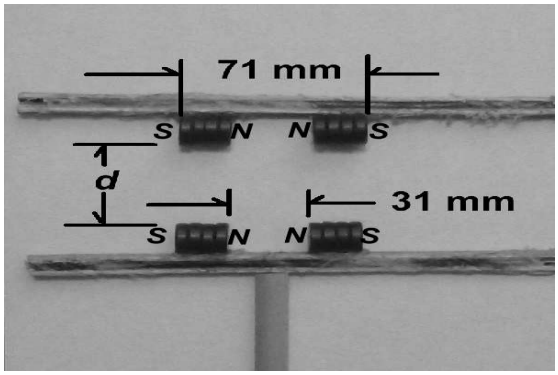

Figure 14: Photo of the magnetic disk arrangement for the fourth experiment.

2.4 EXPERIMENT 4

This experiment is similar to that done by Michaud (2013).

The equations are:
Zone1: $W = (2.6 * 1000/d - 55.8) \pm 0.5$ gw
Zone2: $W = (14.67 * 1000/d^2 - 0.71) \pm 0.03$ gw
Zone3: $W = 132.1\, e^{-0.051d} \pm 0.6$ gw
Zone3: $W = (1068.3 * 1000/d^3 + 0.2) \pm 0.7$ gw

During the course of this experiment, the tendency of the bar was to rotate but not translate away from the repulsive orientation to an attractive orientation.

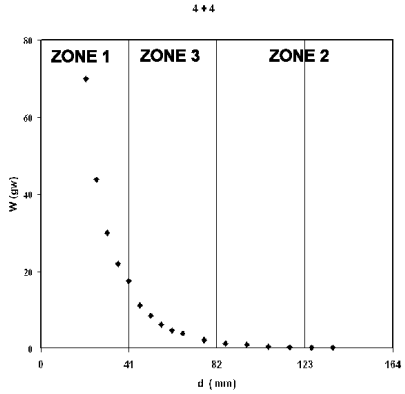

Figure 15: Plot of the W versus d for disks in the fourth experiment as seen in Fig. 14.

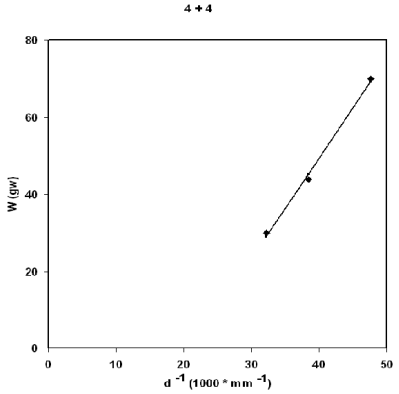

Figure 16: ZONE 1: Plot of the W versus d^{-1}.

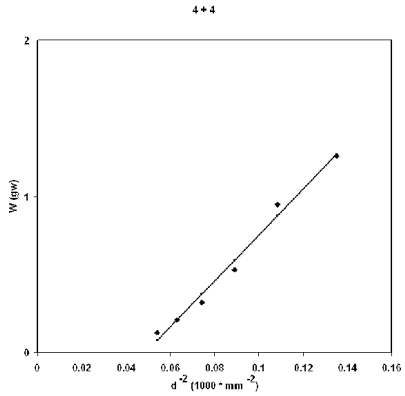

Figure 17: ZONE 2: Plot of the W versus d^{-2}.

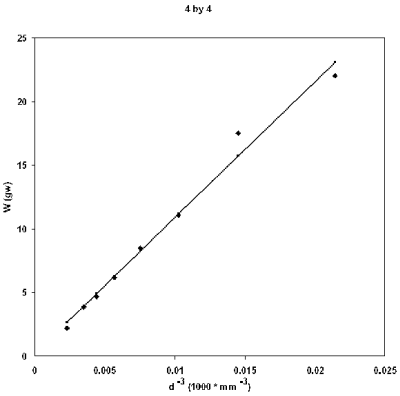

Figure 18: ZONE 2: Plot of the W versus d^{-3}.

3 DISCUSSION AND CONCLUSION

Michaud (2013) experiment was a restricted range of d. Comparing the two suggested models for modeling Zone 3 of section 2.1, Table 4 suggests the exponential is slightly better. The decay form (exponential) offers a better consistency with the STOE model because it does not require a monopole magnetic model, it is consistent with the Zone 1 decaying into Zone 2 physical model, and the separation of the two Zones is $d = L$.

The method of conjugate functions is used to model electric fields, magnetic fields, and fluid flow. These experiment suggest that the transformation $w = z + \mathrm{e}^z$ is preferred over $w = \cosh z$ which was used in Hodge (2018e). The former includes the exponential function. This function is used to model the electrostatic field at the edge of a parallel-plate capacitor which also has the field strength proportional to d^{-1} in the capacitor. The $w = z + \mathrm{e}^z$ is also used to model the flow of fluids from a channel into a sea. Zone 1 is also explained. The equipotential lines to the side is minimal as seen in section 2.2 and may be summed with the potential from the opposite pole at some distance from photon (bar magnet).

Table 2 shows the South Pole has statistically larger W vs d^{-2} slope than the North Pole while the W relation with d^{-1} is nearly identical (Table 1). This would imply the South Pole dominates at the side of the photon (bar) configuration. So, gravity may be the sum of the poles at the side of photons or the photons comprising particles. Because gravity is attractive, the labeled South Pole would be the side of the hod with zero plenum density. But this observation should be repeated with a different experiment using different means. At this stage, this concept is very speculative.

On the other hand, this speculation is consistent with the STOE prediction that gravity is an emergent effect of the plenum.

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DOI 10.32370/IA_2019_09_4

Magnetic field evolves to gravity field Part 2: particles

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August 21, 2019

Abstract

The characterization of magnetic fields around elementary particles is an extension of a project to model the gravitational field. The observation that the South Pole is slightly stronger than the North Pole as suggested in a previous experiment is confirmed. Each of the particles has a unique magnetic field lobes structure.

keywords: magnetism, gravity, particles

1 INTRODUCTION

The Scalar Theory of Everything (STOE) posits the magnetic field of particles evolves into the gravitational field at macro scales. Particles were postulated to be assemblies of hods that are magnets. Accordingly, models of photons, neutrons, electrons, and positrons were suggested (Hodge 2016a).

This Paper continues the study that began to characterize the magnetic field in Hodge (2019). The experiments are in section 2. The Discussion and Conclusion are in section 3.

2 THE EXPERIMENT

The same experiment setup that was used in Hodge (2019) is used in these experiments. Four disk magnets on the lower support is the probe of the magnetic field strength. The South Pole of the bottom magnet was oriented upward. The probe (bottom magnet) had 4 disks which is too strong for the fixture to have accurate measurements of Zone 1 (d^{-1}).

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2.1 EXPERIMENT 1: PHOTON

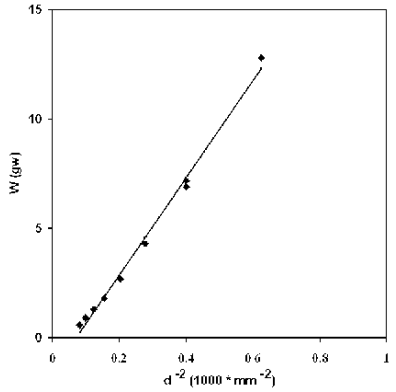

Figure 1: Plot of the W versus d^{-2} for 4 disks in the lower support and 6 disks in the upper support.

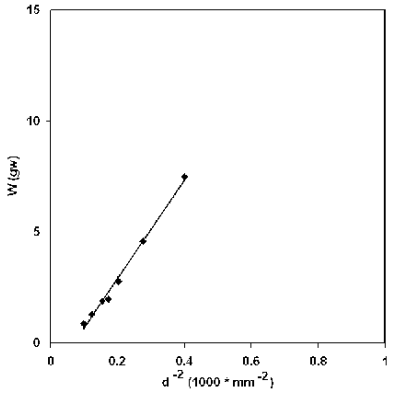

Figure 2: Plot of the W versus d^{-2} for 4 disks in the lower support and 7 disks in the upper support.

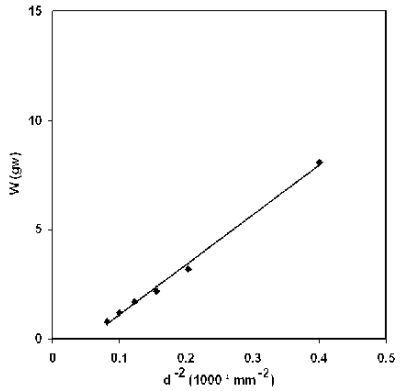

Figure 3: Plot of the W versus d^{-2} for 4 disks in the lower support and 8 disks in the upper support.

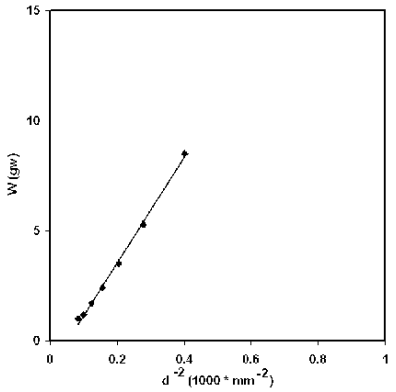

Figure 4: Plot of the W versus d^{-2} for 4 disks in the lower support and 10 disks in the upper support.

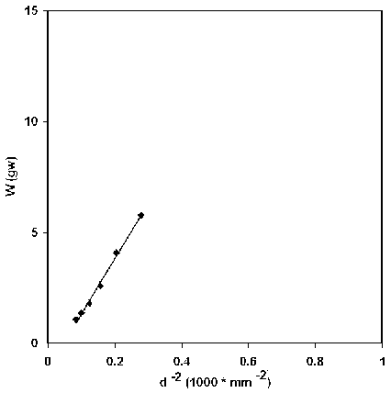

Figure 5: Plot of the W versus d^{-2} for 4 disks in the lower support and 11 disks in the upper support.

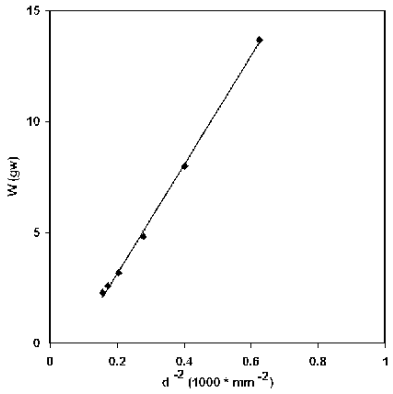

Figure 6: Plot of the W versus d^{-2} for 4 disks in the lower support and 12 disks in the upper support.

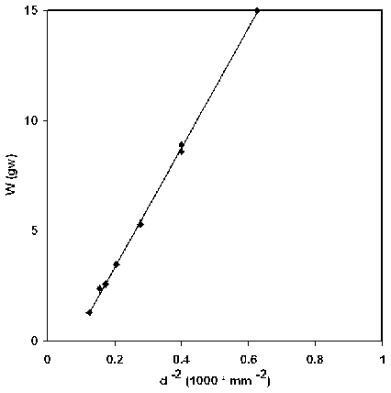

Figure 7: Plot of the W versus d^{-2} for 4 disks in the lower support and 15 disks in the upper support.

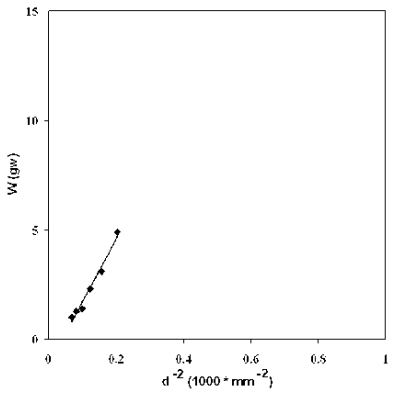

Figure 8: Plot of the W versus d^{-2} for 4 disks in the lower support and 20 disks in the upper support.

The equations for the best–fit lines at 1σ confidence are:
Fig. 1 $W(4to6) = [22.2(1000/d^2) - 1.6] \pm 0.1$ gw
Fig. 2 $W(4to7) = [22.3(1000/d^2) - 1.6] \pm 0.1$ gw
Fig. 3 $W(4to8) = [23.0(1000/d^2) - 1.2] \pm 0.1$ gw
Fig. 4 $W(4to10) = [23.87(1000/d^2) - 1.22] \pm 0.07$ gw
Fig. 5 $W(4to11) = [24.84(1000/d^2) - 1.11] \pm 0.07$ gw
Fig. 6 $W(4to12) = [24.52(1000/d^2) - 1.74] \pm 0.08$ gw
Fig. 7 $W(4to15) = [26.57(1000/d^2) - 1.24] \pm 0.09$ gw
Fig. 8 $W(4to20) = [28.98(1000/d^2) - 1.22] \pm 0.09$ gw

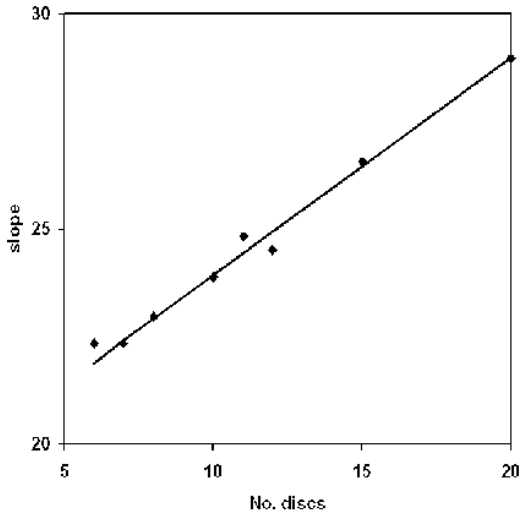

Figure 9: Plot of the slopes of the lines in Figures 1 – 8.

The line in Fig. 9 of the SLOPE of the lines in Figures 1 – 8 is related to the number N of disks in the upper support by:

$$SLOPE = (0.51N + 18.9) \pm 0.2$$

2.2 EXPERIMENT 2: NEUTRINO

The following plots the W versus the angle A of rotation for each of the particle configurations.

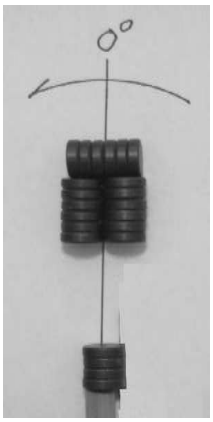

Figure 10: Photograph of the neutrino magnetic configuration from the "flat" side. The arrow indicates the direction of rotation.

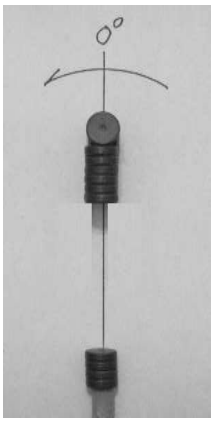

Figure 11: Photograph of the neutrino magnetic configuration from the "side" side. The arrow indicates the direction of rotation.

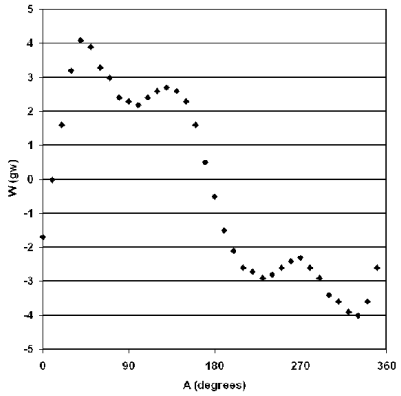

Figure 12: Plot of W versus A for the "flat" rotation.

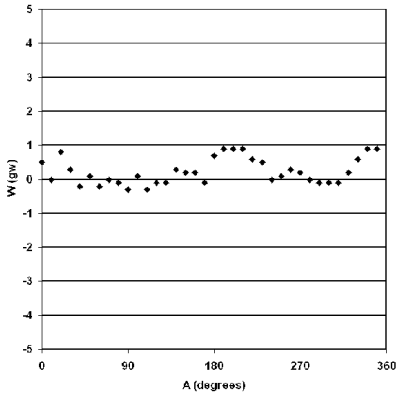

Figure 13: Plot of W versus A for the "side" rotation.

2.3 EXPERIMENT 3: ELECTRON

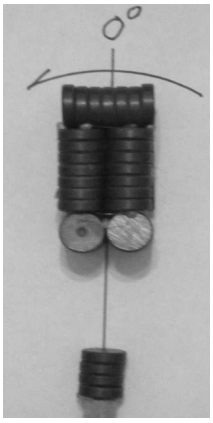

Figure 14: Photograph of the electron magnetic configuration from the "flat" side. The arrow indicates the direction of rotation.

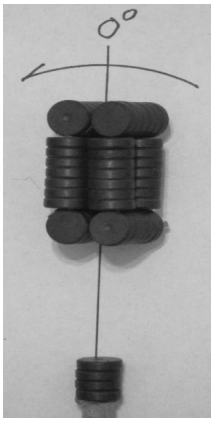

Figure 15: Photograph of the electron magnetic configuration from the "edge" side. The arrow indicates the direction of rotation.

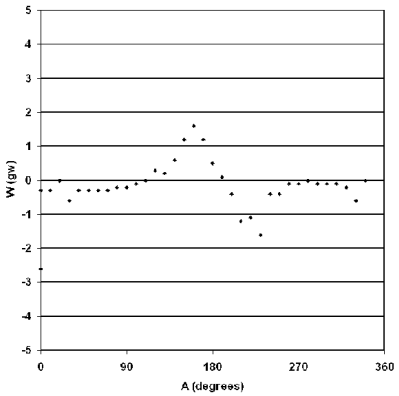

Figure 16: Plot of W versus A for the "flat" rotation.

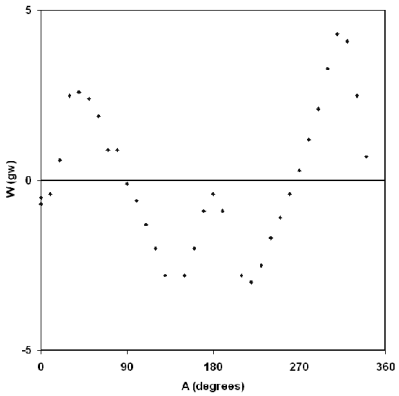

Figure 17: Plot of W versus A for the "edge" rotation.

2.4 EXPERIMENT 4: POSITRON

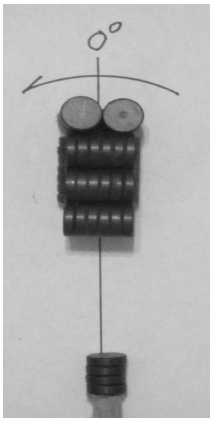

Figure 18: Photograph of the positron magnetic configuration from the "flat" side. The arrow indicates the direction of rotation.

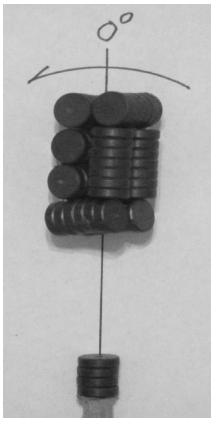

Figure 19: Photograph of the positron magnetic configuration from the "edge" side. The arrow indicates the direction of rotation.

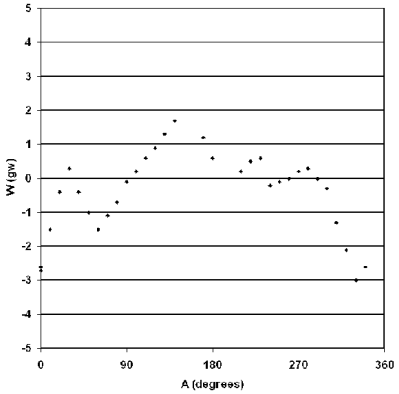

Figure 20: Plot of W versus A for the "flat" rotation.

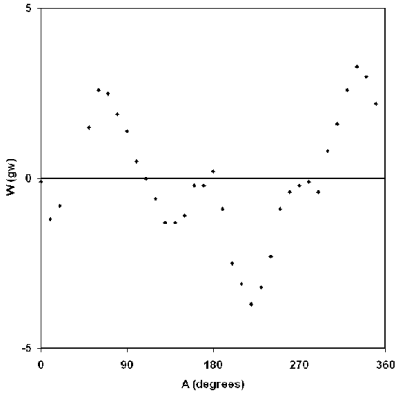

Figure 21: Plot of W versus A for the "edge" rotation.

3 DISCUSSION AND CONCLUSION

The characterization of magnetic fields around elementary particles shows lobes of magnetic field strength around particles separated by directions of little variation between the lobes. The Stern-Gerlach experiment and the fermionic nature of particles follow from the lobe structure of the magnetic field of particles (Hodge 2016b). Because the South Pole was used to measure field strength, the slightly repulsive force measured between lobes is South Pole strength such as seen in Fig. 13. This confirms the idea of the South Pole having slightly stronger force than the North Pole as seen in Hodge (2019). However, this measurement is within the error limits of the setup.

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DOI 10.32370/IA_2019_09_5

AI, Robotics, and the Workplace of the Future

Artyom Kravchenko

Abstract

Robotics has been developing at an enormous speed with the AI advancements of the past decades. Today's robots boast advanced performance, dexterity, and ever-increasing intelligence that allow them to analyze the dynamic external environment and employ contingent decision-making. While machine learning is still at the germinal stage of development, some notable steps forward (e.g., probabilistic modelling, Bayesian optimization, data compression) have been made to equip contemporary robots with more functionality. Such improvements contributed to the commonplace introduction of automatons in the workplace to substitute human labor, thus causing rising concerns about the threats of industrial computerization to the human jobs globally. This article explores the implementation of AI in robotics, determines the ways in which intelligent robots change the contemporary workplace, and lays out the forthcoming changes expected in the job structure and skills related to workplace robotization.

Introduction

The humanity has already been fascinated with an idea to create rational, intelligent robots. Since the advent of primitive mechanical assistants in the Industrial Age, people have been working on improving their design and functionality. Though this area of technological development still remains ambiguous in terms of machine ethics and artificial agents' morality, application of artificial intelligence (AI) in robotics has aided the industry enormously (Ashrafian, 2015). AI and robotics have traditionally shared the goal of designing and building intelligent agents that perceive reason about, and act upon, the everyday world. Thus, today's machines don't function only as a human being's "mechanical arm"; they can perform complex multi-step tasks and operate under computer control without human intervention.

AI has contributed to the modern advancements of robotics in many ways. It has improved the robots' perception and reasoning about physical objects in terms of space, path planning, dealing with uncertainty, and compliance with complex human instructions (Brady, 1985). In simple terms, AI has enabled machines to learn from their experience, which is presently implemented in the industrial practice via probabilistic modelling. The latter has grown into one of the most common theoretical and practical approaches to designing machines capable of experiential learning. The probabilistic framework has also enabled dealing with uncertainty, which is the most critical challenge of machine learning. The AI-

enriched robotics thus witnessed considerable progress in the form of innovative, state-of-the-art technologies such as probabilistic programming, Bayesian optimization, data compression, and automatic model discovery (Ghahramani, 2015).

The AI-led advances in robotics are an indisputable step forward in a variety of industries as they perform some of the human functions more precisely, quickly, and efficiently. Moreover, they enable exploration of dangerous sites such as depths of the ocean and space – the places which people cannot reach due to physical limitations. However, the rapid technological progress and fast advancements in robotics have caused heightened concerns among workers of all specialties in terms of the potential danger to their employment. There is a common opinion suggesting that up to one-third of today's jobs will be taken by robots by 2025 (Frey & Osborne, 2013; Lynch, 2015). This article thus explores the overall connection of AI and robotics in detail, examines the changes that AI-enriched robotics is gradually introducing in the modern workplace, and discusses the potential implications of those changes for workers.

Defining AI and Robotics

Artificial intelligence is defined as a branch of science aiding machines to find solutions to complex problems and deal with uncertainty in a human-like manner, which implies equipping machines with human features such as intelligence and ability to learn (Tirgul & Naik, 2016). Due to these purposes, AI commonly works on the advancements of math, psychology, cognitive science, biology, ethics, and philosophy and integrates them in the computer science approach to machine design.

Robots are defined as machines collecting information about their environment via sensors and using it to follow the instructions and perform their work. The term 'robot' initially stood for the futuristic vision of a mechanical man; however, the industrial robots usually have no resemblance to humanlike figures. A more precise definition of an industrial robot is that of a mechanical arm – an intelligent appliance that can augment the human abilities and contribute to industrial process automation. The Robot Institute of America (RIA) defined robots as "programmable multifunction devices designed to move material, parts, tools, or specialized devices through variable programmed motions for the performance of a variety of tasks." (Brady, Gerhardt, & Davidson, 2012).

The challenge that robotics posed to AI at the dawn of two field's collaboration was the need to deal with real-world objects; AI was initially developed and applied for solving purely abstract, cognitive problems, while robots are physical objects equipped with mechanical effectors, sensors, and computers, the operation of which AI improves. Since robotics is the field of technology connecting perception to action, AI plays a central role in robotics by fostering the establishment of intelligent connections. AI initially aided robotics in terms of determining the proper types of knowledge required for any aspect of thinking, specifying the ways of its representation and use (Brady, 1985). In the 1990s, the increased interest in developing multiple autonomous mobile robots exhibiting cooperative behaviour led to further advancements of nanotechnology and micro electromechanical systems.

At present, the image of robots evolved into an electromechanical or biomechanical device (or group of devices) performing repetitive, pre-programmed tasks. Contemporary robots operate both under the direct human control and autonomously, under computer control. Robots are now extensively used in surgery, space and ocean exploration, in a variety of industrial spheres, and in many other dangerous areas where human beings cannot operate efficiently (Tirgul & Naik, 2016).

Intelligent Agents in Robotics

An intelligent agent in robotics is the one deriving information about the environment through sensors and able to act upon it via activators by directing its activity towards achieving the set goal. To do no harm to humans, intelligent agents should also be rational, i.e., the ones that perform the right actions and act in the best way to succeed in the goal's completion. Robotic dexterity and intelligence are guaranteed by the inclusion of intelligence blocks into their design for retrieving data from external sources and processing it high-level decision-making (Tirgul & Naik, 2016).

To date, two kinds of AI have found an application in robotics: software intelligence and hardware intelligence. Software intelligence is understood as the one provided by a computer, microprocessor, or microcontroller linked to hardware and giving instructions to it. In this case, software functions as a control block in which the sequence of actions is programmed to determine the robot's activities. The intelligence block of such a system may learn from the incoming data and adapt the programmed structure of decisions and actions in line with new information (Elleithy, 2008). Hardware intelligence in turn is encapsulated in

the robot's circuits. Similar to humans who learn and develop by means of processing data from external sources via their nervous systems and brains, the robots equipped with hardware intelligence also process data and learn based on it (Govers, 2018).

The main feature distinguishing intelligent robots is their ability to plan actions, which presupposes choosing a sequence of actions for achieving a certain goal. While humans rarely stop and consciously plan a concrete sequence of actions to perform some complex activity due to their sophisticated intelligence, robots need to invest much effort into planning of any multi-step task. At the same time, robots have to perform the planned action with proper regard to any changes of the dynamic external environment and sometimes adjust actions to those changes (Tirgul & Naik, 2016). Here comes the greatest pressing challenge of contemporary AI-enhanced robotics: allowing robots to act based only on the continuous sensory data retrieved from the external environment removes the computational and semantic challenges of keeping a large database of facts and planning actions. However, robots with a stimulus response system only cannot act as rational agents as they have no computational efficiency for evaluating how well their actions are targeted towards the goal's completion. Thus, more advancements in machine learning and decision-making are to come to make robots more intelligent and able for contingent planning.

How Intelligent Robots Change the Contemporary Workplace

While AI developments in robotics remain a trending topic, with vast investments provided to foster the technological progress and enhance machines' intelligence and dexterity, the community fears are elevating regarding the adverse impact of computerization on the global workforce. Such technological advancements as automated accounting, checkouts, smartphone apps tailored to numerous user needs have already take thousands of jobs, while the forthcoming developments of the Internet of Things and autopiloted vehicles may take even more. In line with leading tech experts' estimates (e.g., Stephen Hawking, Bill Gates), up to one-third of jobs will be taken by robots by 2025, thus leaving hundreds of millions of people unemployed and without prospects (Brougham & Haar, 2018).

Webster and Ivanov (2019) also pointed out that in the robotics-enhanced (and evolving) environment of today, people are ever less involved in numerous economic spheres, at least in the traditional sense of the word. While computerization is the greatest hazard for

the low-skilled, manual jobs which machines with their limited intelligence can perform better and cheaper than people, sophisticated AI algorithms have also paved their way into non-manual labor (e.g., accounting, legal analysis, education, medicine, etc.).

Labor market analysis shows that robots are substituting human workforce at such jobs, and the more people come across such intelligent machines in their daily work activities, the more realistic the threat of human obsolescence in the workplace is. Brougham and Haar (2018) conducted a study among 120 employees in New Zealand to test their perceptions of their future workplace as related to their Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA) knowledge. Not surprisingly, high STARA awareness was positively correlated with skepticism, depression, and turnover intentions, coupled with low organizational commitment and poor job satisfaction. However, industry experts are still optimistic about the future of the human labor market by pointing out that massive industrial computerization will require more software development specialists, AI experts, engineers, and operators of the sophisticated equipment at the factory floors. Moreover, robots are unlikely to substitute people at such inherently human professions as sales, outreach, packaging, and consulting (Smith & Anderson, 2010).

Conclusion

Robotics has witnessed exponential growth and development with the newest advances in artificial intelligence and machine learning. Today's machines still possess skills far from human intelligence, but they become more precise, more accurate, and more dynamically adaptive to external environment changes. Due to economic benefits of substituting the human labor force with automatons, numerous businesses automate their industrial processes at a massive scale, but this trend does not necessarily mean the extinction of human jobs. On the contrary, the increasing automation of the contemporary workplace requires more labor force with innovative technological skills. Thus, while the future of manual jobs is gloomy, knowledge-intensive, technological jobs represent a new career opportunity for millions of future workers.

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DOI 10.32370/IA_2019_09_6

Evolution of Modern Recommender Systems with AI Techniques

Artyom Kravchenko

Abstract

Recommender systems (RSs) emerged several decades ago as software tools analyzing Web user preferences and making intelligent product and content suggestions based on their behavior and tastes. At first, they utilized simple comparison algorithms and analysis of explicitly stated user data in the form of ratings and likes. With the booming expansion of Web data and growing variety of products, services, and information sources online, RSs face pressing challenges to efficiency of recommendations such as data sparsity, cold start, and scalability requirements. The solutions to these issues come in the form of AI-based techniques – advanced machine learning algorithms that adapt to the Web landscape and address the user requirements flexibly. With the trend of Web expansion certain to remain unchanged for many years to come, intelligent, AI-enriched RSs are expected to gain greater significance in users' decision-making and Web navigation. But to gain user trust and ensure a greater user buy-in, RSs have to offer transparency and perceived credibility.

Introduction

Today Internet users have to navigate in the endless (and expanding) amounts of information and product variety, which are incomprehensible for a single individual. Thus, the problem of relevant resources' findability has arisen in the technology sector, and its solution came in the form of recommender systems (RSs) (Manouselis, Drachsler, Vuorikari, Hummel, & Koper, 2012). These systems are an integral part of intelligent mechanisms for sorting out the Internet content and making suggestions for users based on their tastes and preferences. Such recommendations are traditionally provided by smart search engines and web marketing resources based on the users' previously viewed content, collaboration (likes and ratings provided by the user), and demographics (Azam & Yao, 2014). The suggestions that recommender software tools provide to users relate to a variety of decision-making processes, such as items for purchase, video and audio content to consume, news feeds to read, and tourist destinations to attend.

With user guidance in a personalized way to interesting objects and information in the large space of Internet, RSs have proven efficient in matching up the attributes of a user profile with the attributes of the content object. For instance, 2/3 of movies watched on Netflix are recommended movies, while 38% of click-through rates on Google News and 35% of sales at Amazon also come from the system's recommendations (Gorakala, 2016). Thus,

investment in cutting-edge, flexible, advanced RSs is imperative for business growth today as an ability to provide genuinely relevant recommendations is an effective sales driver.

How RSs Work

RSs, (also referred to as advice-giving systems, recommendation engines, and recommendation agents) are defined as "a branch of information retrieval and artificial intelligence" and as "powerful tools and techniques to analyze huge volumes of data, especially product information and user information, and then provide relevant suggestions based on data-mining approaches" (Gorakala, 2016, p. 7). RSs come to Web users' rescue when it comes to provision of relevant, required information corresponding to the user's search query. They act on the basis of mathematical models and objective functions predicting how much a user may like a certain suggested item.

Modern RSs focus on specific types of items such as music, news, or tourist destinations, and their graphical user interface (GUI), design, and the core recommendation technique utilized for the generation of suggestions are all specifically tailored to generating effective, relevant recommendations on them (Ricci, Rokach, & Shapira, 2010). The purpose of RSs is to advise content or items to users lacking a personal experience in some area for making a relevant, useful purchase or choice of free content. For instance, Amazon employs AI-powered algorithms to customize the look and feel of its e-store for each individual visitor and deliver a personalized shopping and reading experience (Smith & Linden, 2017).

Any web resource's RS is designed in such a way that analyzes each individual user's digital footprint (e.g., socio-demographic information, transaction details, interaction logs) and compares the derived data with the particular product's information (e.g., its features, feedback from users, comparison with other products). Sources of such data include explicitly stated information in the form of ratings and likes given to some products and implicit data derived from the user's behavior on the website and the search engine history derived from cookies on the user's device. By collecting and analyzing this data, the RS can predict whether particular users may prefer an item or not, thus simplifying their decision making in the complex information environments (Isinkaye, Folajimi, & Ojokosh, 2015).

Creating a good, effective recommendation engine is a task of strategic importance for both consumers and vendors. On the customer's side, a good recommendation system guarantees receiving relevant suggestions and quicker, better decision making, which leads to

consumer confidence and loyalty. On the seller's side, deep analysis of consumer data and custom-tailored product suggestions promise exponential sales increases. Thus, the evolution of RSs takes place together with the expansion and growing sophistication of online systems, with challenges of recommendations in real time, big-data analysis, and AI integration to be met for the sake of focused, personalized user service (Gorakala, 2016).

How RSs Evolved

The first RS algorithms employed simple neighborhood methods and provided batch-mode recommendations derived from similarity calculations. They analyzed only user ratings by means of calculating Euclidian distances, the Pearson coefficient, cosine similarity, etc. (Gorakala, 2016). They also followed the collaborative filtering rationale, which presupposed the provision of recommendations based on what other users with similar tastes and choices made. This approach suggested that since the user agreed with other users in their choices and ratings before, their later choices would also be appealing to him or her (Arazy, Kumar, & Shapira, 2009).

However, the principle failed to meet the demand for efficient and customized recommendations in the e-commerce area, with e-shops possessing huge assortments of items and requiring RSs that would give sensitive, smart suggestions based on the whole range of available alternative products (Falk, 2019). In addition, the overall global expansion of Web data and product offerings has led to the decrease of users' well-being and inability to make wise choices amid the information overload. Smart RSs based on the AI advancement, machine learning, and the principles of user-adapted machine interaction emerged to address this phenomenon and enable users to navigate in the abundant Web data.

It is notable that RSs operating on the simple user-based and item-based collaborative filtering approaches are still in place and work quite well. The former generates recommendations based on the analysis of the user's neighborhood and similar user preferences, while the latter finds similarities between items and recommends non-rated items similar to those rated by the user in the past. But along with the technological progress, RSs also evolved into personalized, context-aware recommenders providing suggestions in real time based on accurate, complex machine-learning approaches. Many of them apply advanced computational models such as matrix factorization and singular value decomposition to address the changing needs of users and embrace exponential Web data growth (Gorakala,

2016). Hybrid RSs are increasingly adopted as more robust recommender solutions because of combined strengths of user-based and item-based systems. They issue more accurate suggestions by analyzing aggregate data on the user and the item, thus leveraging the power of multiple data sources and improve the performance of existing RSs with particular data modalities (Aggarwal, 2016).

AI-Enriched RSs

Modern RSs have to become much more than they used to be even a decade ago as the pressure of the increasing information overload in the Web is a serious challenge to their efficiency. An efficient RS design has to address the problems of scalability, sparsity, and cold start, as well as the need for ubiquitous information processing in the Web (Gabrani, Sabharwal, & Singh, 2016). Such needs led to the development of AI-based, context-aware, intelligent RSs capable of managing the information overload and filtering. Contemporary RS progress is in part attributable to the use of advanced artificial intelligence (AI) techniques improving recommendation accuracy and sustainably mitigating the aforementioned issues. Such techniques presently used in RSs include fuzzy sets, artificial neural networks, evolutionary computing, swarm intelligence, and artificial immune systems (Abbas, Zhang, & Khan, 2015).

One of the most common AI technologies applied in RSs is collaborative filtering; the challenge of its application was dealing with data sparsity at the cold start, which means having little rating information from the user to base suggestions on. The solution to this problem was found in the involvement of transfer learning techniques by leveraging a rich collaborative body of knowledge from other similar systems running for a long time. Zhao, Pan, and Yang (2017) suggested the use of maximum-margin matrix factorization, regularized low-rank matrix factorization, and probabilistic matrix factorization to maximize the utility and output of cross-system knowledge transfer and improve recommendation quality.

AI-based digital assistants now become available in large numbers and for a variety of purposes. Many tech giants make use of AI-based recommenders and assistants today (e.g., Microsoft, IBM, Google, and Amazon). Some recent examples include the chatbots incorporated into the Facebook Messenger system or Amazon Alexa, a digital recommender of the marketplace (Maedhe et al., 2019). eBay and Netflix are also known to use AI recommender techniques to provide personalized suggestions and customize product/service

offerings to individual clients. In addition, the machine-learning library Mahout developed by Hadoop provides a flexible infrastructure for building, evaluating, and streamlining a variety of RS algorithms and makes RSs scalable (Verma, Patel, & Patel, 2015). Another AI-powered RS technology is Apache Spark Streaming – a solution enabling scalability of big data and generating recommendations in real time (Meng et al., 2016). Neo4j is also a popular innovative tool for design of real-time graph-based RSs enabling fast retrieval and searching (Pellegrino, 2017).

AI Application in RSs: Future Prospects

The Web grows at an enormous pace, and billions of Internet users find it increasingly hard to make decisions and find relevant information in such a multitude of data. Thus, the future of AI-based RSs is optimistic given their intelligent ability to process large data volumes, interact seamlessly with Web users, learn by experience, and develop more sophisticated suggestion algorithms based on the analysis of user data. However, Bigras et al. (2018) pointed out the need for AI-based recommendation agents to offer richness of information and a variety of suggestions to end users for the sake of gaining credibility and being adopted. Therefore, while RSs continue to evolve to improve the users' decision-making processes, they need to be developed with the user's adoption intention in mind, which is influenced by the perceived decision quality.

Zhao, Benbaast, and Cavusoglu (2019) also pointed out the need to ensure transparency in RSs because its lack is what impairs users' adoption of RSs and hinders the efforts to assist clients in decision-making and maximize business profits. Unlike RSs of the past that explicitly asked the users to indicate their preferences and needs, modern AI-based RSs collect data and analyze it implicitly via smart collaborative filtering an content-based filtering techniques, which arouses privacy concerns among users and causes confusion about how a certain recommendation was generated. Transparency thus determines the extent to which information of a system's reasoning is provided and made available to users, and the provision of adequate explanations of is seen as the underlying factor of greater user buy-in of RSs.

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DOI 10.32370/IA_2019_09_7

Refining the Understanding of the Technosphere as Part of the Noosphere (Based on the Material of the Soviet and Russian Philosophical Discussions)

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Abstract

The article proposes the version of philosophical reflection on technology, within which the technosphere is considered as a necessary component of the noosphere. This, in turn, confronts us with the problem of interpreting the latter. Critically analyzing those versions of such an interpretation that were called "occult" and "exceptionally spatial", we show that it is impossible to constructively consider the prospects for the development of the technosphere within their framework. Accordingly, we are explicating the advantage of that understanding of the noosphere (as a new stage in the evolution of the biosphere, when the Mind of mankind is "at the helm"), which "ripened" in "Russian cosmism" and was scientifically designed by V. I. Vernadsky: in this framework, technology is becoming much more important than just being a means of enhancing human comfort.

Key words: technosphere, purpose of technology, noosphere and its interpretations, humanity and the biosphere, "Russian cosmism", V. I. Vernadsky.

Introduction. On the pages of "INTELLECTUAL ARCHIVE" we repeatedly comprehended the legacy of "Russian cosmism" [1-4]. In particular, the idea of "Noosphere", specifically evaluated by us as the main scientific achievement of this trend. In favor of the relevance of this topic for English-speaking readers, we give the following words of the prominent contemporary Russian biophysicist and philosopher, B. G. Rezhabek, the head of the "Problems of the formation of the noosphere" section in the Russian Philosophical Society. Even such an outstanding Western philosopher and futurologist as F. Fukuyama, "at a meeting in Moscow on June 13, 2007 in response to my question about Vernadsky and the noosphere said that he is not familiar with these ideas "[5, p. 163]. But the doctrine on the formation of the noosphere, developed by the great Soviet encyclopedist and philosopher V. I. Vernadsky, is, in our opinion, the main alternative to the Fukuyama's concept of the "end of history"! Therefore, this teaching can not be simply ignored even by those who hold different views on the future of mankind. Also, according to our position, it is not constructive to consider the development of the technosphere without taking into account the provisions of the noosphere concept. In other

words, in our studies we identify ourselves with those authors who interpret the technosphere as part of the noosphere. Turning to authoritative Russian encyclopedic publications, we will consider definitions of the italicized concepts. The first of them, in a broad sense, captures "the realm of reality, which is characterized by the use of technology" [6, p. 674], but in the narrow one (which appeared in the works of sociologists of technology as a response to the scientific and technological revolution by the middle of the 20th century) "it is used to characterize modern civilization, for which the penetration of complex machine technology into all spheres of activity is specific" [6, p. 674]. In other words, the technosphere is "the totality of all functioning and old, inactive technical objects and all the products of their activities that arose on Earth and in space. Spatio-temporal system of technology and the technological form of matter motion controlled by it "[7, p. 208]. But with the second concept - namely, the "noosphere" - the situation is more complicated, which forces us to consider the etymology and various options for the definition of this concept.

1. The role of V. I. Vernadsky in the appearance of the term "noosphere" and its interpretation as a new geological era. The term "noosphere" (from the Greek "nous" - "mind" and "sphaira" - "sphere") was proposed in 1927 by French thinkers: the naturalist and religious philosopher P. Teilhard de Chardin and the philosophizing mathematician E. Le Roy. However, they were based on the ideas of the Soviet philosophizing naturalist V.I. Vernadsky expressed in readings at the Sorbonne (at the personal invitation of its rector P. Appel) in 1922-1923. lectures on geochemistry [8, p. 7]. These are generally recognized facts from the history of natural science. However, for example, the outstanding Soviet philosophizing mathematician and ecologist N. N. Moiseev, the academician of the USSR Academy of Sciences and the Russian Academy of Sciences, reinforces the role of V. I. Vernadsky in the appearance of the term "noosphere". Based on the testimonies of a number of scientists, "related to the staying of V. I. Vernadsky in France, in particular, in the words of N. V. Timofeev-Resovsky" [9, p. 28], he claims that the term that interests us was proposed by E. Le Roy precisely "during the presentation of V.I. Vernadsky at the A. Bergson's seminar in Paris in the mid-1920s ... (with the aim of P. M.) to serve as the name of the concept of V. I. Vernadsky on the transition of the biosphere to a new evolutionary state under the influence of human activity "[9, p. 28]. But what interests us first of all is not

the one who suggested the word itself, but which of the meanings invested in it contributes to a constructive consideration of the future of our civilization, including its technical component. We believe that this meaning appeared before the term “noosphere”, namely, in the Essays on Geochemistry by V. I. Vernadsky published in Paris in French in 1924 (These essays, we add, were known by E. Le Roy and P. Teilhard de Chardin). It said that "with man ... a huge new geochemical force appeared on the surface of our planet." The equilibrium in the migration of elements, which has been established over long geological times, is disturbed by the mind and activity of mankind ”[10, p. 258]. In subsequent work, "Scientific thought as a planetary phenomenon" (which was written in the late 30s of the XX century, but was not completed), on this occasion it was said even more definitely: “a living, dynamic process ... of the existence of science, connecting the past with the present ... is reflected in the environment of human life, is an ever-growing geological force that turns the biosphere into the noosphere. This is a natural process ”[11, p. 376]. The last words, we repeat, mean that the noosphere is the stage of development of the biosphere, at which the mind acts as the main driving force. Moreover, the biosphere is understood not simply as “the area of the living,” but as “the area of the living inextricably linked with the inorganic.” In his last lifetime publication, the article “Some words about the noosphere” (1943), briefly summarizing his research, V. I. Vernadsky writes: “In the lectures at the Sorbonne in 1922/23, I accepted biogeochemical phenomena as the basis of the biosphere” [12, p. 11] (pay attention to the mention “Geochemical phenomena”!), And the “new state” of the biosphere that is so understood “is the noosphere” [12, p. 11]. This understanding of the noosphere that is recorded in the most authoritative Russian specialized publications. In the “New Philosophical Encyclopedia” (2010): “a concept used in ... evolutionary concepts to describe the mind as a special natural phenomenon” [13, p. 107] and fixing, first of all, the fact that "mind arises as a result of the ongoing development of the material world and gradually turns into a leading factor in this development" [13, p. 107]. Similarly, in the “Russian Philosophy” encyclopedia (2014): “a concept denoting the sphere of interaction between nature and man, in which the latter plays a decisive role” [14, p. 426], which "was a natural consequence of the synthesis of the idea of the evolution of the organic world, the idea that with the advent of mankind, our planet entered a new geological era" [14, p.]. And, finally, in the “Human Ecology” dictionary (1997): “a qualitatively new phase; the

highest stage of development of the biosphere, associated with the emergence and development in it of civilized humanity … when intelligent human activity becomes the main, determining factor in the development of the Earth ”[15, p. 106].

2. The essence of the technosphere “in the light” of alternative interpretations of the noosphere. However, the reader may ask: why did we use the concept of “discussion” in the title of the article if all the discussions on the noosphere considered so far are complementary? The answer is: we are talking about discussions with those authors who interpret the noosphere alternative way. Among the alternative interpretations, we distinguish two, which we will call “occult” and “exceptionally spatial”. The essence of the first is vividly conveyed by B. G. Rezhabek, thus criticizing this position on the example of the reasoning of the famous Russian religious thinker, deacon A. Kuraev. According to the latter, the term “noosphere” to V. I. Vernadsky “was suggested ... by the priest Pavel Florensky” [16]. (On this occasion, we repeat what was said at the beginning of this article: yes, the idea of the noosphere, even when there was no such term, was also developed by the “Russian cosmists” preceding V. I. Vernadsky. Including P. A. Florensky, who, in fact, talked about the “noosphere”, using “his” term - "Pneumatic sphere"). It would seem that this should be approved by the modern priest, however A. Kuraev categorically states: “Florensky himself borrowed this idea from occult literature” [16]. And moreover, “both Vernadsky and all literature on Russian cosmism” has the "noosphere" as just a polite invitation to the world of occultism "[16]. Strengthening this, let us say that A. Kuraev in such assessments of the idea of the noosphere is not alone. For example, professor of theology V. Chernyshev considers the “energy-informational field (Vernadsky’s noosphere)” to be “temptations” sent by “rational creatures of a non-protein-nucleic nature” [17]. By the mentioned “non-protein,” but “rational” creatures, we can mean only “demons,” but the discussion about them, of course, goes beyond our - as well as any scientific - article. But such reasoning is fully consistent with the esoteric tradition. To illustrate this, let us turn to the work “Occultism and Magic. Ancient high magic ... ” of Count Pierre Vincenti (1874-1942) (from an ancient Italian-French family), who, under the pseudonyms Pierre Piobb (P. V. Piobb), described in detail the ideas of the European esoteric school of the turn of the 19th-20th centuries. “Occultism recognizes the existence of three worlds, ... three schemes of existence ...: the spiritual world, the astral world and the

physical world" [18, p. 35], and the second one is filled with "Astral bodies", or, "astrosomes", "partly conscious, partly unconscious" [18, p. 36].

We can agree with B. G. Rezhabek that, firstly, the considered assessments are justified, since the term "noosphere" is actively used by "occultists and charlatans," including - V. Yu. And T. S. Tikhoplavy [19]. (It is worth mentioning specifically about these authors, representatives of technical knowledge, citing the names of their books: "Physics of Faith" (2005), "God's Time: Consciousness and Life" (2005), "God's Time: A Voice from afar" (2006). Even more revealing is the name of their official website: "Scientific Esoterics" [20].) However, secondly, we agree that the real noospheric ideas of V. I. Vernadsky, as well as other representatives of Russian cosmism, "have nothing to do with this occult whistle" [19, p. 61]. "The scientific understanding of ideas about the noosphere as one of the geological shells ... has nothing to do with the occult understanding of the noosphere as a" sphere of spirits "," subtle worlds "" [19, p. 61]. Actually, we justified this in detail in the last paragraph of our article, therefore, without further explanation, we agree with B. G. Rezhabek that the circumstance under consideration may not be obvious due to "superficial acquaintance" of the "deacon-humanitarian" (and other authors who interpret the noosphere in the occult channel) with the achievements of natural science [19, p. 60]. But for us it is especially important how the technosphere can be interpreted in the framework of such an understanding of the noosphere ?! The answer is paradoxical: in no way! Hence if the noosphere is "the realm of spirits", "the subtle world", "the sphere of the astral", etc., it is, in principle, connected neither with the biosphere, nor with the noosphere.

We turn to the second alternative interpretation of the noosphere, which we called "exceptionally spatial." It, in fact, is a "truncated" version of the interpretation that goes back to V. I. Vernadsky: understanding the noosphere as a stage (and regular) evolution of the biosphere is being "taken out of brackets", and the noosphere "shrinks", "decreases" exclusively to the region space transformed or at least affected by activity of the "armed with science" humanity. Such an interpretation of the noosphere is characteristic of those representatives of the natural and technical sciences who ignore the philosophical level of the noosphere concept and reduce the "sphere of reason" simply to a combination of technical devices, technologies for their application, and the results of such applications. It

follows that the noosphere and technosphere become synonyms, and - most important for us - discussions about them no longer need philosophical analysis. After all, the development of the so-called noosphere (= technosphere) is simply an ever deeper scientific knowledge, and on this basis - an ever-increasing “processing”, the transformation of both the lithosphere and the hydrosphere, into an “anthropogenic landscape” (by which we mean “how landscapes were re-created by man, and all those natural complexes in which a radical change ... under the influence of man has undergone any of their components ”[21, p. 25]). But then it makes no sense to ask the philosophical questions of technology proper: what are the boundaries of such an intervention (they simply are not provided for with this approach - the whole biosphere should become the so-called “noosphere”), what is the true purpose of the technology (in this case, it simply reduces to turning nature into “comfortable”, “convenient” environment for humanity).

Conclusion. As we tried to show, within the framework of those interpretations of the noosphere, which we called “occult” and “exceptionally spatial”, it is impossible to constructively consider the prospects for the development of the technosphere and, therefore, avoid technosphere disasters (or at least minimize them). But this raises the question: why is it better, more constructive, then the understanding of the noosphere, which has "ripened" in “Russian cosmism” and was scientifically designed by V. I. Vernadsky?! In response, we add to the analysis of the ideas of this philosophizing natural scientist carried out in the first paragraph of this article a couple of thoughts of his modern researchers. G. B. Gutner, an important feature of the "building" activity of mankind is reflection: it (humanity) "not only changes nature, but also recognizes the changes as a result of its activities” [13, p. 107]. B. G. Rezhabek recalls that the emerging “holistic noospheric worldview” should be based on the idea of “not only about the Rights, but also about the Obligations of Man” [13, p. 107] that it is "necessary to create a real strategy for solving global problems of our time" [13, p. 107]. In other words, if the “noosphere” is a new stage in the evolution of the biosphere, then when “Mind” (moreover, funded by Morale) is “at the helm”, then technology (and, therefore, the technosphere as a whole) cannot be considered utilitarianly, as an instrument to increase the “comfort” of mankind . Accordingly, any changes made to nature should be subject to philosophical reflection, including and from the point of view of the “duties of mankind” organizing co-evolution

(this concept fixes the mechanism of the "interdependent changes in the elements that make up a developing integrated system" [22, p. 514]), ie joint evolution, in the process of which humanity is assigned both active and adaptive roles. The "tool" for the implementation of this is the technique, which through this takes on much greater significance than would simply be a means of increasing human comfort.

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DOI 10.32370/IA_2019_09_8

Experience of Philosophical Reflection about Problems of the Technosphere Safety (Based on the Material of Soviet and Russian Philosophical Discussions)

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Abstract

The article continues to implement a philosophical reflection on the technosphere, considered as a necessary part of the noosphere, in the aspect of technosphere disasters, whose “Sword of Damocles” “hangs” over humanity on an increasingly “thin” "horsehair". However, from our point of view, they basically will always be solvable, and we consider the cultivation of "university", "multifaceted", “multidisciplinary” type of education to be the "key" to their solution (in contrast to “mosaic”, “highly specialized”, “limited professional” education). Indeed, it is “one-dimensional people”, “narrow specialists” = “learned ignoramuses”, “Das MAN” (in the terminology, respectively, H. Marcuse, J. Ortega y Gasset and M. Heidegger) act, firstly, as a brake of technosphere progress, and, secondly and most importantly, the "creator" of technosphere disasters.
Key words: technosphere, technosphere disasters, “university” and “mosaic” education, science-based and spontaneous development of the technosphere.

Introduction. At the end of the second decade of the 21st century, “shaken” by the disasters of the technosphere, it does not seem necessary to justify the relevance of philosophical understanding of the ways of its safe development. Also, the reader, we hope, will not have a question, why is such a reflection relevant to be based exactly on the material of the Russian debates: in the first article in the same issue of the "IntellectualArchive", we tried to show the heuristic nature of that version of philosophical reflection on technology, in which the technosphere is considered as a necessary part of the noosphere. And comprehension of the latter as, we repeat, a regular stage in the evolution of the biosphere from the 19th century was carried out by the “Russian cosmists”. But we realize that the question is legitimate: why did we focus on discussions about education, in particular in terms of its “breadth”, "multifacetedness", "multidisciplinarity"? Indeed, it would seem, on the contrary, it is precisely the “narrow”, but “deep” professional training of future technical specialists that can prevent the technosphere disasters of the future!

1. Our position in the "technicalism - anti-technicalism" coordinate system.

We must say right away that we will not consider the position of anti-technicalism, i.e., technical pessimism, declaring - according to authoritative Russian "Humanitarian Encyclopedia" - the technology "and scientific and technical knowledge in general ... a negative alternative to social and cultural values, and scientific and technological achievements are rejected as possible tools for enslaving a person" [1, p. 7]. The brightest representatives of this position, if listed in chronological order, are J.-J. Rousseau, K.Jaspers, M. Heidegger, "Frankfurt School", J. Ellul, and others. The last in his work "Technique" (1962), acknowledged that the latter "became the fate of mankind", and in a work with the significant title "Technological bluff" (1988) claims that this does not lead to any particular technical disasters (even such large-scale, like Chernobyl, Fukushima, etc.), and to the catastrophe of humanity as such. This creates a "philosophical absurdity without a way out", "which has turned into a kind of ontology of the world formed by technology" [2, p. 284]. The discussion with this position is beyond the scope of this article, but we also do not accept the opposite extreme - technicalism, that is, technical optimism dating back to the Renaissance philosophy, which "was inclined to see in technology and scientific and technological progress (scientific and technological progress - P. M.) the most important means of resolving social problems and achieving the common good "[3, p. 525]. Subsequently, this position is being developed by the following thinkers: E. Kapp, T.Veblen, J. Galbraith, W. Rostow, D. Bell, A. Toffler, P.K. Engelmeyer and others.

Trying to get between these "Scylla and Charybdis", we say that although we do not believe that civilization, which has embarked on the path of technological progress, has necessarily doomed itself to death from technological disasters, at the same time we do not agree that the indicated progress "in itself" in the future is capable of ridding mankind of catastrophes, both technogenic and social. The threat of these catastrophes will always remain (and moreover, as we show later, intensify), but at the same time they basically will always be solvable, and we consider cultivation of the "multi-faceted", "multidisciplinary" education the "key" to their solution.

2. The universality of the experience of Russian debates regarding educational reforms. In our opinion, contemporary Russian discussions on the problems of education are of interest to foreign experts in the field of educational philosophy, and primarily because the Russian Federation has undergone a dramatic change in the types of education

over the past three decades (we'll clarify: in the part of the latter that is accessible to all population). Namely: the "university" type is replaced by the "mosaic", "highly specialized", "limited professional" type of education. Here is a concise description of their differences, given by one of the most influential modern Russian philosophers, S. G. Kara-Murza. The "university" school (in the broad sense of the term) "based on the Christian tradition, emerging from the monastery and the university, sets the task of" educating the individual "- a person who turns to God (more broadly, to the ideals)" [4, p. 247]. Accordingly, from the very first steps an "integral set of principles of being" was given, i.e. knowledge immediately connected to the system. For bourgeois society, "a manipulated person of the mass, formed in a mosaic culture" became necessary. [4, p. 247]. (Which, of course, does not negate the importance of university education for the economic and political elite). We find a similar contrast in other prominent Russian thinkers, for example, V. A. Kanke, who distinguishes education as mastering only "those skills that are needed directly at the future workplace. Nothing superfluous, only the most necessary "[5, p. 240] from education, interpreted as "the most effective inclusion of a person in the culture of mankind" [5, p. 240]. With such a campaign, the meaning of even professional training lies in "a comprehensive cultivation of such values as truth, goodness, beauty, creativity, responsibility" [5, p. 240]. Under the conditions of a "step-by-step" (continuing, we repeat, almost three decades) change of this approach to education to a "highly specialized" one, the theoretical, and firstly philosophical, apology of the "university" type of education, is especially relevant for Russian authors. And the relevant arguments they developed seem to be of interest outside Russia too. (Here, readers may ask us in surprise: where is the consideration of the arguments of the opposite side?! We are aware that this may seem biased, but still say: we are not aware of any philosophical arguments proper, i.e. The "opposite side" does not operate with scientific arguments, but administrative, policy documents).

3. "Learned ignoramuses" as the "creators" of technosphere disasters. Returning to the question of the safe development of the technosphere, let us cite the idea of the most authoritative Russian philosopher of recent decades, V. S. Styopin, regarding the radical difference between the so-called "traditionalist" and so called "technogenic" types of civilizations. The most important basis for the vital activity of the last of these types is the

development of engineering and technology, “not only through spontaneous flowing innovations in the sphere of production itself, but also through the generation of new scientific knowledge and its introduction into technical and technological processes” [6, p. 84], which cannot but cause fundamental social changes. So that this does not seem trivial, we cite V. S. Styopin’s conclusion that “technogenic civilization opens up new risk zones” [6, p. 98]. Not being able to consider in detail the ideas of M. Heidegger, K. Jaspers, J.Ortega y Gasset, representatives of the "Frankfurt School", N.F. Fedorov and other "Russian cosmists" (among which we particularly highlight the "late" N. Y. Berdyaev) and other thinkers, "classics", who have penetratingly analyzed such "risk zones", we restrict ourselves to the following laconic reasoning by modern Russian authors. (Immediately making a reservation that we are certainly in solidarity with their critical attitude to the trend of Russian education reforms they analyze). A.F. Polomoshnov in first place among the problems of the "balance of the general orientation or the goals of education" [7, p. 69] puts the following: “a balance of focus on the development of a widely and deeply educated personality with an integral comprehensive fundamental worldview or on the development of high professionalism in a narrow specialized field” [7, p. 69]. Similarly, O.D.Machkarina writes that “the image of a modern student focused on narrow specialization, accompanied by a departure from fundamentality in educational strategy, a drop in the level of general education and the degradation of society, a crisis of education in general,” relates to the following: “ avalanche-like increase in information and the need for its assimilation ”[8, p. 22] to turn a student into a specialist. I. V. Fotieva and T. A. Artamonova detail this idea in this way: “First, the growing volume of scientific knowledge and the specialization of sciences, as claimed, raise the question of the inevitability of a narrow specialization of graduates. Secondly, fundamental education leads to student overload. And the last argument is the demand of the market, that is, the need to raise only those specialists whom society demands ”[9, p. 153].

Now we will consider the tendency brightly “highlighted” by these authors in the context of the prospects for disasters in the technosphere. As S. I. and N. A. Nekrasov write (whose ideas we have already referred to in another article in this journal), “the spontaneous development of the technosphere threatens the safe existence of human being. In this regard, in the future, scientifically-based development of the technosphere as an

integral part of harmonious noosphere ”[10, p. 209]. N. V. Popkova also speaks of the same thing: “of all the proposed options (the future - M. P.), the most probable is the further development of technosphere growth trends, with the goal of forming technogenic complexes ... a unified and people-controlled technosphere system on the planet instead of a kaleidoscope” [11, p. 136]. (Here, however, one can doubt that such an - optimistic - version of the future is "most probable"). The following thought of S. I. and N. A. Nekrasov is especially important for us: such a “scientifically-based development” of the technosphere “will cause a significant increase in the number of objects of technical creativity” [10, p. 209].

Summing up this semantic block, we put forward the following thesis. The “Sword of Damocles” of the spontaneous development of the technosphere, which threatens the very existence of mankind, requires representatives of an increasing number of specialities, primarily technical ones, to “not lock themselves” in their professional frameworks, that is, not to be "narrow specialists." Indeed, firstly, the increasing complexity of the technosphere, in which "the number of objects of technical creativity" increases, requires many even working specialities - not to mention engineering! - both knowledge in related fields, and those thinking skills that can be formed only when studying a wide range of subjects, which necessarily includes a social and humanitarian component. Secondly, let us point out the danger of the fact that “narrow specialists” will not be able to timely notice and prevent catastrophic technosphere processes. (In other words, they cannot contribute to the science-based development of the technosphere as opposed to the spontaneous). Moreover, they themselves can provoke them, in connection with which it is necessary to recall the warning of J. Ortega y Gasset about the danger associated with the appearance in the 20th century. "knowledgeable ignoramuses." If before this century “people were simply divided into knowledgeable and ignorant” [12, p. 101], then in modern times a type of narrow specialists who cannot be ranked in any of the indicated categories has arisen. For our topic, it is especially important to take into account the threat to the technosphere lurking in the “internal conflict” of these “one-sided specialists”, each of whom “will approach any field which he does not understand, not as an ignoramus, but with the bold arrogance of a person who knows his own worth” [12, p. 101]. It turns out that the “learned ignoramus” - as a product of education aimed at a narrow specialization - poses a much

greater danger to the technosphere, and, consequently, society, rather than a completely uneducated, ignorant person. Indeed, the latter, in a situation in which he is incompetent, will not be allowed to draw unreasonable conclusions by common sense, which is blocked by “one-sided specialists” because of their self-conceit.

Conclusion. We summarize everything considered by putting the reader “in front” of the choice: either the education system will reproduce "technogenic man" of "mass society" ("one-dimensional man", “narrow specialist” = “learned ignoramus”, “Das MAN” in the terminology, respectively, H. Marcuse, J. Ortega y Gasset and M. Heidegger), thereby increasing the likelihood of death of both the most technogenic civilization and humanity in whole. Or the educational system will contribute to the formation of comprehensively developed, harmonious personalities, reducing the likelihood and scale of disasters in the technosphere.

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DOI 10.32370/IA_2019_09_9

How to Compete with Private Labels (Pls) as They Continue to Outperform National Brands

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Abstract

The significant growth of private label brands in many categories and marketplaces has reshaped the competitive landscape in the Consumer Packaged Goods (CPG) industry. Today, global CPG companies have to fight for market share not only against global players but also against local retailers that are capable of competing for customers by marketing their own brands. The purpose of this article is to (i) explain what private labels (PLs) are (ii) explain how PLs have gained ground over time and in different markets (iii) provide recommendations to global CPG companies on how to best compete with PLs.

Keywords: Consumer Goods, Private Labels, Strategy, Competition.

PLs, also known as store brands, are products that are produced by a contract or third-party manufacturer and sold under a retailer's brand name. Today, PL goods are offered in almost every consumer product category, including personal care, cosmetics, pharmacy, beverages, food, and many others. In fact, when introducing a private brand, retailers become accountable for the entire marketing mix of products. In other words, a store's management decides upon the PL's ingredients, packaging design, pricing strategy, promotion campaigns, and merchandising. Full control over the value chain and marketing mix allows a retailer to minimize costs and increase profitability. As a result, a solid profit generated from selling PLs facilitates the ability for retailers to decrease prices of PLs to drive sales volume while remaining profitable. Alternatively, retailers can reinvest profits into enhancing the products' quality or into promoting them more heavily within outlets. The bottom line is that with national brands, retailers have minimum impact on marketing strategy because they act as resellers of products. However, with PLs, retailers must control the entire process from production to merchandizing and make appropriate decisions within this process to market their own brands attractively alongside national ones. Hence, the first question is "How big are PLs?"

PLs across the Globe

PLs are on the rise across the globe, but to date the greatest market shares and increase of supply and variety are observed primarily in developed markets. The PL market developed in European countries for many years, with Spain, the UK, Germany, Austria, and Belgium having over one third of sales going to PL producers. A German grocer Lidl is known for its own products

comprising 90% of its sales, which helped the company boost its supply chain considerably and start its market entry to the USA [1].

The global trend for PLs' increasing popularity and rising revenue share is expected to continue in most industries. For instance, the forecast of BusinessWire experts for the global houseware market in 2018-2022 is optimistic about PL houseware products, especially in the developing states [2]. In turn, Grand View Research issued a global outlook on the 2018-2025 PL market in the food and beverage industry, which also delineated firm growth trajectories for PL ready-to-eat meals and healthy snacks. With this in mind, the GVR report forecasts a considerable share for PLs in the rising online food delivery system, expected to increase from $7 billion in 2017 to $12 billion in 2025 [2].

U.S. Private Label Market Overview

While European consumers have been reaping the benefit of PLs for many years already, U.S. consumers are now starting to catch up with the trend. Based on an IRI report, turnover in the CPG industry in the United States in 2017 increased by 0.5% and reached $799B. At the same time, PLs outpaced national brands and have grown by 2.5% while national brands have shown only 0.1% increase in dollar sales. Moreover, in 2017 PLs outperformed national brands and the CPG industry in each department. A solid uplift in sales allowed PLs to gain dollar share in 2017, accounting for 14.8% vs. 14.5% in the previous year. As a result, total PL sales in the United States in 2017 were roughly $120B (in 2013 PL sales were $113B). Obviously, for the last few years retailers have done a great job in terms of expanding penetration of their own-brand portfolio, and within the next ten years, PLs are projected to take over 25% of market sales [3]. Table 1 demonstrates sales performance by department of the total CPG industry, national brands, and PLs in 2017 vs. 2016.

Table 1

Dollar Sales Change in the United States by Department in 2017* vs 2016

	Total CPG	Total National Brands	Total Private Labels
Beverage	+0.4%	-0.1%	+6.3%
Frozen	+0.6%	-0.5%	+5.2%
Beauty	-0.6%	-0.9%	+3.2%
Health	+0.3%	-0.3%	+2.5%
Refrigerated	+0.3%	-0.4%	+2.0%

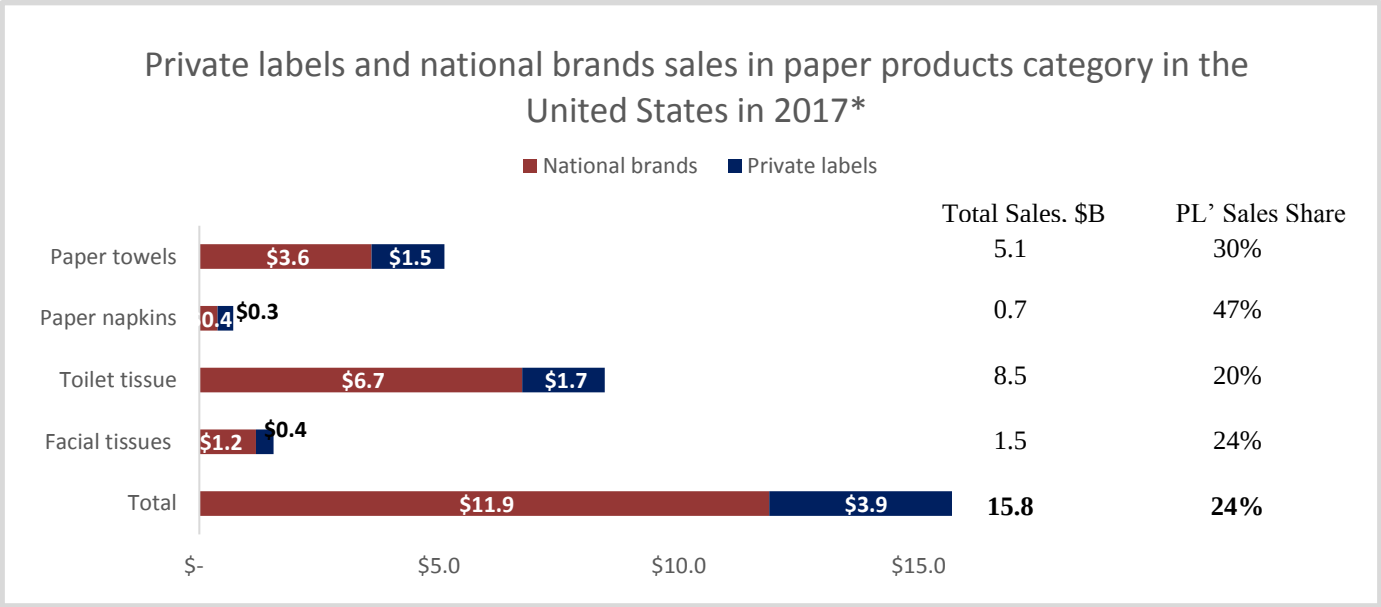
General Merchandise	+0.1%	-0.4%	+2.0%
General Food	+0.4%	+0.3%	+1.5%
Home Care	+0.5%	+0.5%	+0.7%

**Year-to-date ending 9/3/2017 versus same period 2016*

Source: IRI (2017). Private Label 2017: The Evolution of Private Label in a Transforming Marketplace.

Despite the fact that national brands are still dominating the CPG industry, in some categories PLs are achieving leadership position, presenting major competitive challenges to top-tier manufacturer brands. For example, in the total paper category, with turnover of $17B (in 2017), PLs' sales share reached 24% while in one particular subcategory they gained almost 50%. In fact, in the toilet tissue subcategory, PLs attained fourth place based on sales share after P&G, Kimberly Clark, and Georgia-Pacific; while with 30% of sales share in paper towels, store brands are second after the national leader—P&G. Exhibit 1 shows the breakdown of sales in the leading PL category—paper products [3].

Exhibit 1



** 52 weeks ended July 9, 2017*

Source: IRI; Store Brands Magazine, October 2017, page 104

Nevertheless, PLs are gaining ground not only in physical stores but also in the e-commerce space. The tech giant Amazon has invested heavily in its AmazonBasics range, and currently is benefiting from penetrating its own brands into more and more categories. In 2009, Amazon launched

its first PL, AmazonBasics, selling a full product line of electronic goods from disposable batteries to USB cords and laptop bags. Today, Amazon sells PL brands for everything from fashion to food, health supplements to household goods. Based on estimates by analysts at SunTrust, Amazon's PL sales were roughly at $7.5 billion in 2018; by 2022, they are expected to hit $25 billion [4]. Moreover, acquisition of Whole Foods (in 2017 Amazon bought Whole Foods for $13.3 billion) allows Amazon to push PL goods even further by leveraging both channels—the e-commerce platform and physical stores. In fact, PLs seem to keep gaining more share in all retailing formats, but the question is—Why?

Why Are PLs Thriving?

A closer look at the penetration of PLs led me to figure out three key reasons contributing to the exponential growth of PLs.

Attractive Price Points

In developed markets PLs were traditionally aligned as cheaper alternatives to national, premium brands—this pricing strategy allowed store brands to gain market share, especially when consumers needed to make cost savings. Tamara Barnet, vice president of strategic insights at the Hartman Group, said: "During the recession, people were increasingly willing to trade down for a brand equivalent" [5]. She mentioned that the biggest jump of PLs' growth was in 2008 and since then it has been steady but decelerating, with incremental growth of 1-2% annually. Two partners and senior directors of Bain & Company, in their article issued in 2011, stated the following: "The global recession gave private labels an added boost, and in many categories the gains were sticky. Of 30 top US categories we analyzed recently, there was only one—yogurt—in which private labels lost share while brands grew in the years 2006 to 2010" [6].

When an economy recovers from recession, however, consumers won't necessarily "uptrade" to return to national brands; and this pattern is a big driver of sustainable PL growth. Nielsen's report "The Rise and Rise Again of Private Label" emphasized: "When coming out of economic downturns, consumers will maintain a more cautious approach with regard to household expenses, having developed a habit of seeking and expecting value for their money" [7].

Based on Nielsen's survey, 71% of respondents from North America indicated that they purchase PLs to save money, which is close to the global average of 70%. The highest rate is from

the European Union—81% of people chose PLs because of lower price points in comparison with multinational brands. In fact, store brands are most prevalent in European countries where their value share is about one third of the total retail industry turnover [7]. At the same time, 78% of respondents from North America said that it is important to get the best price on a product; the global average was 69% [7].

As a result, an attractive price tag is a major factor that stimulates shoppers to switch from manufacturer brands to PLs, especially when consumers are mindful of their spending. When retailers are able to offer good value for a reasonable price, they meet shoppers' most essential expectations, and that creates significant challenges for national companies.

Product Differentiation

Contemporary consumers have observed a shift of PLs from being only generic, low-end products to becoming more differentiated, more premium offerings with an individual appeal to customer needs and preferences (e.g., organic products, locally grown foods, healthy products, wellness products). This means that store brands have started to differentiate themselves in the marketplace and are able to fulfill needs unmet by major global brands. For example, Woolworths Macro Wholefoods is a retailer that understands the functional and emotional needs of shoppers in the world of healthy eating. Specifically, it differentiates itself by offering a huge range of healthy products at competitive price points [8]. Today, consumers are not only shopping but also eating differently—they demand more products that are natural, green, organic, and free of sugar, gluten, and antibiotics. Therefore, by providing the highest quality products in the healthy-eating segment, retailers consistently win the hearts and minds of their shoppers. For example, Aldi is expanding its fresh produce and organic assortment at ALDI.us/hellohealthy. Visitors find new offerings each week, including meal plans, recipes, videos, and tips on how to shop for a variety of eating styles, such as paleo, vegan, and plant-based. Aldi has partnered with food and lifestyle leaders Cookie and Kate, A Couple Cooks, The Healthy Apple, and My Heart Beets to curate recipes and meal plans and has enlisted an advisory council of registered dietitians who help shoppers find smart choices through products identified by the "Dietitian's Picks" emblem on their website [9].

In fact, wellness brands are the fastest growing segment in the private brands universe. Every retailer, from the most price-oriented to the most progressive, can differentiate with a wellness brand

program suited to their customer segments and banner values. As a result, packaged goods face a challenge, because consumers' preferences have switched to fresh and healthy food.

The Millennial Effect

Compared to older generations, consumers under 35 differ in terms of shopping habits. They tend to try new brands, including PLs. According to McKinsey research, millennials are almost four times more likely than baby boomers to avoid buying products from "the big food companies" [10]. They also do a lot more research before buying, and they will buy brands that do more, provide more convenience and offer a variety of lifestyle options. Millennials are generally willing to pay for special things such as heath and fresh daily food—that is exactly where PLs are gaining market share. When looking at millennial shopping habits, we see that millennials are willing to spend on what matters to them, even though they seek value. Millennials in the United States are 9 percent poorer than Gen Xers were at the same age, so they have much less to spend and choose carefully what to buy and where to buy it. Therefore, in many categories they choose PLs instead of national brands [10].

Final Thoughts: How Can Global Consumer Good Companies Respond to the PL Challenge?

The threat to global consumer good producers emanating from the rapid PL market share growth is evident, so global giants need to take urgent measures to address the challenge and preserve their market shares. When developing a response, companies should keep in mind that the major reason for PLs' success is their unique appeal to consumers and a thorough understanding of demand. Thus, a response strategy should be developed based on market analysis and with specific consumer categories in mind.

The following trends rule consumer demand for PLs and may be adjusted by global giants:

- ✓ Popular PLs may be roughly divided into two categories—affordable analogues of branded products and premium PLs with a strong differentiation (e.g., organic and natural products). Brands may also adjust their product offerings to the needs of these different consumer categories.

- ✓ Older consumers tend to be wealthier, while younger consumers spend less on their consumer product set. Global brands may adjust their product lines with a relevant appeal and pricing strategy for different age categories.

- ✓ Online sales are also driving the market change, with fewer consumer products purchased in stores and a larger number of in-store sales going to on-the-go-meal solutions and convenience products. Brands may preserve their standing in the market if they take a more active role in the consumers' digital lives and offer products with distinct personal benefits.

- ✓ Consumers strive to receive value for their money. They mostly stick with PLs because they find the same level of quality that a branded product has, but for a lower cost. If CPG producers innovate their products and offer higher quality, they may retain significant portions of customers unwilling to experiment with PLs and seeing the evident benefit of buying branded merchandise.

By taking these steps, CPG brands may regain a competitive advantage and preserve their market share in the USA and other countries. However, they need to realize that the market is evolving at an unprecedented scale, with numerous disruptive trends massively changing the market landscape. Hence, PLs are not the only challenge to which they must respond, and staying innovative, proactive, and not resting on their laurels is the most productive competition strategy even for well-established global brands.

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DOI 10.32370/IA_2019_09_10

Issues of Quality of Expert Opinion, and Certain Aspects of Forensic Expert Safety in Criminal, Civil and Administrative Proceedings

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Abstract

The concept of quality may be regarded as a composite structure comprising the support for the following elements: legal, scientific and technological, methodological, organisational, logistical. The quality of expert investigation is not an abstract concept; it actually exists and has a certain content that expresses substantial

certainty, since it results in an expert opinion — judicial evidence. An expert opinion has a procedural (legal), scientific and technological aspects. The ‘quality of forensic examination’ concept therefore has a procedural (legal), scientific and technological content.

Key words: legal protection of the forensic expert, physical protection of the forensic expert, quality of expert opinion, court proceedings, forensic expert regulation

Introduction. Thus, the very concept of ‘quality of forensic examination’ is composite and requires a comprehensive, systematic approach to its study [1, pp. 33–36; 10].

The concept of ‘quality’ is closely related to that of ‘efficiency’. It is generally remarked that an expert investigation should be complete, comprehensive, objective, etc., whereas an expert opinion should be complete, clear, consistent, coherent, informed, etc. Therefore, examining the efficiency of expert investigation and measures to improve it involves a simultaneous analysis of factors that raise the investigation quality and level, as well as reliability and validity of expert’s findings.

In the legal literature, less attention is given to the concept of ‘quality’. For example, I. P. Kononenko defines the quality of a forensic expert opinion as ‘a totality of legal, scientific and technological properties, which comply with the law and other regulations governing the conduct of forensic examination, and of instructional research rules applicable to a forensic expert opinion as judicial evidence’ [2, pp. 31–40; 11]. This definition is not objectionable on the whole. It makes it evident that quality describes outputs of a (forensic examination) system operation at its individual stages, i.e. a ‘finished product’, whereas efficiency describes the entire system, showing how this system functions in accordance with the tasks and objectives it was intended to address upon its creation. Some of these tasks are focused on delivering a product of a certain quality (such as giving an informed opinion); others refer to a procedure for the operation or to the process itself (such as timeliness of forensic examination). However, both are intended to deliver a certain result that reflects the degree of system efficiency.

It seems reasonable to conclude that efficiency is a broader category than quality and encompasses the latter.

Quality indicators of expert investigation are closely related to efficiency indicators of expert investigation.

Quantity indicators of efficiency ‘quality’ in an expert’s activities include:

1. Indicator of achieved objective of establishing evidence. It represents the ratio

between the number of questions posed and resolved. Those questions are regarded as resolved to which answers have been given in a categorical (positive or negative) form, since such answers always contain actual data of evidentiary value. Resolved questions should also include those the answers to which have been given in conditionally categorical, alternative or probabilistic forms, since conclusions containing such findings may be used to develop investigative leads. Only those questions should be regarded as unresolved the answers to which contain the wording 'resolving this question was not possible.'

2. Number of forensic errors made by an expert. This indicator is derived by comparing findings of initial and repeat examinations, forensic examinations and case files of concluded proceedings (in which a final verdict or judgement has been passed), as well as by reviewing the supervised proceedings, and by monitoring outgoing expert opinions arranged at an expert institution. Here, high quality implies minimising expert's errors or their complete elimination.

3. Observance of deadlines. An indicator of this criterion is the number of questions that have been resolved in the time spent on the examination over the deadline established by departmental instructions. Here, the extent and quality of examination may be determined by the ratio between the number of questions resolved before the deadline and all questions put to an expert.

4. Indicator of law observance in the conduct of examinations. It includes the number of questions resolved without violating examination procedural rules.

5. Completeness and clarity of opinion. This goal is achieved when no unanswered questions or unexplored items have been left after examination; no unsupported statements or unclear answers, offering different interpretations and thus preventing their use by an investigator or court, are included in the opinion. An indicator here may be the ratio between fully and clearly stated findings and all findings made.

Quality criteria and indicators of an expert investigation when addressing the tasks put before an expert from the viewpoint of end results of a forensic examination, and their relation to the criteria of a forensic examination as a whole were examined above [3, p. 25–30; 12].

However, it is hard to assess the quality of an expert's work by using quantity indicators only. One should proceed from a distinction made between two large groups of

quality indicators in an expert investigation: indicators directly related to the investigation and those associated with drawing up an opinion that reflects the investigation progress and the expert's findings.

Indicators from the first group may include:

A match between the selected methodology, on the one hand, and the specifics of investigated objects and the task put before the expert, on the other;

Advanced level of investigation (applying a set of modern investigation techniques);

Rationality of investigation (choosing the shortest path to solve a problem);

Economical use of test substances; accuracy of assessing the totality of identified elements (its compliance with the developed criteria);

Proactive approach by the expert, as may be necessary to establish facts relevant to the case.

Indicators from the second group may include scientific validity, completeness, clarity and visualisation of the opinion. This aspect is associated with efficiency assessment of an expert's operations and is relevant within an institutional structure, although outputs from such operations have a direct impact on attainment of general goals in forensic examination.

Scientific validity and completeness of an opinion are manifested in the following:

Accuracy and consistency in the description of items, investigation process, appearance of investigated items, thereby enabling their individualisation;

Elements identified during the investigation through application of scientific techniques; objective links established between the identified elements and the sought fact;

A statement of interim findings arrived at during the investigation and used to formulate the final findings;

A statement of final findings based on the assessment of the totality of identified elements;

No unanswered questions.

Clarity is characterised by logical reasoning, accessibility of presentation for laymen (explanation of special terms, etc.), a match between the findings and the questions posed. Visualisation is determined by the necessary visual materials attached to the opinion.

Thus, quality and efficiency in investigation are fairly interlinked — higher quality of

the investigation is guaranteed to increase its efficiency.

Because of its geographical and geopolitical position, Ukraine cannot insulate or protect itself against the phenomena that are currently inherent in any other country in the world. In this regard, V. V. Stashys was right to draw attention to the fact that an upsurge in organised crime both in Ukraine and in most other countries had been observed recently. This social phenomenon poses danger not only to individual countries, but also to the entire global community. [4, p. 133; 10]

Investigations in criminal cases related to the activities of transnational criminal organisations are associated with a certain degree of risk facing the individuals engaged in identification, prevention, suppression, detection or investigation of crimes, as well as in court hearings of criminal cases. Without optimum conditions created for proper administration of justice, including by ensuring the safety of individuals participating in criminal proceedings, no fight against organised crime through the use of criminal law methods would be possible. Under Article 65 of the Criminal Procedure Code of Ukraine (previous version), sources of evidentiary information on the basis of which an investigating authority, investigator or court establish the presence or absence of a socially dangerous act, culpability of its perpetrator or other circumstances relevant to the proper adjudgement include a forensic expert opinion. Article 77.3 of the CPCU provided for the expert's right to protection, where eligible [5, p. 15; 11][1].

Article 7 of the Law of Ukraine 'On Forensic Examination' stipulates that forensic activities in Ukraine shall be carried out by specialised state institutions that include research and other forensic institutions of the Ministry of Justice and the Ministry of Health, as well as forensic services of the Ministry of Internal Affairs and the Ministry of Defence, Security Service and the State Border Guard Service of Ukraine. Furthermore, forensic activities may be carried out by individuals on commercial basis under one-time contracts [6, p. 232; 12].

Safety of forensic experts is regulated by the Law of Ukraine 'On Ensuring the Safety of Persons Participating in Criminal Process' [7, p. 51; 10]. Ensuring the safety of individuals participating in criminal proceedings, under Article 1 of the Law of Ukraine 'On Ensuring the Safety of Persons Participating in Criminal Process', involves legal, administrative,

[1] These CPCU provisions were in force in their previous revision until 01/12/2013. We believe that they still retain their relevance.

technical and other measures taken by law enforcement authorities to protect life, homes, health and property of these persons against unlawful encroachments, with the aim of establishing the necessary conditions for proper administration of justice. In Article 2.(f) of this Law, a forensic expert is directly listed among the individuals entitled to protection, where eligible.

Entitlement of forensic experts to safety is regulated not only by this Law. Employees of specialised state institutions that perform forensic examinations (Ministry of Justice, Ministry of Health, Ministry of Internal Affairs, Ministry of Defence, Security Service, State Border Guard Service of Ukraine) are law enforcement officers.

Performing forensic examinations constitutes the exercise of (law) enforcement functions, which, under Article 2.1 of the Law of Ukraine 'On State Protection of Judicial and Law Enforcement Employees', is an attribute of law enforcement authorities [8, p. 50; 11]. By its Article 1, this Law establishes a system of special measures for the state protection of judicial and law enforcement employees from obstructing the exercise of their statutory duties and rights. It is also intended to protect these individuals, in connection with their official activities, and their immediate family against encroachments on their life, health, home or property. It would thus seem appropriate to stipulate that those forensic experts who are employees of state research or other expert institutions of the Ministry of Justice and Ministry of Health, as well as of expert services of the Ministry of Internal Affairs, Ministry of Defence and the Security Service, shall be protected entities under the Law of Ukraine 'On State Protection of Judicial and Law Enforcement Employees'.

Forensic experts from among the persons performing forensic activities on a commercial basis, as well as individuals who provide forensic examinations under one-time contracts, are entitled to protection in the manner prescribed by the Law of Ukraine 'On Ensuring the Safety of Persons Participating in Criminal Process'.

The scope of protective measures stipulated by these two Laws for various categories of persons is also different. However, forensic activities carried out by employees of state expert research institutions are usually associated with the support for criminal proceedings. By contrast, private business employees are generally engaged as forensic experts in civil or economic legal proceedings under one-time contracts [9, p. 202–204; 10; 11; 12].

A more specific legislative definition of forensic experts' protection, depending on the departmental affiliation of forensic or other institutions, would put individuals performing forensic examinations as part of their official duties on an equal footing with other employees from these institutions.

Conclusion. It should be noted in summary that, in our opinion, setting up a system of reliable legal protection for a forensic expert as a participant in legal proceedings and a source of expert opinion would preclude (to a large extent) any potential physical or psychological pressure and would have a correspondent impact on the quality of investigation and validity of its findings.

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DOI 10.32370/IA_2019_09_11

Certain International and Criminal Law Aspects of the Use and Circulation of Weapons and Ammunition During Interstate or Civil Armed Conflicts

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Abstract

At its 63rd session, the UN General Assembly noted that present-day armed conflicts blurred the distinction between international and internal armed conflicts. The number of civil wars has increased, and, statistically, they are more frequent than international armed conflicts. Furthermore, many of these 'civil wars' include 'external' components, such as support and involvement, in varying degrees, by other states that supply arms, provide training camps, financial resources, etc. The existing international humanitarian law contains provisions that govern the use of weapons. They may be divided into groups: 1. Banning and restricting specific

types of weapons under international treaties. 2. Banning and restricting certain types of weapons, such as poison, biological and chemical weapons, under traditional international law. 3. General principles that govern the use of weapons under international humanitarian law.

The first principle involves distinction between military objectives and civilian population, between combatants and civilians during the war. It originated in the St. Petersburg Declaration Renouncing the Use, in Time of War, of certain Explosive Projectiles dated 1868 and was subsequently codified in the Additional Protocol I of 1977 (Article 48). The second important principle involves proportionality. The scale of destruction in the conduct of a military operation should be commensurate with the importance of this operation. Article 57, Additional Protocol I of 1977, stipulates that those who plan or decide upon an attack shall take all feasible precautions in the choice of means and methods of attack, and refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life. Obviously, any kind of restriction is a question of ethics and morality and therefore may be discussed and interpreted differently. As regards restrictions on certain types of weapons, it is essential to have methods that would enable taking reliable and efficient measurements of the environment and consequences of a projectile impact as a means of attacking personnel, materiel and fortifications. Having common criteria for the results obtained through the use of these methods is equally important. All international treaties concerning the use and application of firearms have continuously reiterated two aspects: 1) a party's entitlement to an unlimited choice of weaponry to inflict damage to the enemy; 2) restricting the use of weapons that cause 'unnecessary suffering'.

International legal regulation of warfare is intended to restrain parties to an armed conflict from wanton cruelty. Violations of these rules, either with criminal intent or because of criminal negligence, are recognised as war crimes.

The international community is also increasingly recognising the threat of arms trafficking not only as the countries' internal problem, but also as a significant factor of influence on transnational organised crime, including drug trafficking, money laundering, financing of terrorism, etc. The illicit trafficking in firearms, explosive substances and devices has always posed a serious threat to public safety. The key suppliers and intermediates in the global arms trafficking primarily represent transnational organised crime. It is these organisations that mostly operate in the areas of armed conflict and in adjacent countries. Illicit trade in small arms is the most widespread globally, given their easy use, availability, and opportunities for rapid replenishment of ammunition. These weapons are legal per se; selling them to banned purchasers is illegal. These purchasers usually include those countries whose governments allow conflicts or violations of human rights both within and outside the country. The proliferation of weapons has assumed organised forms long ago, and the main reason for its prevalence is its exceptional profitability. Therefore, signing of the Protocol against the Illicit Manufacturing and Trafficking in Firearms, Their Parts and Components and Ammunition on 02/03/2001, as a supplement to the UN Convention against Transnational Organised Crime, became an important step in the development of international legal rules in the field of combating the illegal trafficking in firearms. Recently, the movement of weapons across Ukrainian borders beyond or concealed from customs control has become of particular concern, as evidenced not only by a higher public danger of such acts, but also by the associated negative processes that tend to be further exacerbated [1].

Key words: The Law 'On Weapons', firearms circulation, firearm registration and monitoring.

Introduction After 1850, in order to increase impact on hard targets, many countries produced ammunition that was guaranteed to disable enemy personnel. Thus, explosive and incendiary shells appeared, comprising a hollow body with gunpowder or incendiary agent and a fuse. At first, no restrictions existed on the use of such shells during hostilities. However, military surgeons treating the personnel with gunshot wounds noticed a hugely disproportionate amount of damage caused by explosive bullets. Rather than being restricted to disabling the enemy, the action of the bullet caused major damage, resulting in lethality or severe disability among soldiers. It was no surprise that, almost immediately after these projectiles were put into service, the public, mostly doctors, started calling for a ban on them.

The initiative to restrict the use of 'non-humane' bullets belonged to the Russian Empire which organised a conference held in St. Petersburg in December 1868. The outcome of the conference was the Declaration adopted on 11/12/1868. It established the principles of 'restriction'. It stipulated inter alia that the objective of a warring country may not include the use of weapons that cause 'unnecessary suffering'.

The Contracting Parties renounced the employment of any projectile of a weight below 400 grams, which was either explosive or charged with fulminating or inflammable substances. This mainly concerned explosive bullets.

In the opinion of the International Committee of the Red Cross, the Declaration of St. Petersburg of 1868, which bans the use of explosive bullets, is the cornerstone of efforts to protect soldiers from excessive damage and unnecessary suffering.

In 1874, merely six years later, in 1874, a second conference was held in Brussels to limit the destructive power of projectiles. Again, the Russian Empire was the initiator. The Conference adopted a draft Project signed in August 1874. By laying the foundation for subsequent treaties, the draft Project was of critical importance, since the Brussels Conference managed to agree the key provisions. For example, Article 12 stated that 'the laws of war do not recognise in belligerents an unlimited power in the adoption of means of injuring the enemy,' whereas Article 13 forbade 'the employment of arms, projectiles or material calculated to cause unnecessary suffering.' The draft Project also reaffirmed the ban imposed on explosive bullets by the Declaration of St. Petersburg. Furthermore, the draft Brussels Project restricted the employment of poison or poisoned weapons.

In 1899, the Russian Empire initiated another conference on limitation of armaments, where it proposed that technological development of guns and hand-held weapons be frozen for at least 5 years. Attention was drawn to different wordings of the quality of hand-held weapons, based on their specific types, weight, projectile calibre, initial velocity and rate of fire. Unfortunately, none of the proposals was ratified by most European countries. The discussion on limiting the impact of weapons continued. Nevertheless, a new Convention was adopted in The Hague in 1899, reaffirming Article 12 of the draft Brussels Project.

By the end of the 19th century, a dumdum bullet had become widespread in a number of countries. Despite its obvious heavy destructive power, disagreements arose around the criteria for its banning. Proponents of this bullet argued that the dumdum bullet was not explosive in the

meaning of the St. Petersburg Declaration. After a lengthy discussion, it was written in the final version of the Hague Convention that 'The Contracting Parties agree to abstain from the use of bullets which expand or flatten easily in the human body, such as bullets with a hard envelope which does not entirely cover the core.' Thus, the Hague Convention of 1899 prohibited the development and use of deforming and, in particular, semi-jacketed bullets.

On 18/10/1907, The Hague once again hosted an international conference dedicated to a wide range of issues associated with observance of the rules, laws and customs of war. The event was attended by representatives from 44 countries. The new Convention, entitled the 'Convention with respect to the Laws and Customs of War on Land', explicitly stated that 'the right of belligerents to adopt means of injuring the enemy is not unlimited.' It was expressly forbidden 'to employ arms, projectiles, or material of a nature to cause superfluous injury.' Once again, opponents of limitations on the stopping power of weapons tried to protect dumdum-type bullets by alleging that the direct bans imposed by the St. Petersburg, Brussels and Hague Conferences had not been formally reaffirmed in the 1907 Convention [2].

Discussions around the problem of limitations on the stopping power of weapons were continued in 1980, when a special conference was held in Geneva under the UN auspices. This had to do with the fact that, in the 1960s, small-calibre 5.56mm cartridges for the U.S. M16A1 assault rifle became widespread [3]. This projectile met all the requirements imposed on a jacketed bullet; however, its behaviour in soft biological tissues resembled that of a dumdum bullet. It was precisely this circumstance that prompted the public to revisit the problem of limiting the stopping power of ammunition. Initially, the matter of reducing the initial muzzle velocity to 800 m/s was considered, since the standard speed of 990 m/s and the low stability of the bullet along the external ballistic trajectory resulted in serious consequences when in contact with a biological target [3]. This was also exacerbated by the design features of the bullet that had a hollow in its head. The most vocal demands were to ban the 5.56mm bullets completely [3]. This bullet was banned neither then nor later.

In view of this, extensive tests were performed in the 1970s by ballistics experts in various countries to study the behaviour of small-calibre projectiles in soft biological tissues. Not all the researchers had achieved consistent results. This was largely due to the fact that the logistical and methodological base differed significantly between the countries. This had a major influence on decisions of the 1980 UN Geneva Conference, where detailed reports of scientists from various

countries were heard. Nevertheless, the Conference adopted a number of rules that represented requirements both on ammunition and on experimental work's scientific accuracy, which is capable of ensuring comparability of findings. The key outcomes of the Geneva Conference were as follows: 1) bullets fired from hand-held small arms should have limits on the energy transferred to soft biological tissues; 2) prohibit the use of explosive projectiles; 3) prohibit to use any weapon the primary effect of which is to injure by fragments which in the human body escape detection by X-rays; 4) unify the techniques for assessing the stopping power of projectiles by using 14cm-thick blocks of transparent ('ballistic') soap as a simulant at a range of 100 m.

In the 1990s, democratic forces attempted to ban the use of AK-74 5.45mm bullets and to remove them from the Russian army's inventory [3]. This demand was largely political in nature. However, it necessitated a thorough comparison study of stopping power between Russian and other foreign small-calibre ammunition for hand-held firearms. Findings of the comparison study made it possible to draw the following conclusion: 1) the emergence of small-calibre (5.45 and 5.56 mm) ammunition for hand-held firearms is a natural and logical step in perfecting weapons and ammunition and is a common process observed in various countries of the world [3]; 2) unlike the 5.56mm M16A1 bullet that, when hitting the muscles, fragments into numerous splinters, the 5.45mm bullet for AK-74, despite having a high stopping power, does not break in soft tissues [3]. Moreover, it was explained to the 'proponents of the bullet ban' that the relevant information had been communicated to the UN Geneva Conference and the International Red Cross back in the 1980s without any critical comments from these organisations.

Other means of attacking the enemy personnel, materiel and fortifications have not been overlooked. For example, the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Geneva, 10/10/1980), and Protocol II (as amended) thereto, which came into force in December 1998, are sometimes also called the Convention on Certain Conventional Weapons, or the Inhumane Weapons Convention (the 'IWC') [2].

The ICW is an international legal instrument governing the use of such types of weapons as land mines, booby-traps, and similar devices in conflicts.

Smuggling was attributed to crimes whose specific feature is the requirement for availability of an item directly targeted by a person's criminal activities, and through which (s)he impinges on the social relations that describe the target of this crime. Thus, an item of smuggling

as a basis for the emergence and a condition for realisation of social relations, the content of which comprises its entities' economic activity, substantiates and highlights precisely this social category. This kind of economic relations was codified and substantiated in the items whose exhaustive list was contained in Article 201.1 of the Criminal Code of Ukraine (the 'CrCU').

When considering the concept of weapons, which, under Article 201.1 of the CrCU, are included in the items of smuggling, the following circumstances should be noted:

1. The domestic law provides no exhaustive definition of the concept of 'weapons'. This is evidenced, in particular, by the existence of seventeen draft Laws of Ukraine 'On Weapons' submitted to the Verkhovna Rada of Ukraine between 01/01/1995 and 01/09/2019. In all these draft Laws, weapons are defined as devices, accessories and items that are specifically manufactured, designed and technically suitable for stopping a human or other target, or protecting against attack. One of the best of them, the eighth (in order of publication) draft Law No. 1171 dated 22 November 2002 defines weapons as devices, accessories and items that are specifically manufactured, designed and technically suitable for stopping a human or other target and that serve no other industrial or household purpose.

Similarly, not a single regulation provides and exhaustive definition of 'weapons'.

2. When commenting on the concept of 'weapons' as an item of smuggling, certain scholars restrict themselves only to pointing out that, under Article 201 of the CrCU, both firearms (other than for smooth-bore weapons) and cold weapons were understood as weapons. This was usually followed by references to a comment to Articles 262 and 263 of the CrCU. The legislator refers to firearms (other than smooth-bore shotguns), ammunition, explosives, explosive devices and radioactive materials in Article 262 of the CrCU, as well as to cold weapons in Article 263 of the CrCU, as targets of a crime. This definition of weapons automatically restricts them to two types — firearms and cold weapons. O. O. Dudorov regards the following weapons as items of smuggling: 1) firearms (small arms, artillery, and shoulder-fired rocket launchers), rocket, missile, mine, incendiary, torpedo and other common types of military weapons; 2) nuclear, chemical, biological, laser, infra-sound, radiological and other weapons of mass destruction; 3) cold weapons; 4) nerve gas weapons; airguns with a calibre over 4.5mm and bullet velocity exceeding 100m per second [3]; special weapons for firing rubber bullets; stun guns. The technical (forensic) group comprises several parts that determine its functionality (barrel, firing mechanism, etc.) and production (weapons must be specifically manufactured according to their

intended purpose, such as active self-defence). Unlike the legal group, the technical one is not completely exhaustive. It is constantly changing, in line with the development of certain branches of science and technology, emergence of new technologies in the weapons manufacture. Therefore, in order to give a precise definition of the concept of 'weapons', all their technical features without exception should be taken into consideration, which is a logical impossibility. The only drawback to the above doctrinal definitions is that the authors failed to give a complete classification of weapon types, by leaving out, for example, combined weapons (that integrate rifled and smooth bores, or have a smooth bore grooved at the muzzle, or combine firearms and cold weapons) and explosive weapons (devices and accessories designed to stop a human or other target by an explosive charge effect), etc.

3. Under Article 201.1 of the CrCU, smooth-bore shotguns are not included into smuggled firearms. A smooth-bore weapon is a type of firearm intended for firing from smooth barrels without rifling. It is therefore not entirely clear what O. O. Dudorov meant by defining it as a weapon 'whose design does not allow firing a rifled bullet.'

Smooth-bore weapons constitute those that are industrially produced for the needs of hunting sector. Their sole purpose is hunting and they are in no way suited for combat operations. Therefore, making a sawn-off shotgun from a smooth-bore hunting weapon (by sawing off a part of the barrel and/or butt) increases the public danger of this item. In other words, by changing its original purpose, a particular shotgun changes its classification from a standard smooth-bore hunting weapon to a custom-made converted firearm.

4. Given the above, it should be noted that the concept of 'weapons' under Article 201.1 of the CrCU should be replaced to include specific types (firearms, explosive, special military weapons; cold, gas, air, and combined weapons), the definition of which must be provided in a dedicated Law of Ukraine 'On Weapons' [4].

Conclusion Public danger of rifled firearms is manifested in penetrability and accuracy of fire. As such, rifled barrels increase the range and penetrative power of bullets. It is assumed that the idea behind these definitions (i.e. defining a weapon through its classification) is commendable, since the concept of 'weapon' is a comprehensive category in the sense of criminal law. Its comprehensiveness is manifested by having two groups — legal and technical (forensic) — of interrelated features. The legal group includes the following: first, objective elements that describe the external aspect and the modus operandi

(use of weapons); second, subjective elements, i.e. deliberate and wilful attitude towards the action on the part of a person using the weapon; third, an element of legitimacy in using the weapon.

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DOI 10.32370/IA_2019_09_12

Practical Aspects of Appointment of Judicial Expertise in the Field of Intellectual Property (Expertise of Copyright Objects and Related Rights, Articles, Computer Programs and Databases, Implementation of Phonograms, Videos, Programs (Transfer) of Loans Organizations)

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Abstract

The object of examination of objects of copyright and related rights is the actual data belonging to the properties of material and non-material (information) objects. These data are established on the basis of special knowledge in the field of copyright and related rights, strictly in accordance with the requirements of the law and may have probative value in criminal, civil, economic and administrative cases. The features of an expert

examination by the new Criminal Procedure Code of Ukraine are carried out in the article. The procedure of judicial examination in intellectual property rights sphere in criminal proceedings is analyzed and shown in accordance with current legislation.

Keywords: expertise of copyright objects and related rights, articles, computer programs and databases, implementation of phonograms, videos, programs of loans organizations.

Introduction Objects of examination of copyright and related rights are: literary, written works of fiction, journalistic, scientific, technical or other nature (books, pamphlets, articles, etc.); speeches, lectures, sermons and other oral works; computer programs; databases, if they are the result of intellectual activity by selection or ordering of their constituent parts; musical works with text and without text; dramatic, musical and dramatic works, pantomimes, choreographic and other works created for the stage show, and their production; audiovisual works; works of fine art; works of architecture, urban development and garden art; photographic works, including works, executed in ways similar to photography; works of applied art, including: works of decorative weaving, ceramics, carvings, pouring out of art glass, jewelry, if they are not protected by the laws of Ukraine on the legal protection of industrial property objects; illustrations, maps, plans, drawings, sketches, plastic works relating to geography, geology, topography, engineering, architecture and other fields of activity; stage workings, folklore processing, suitable for stage show; derivative works; collections of works of folklore, encyclopedias and anthologies, collections of ordinary data, and other compositions, provided that they are the result of creative work in the selection, coordination or streamlining of content without infringing the copyrights of the works included in them as an integral part; any methods of performing literary, dramatic, musical, musical-dramatic, choreographic, folklore and other works; phonograms; videograms; broadcast programs, etc.

Examination of the objects of copyright and related rights are solved by two main groups of tasks: identification and diagnostic. Identification study is to establish the identity of objects. It includes identification: a work for the use of plagiarism; persons who created the work; the work by its parts (or part); source of the work; according to the requirements for the production and distribution of copies of the work; equipment by which the carrier of the work (its packaging) is manufactured. The diagnostic study consists in revealing the essence of the particular taken for the study of the object by its features by referring it to a particular type, class, and the like. This includes installing: the security of research objects; originality of the

name of the work, parts of the work and legally significant elements of the work; kind of object of copyright (related rights) and its nature; establishing the fact of the change of the work and its method; establishing the fact of using the product and its method; determination of signs of counterfeiting copies of the work [1].

Concerning one research object, both identification and diagnostic tasks can be solved. Approximate list of issues that are solved during the examination of objects of copyright and related rights: 1). Does the work "XXX" have signs of a creative character, is it a result of creative work? 2). Is the work "XXX" a subject of copyright (related rights) and, if so, which type of object does it belong to? 3). Is the title "XXX" original? 4). Are there copyright objects (related rights) on the bearer "XXX" and, if so, which types of objects do they belong to? 5). Does the copy of the work contain a sign of counterfeiting? 6). Is there a fact of the use of the work (fragment of the work and the original title of the work) "XXX" in the work "UUU"? If so, is there such use of plagiarism? 7). Was the product "XXX" changed by processing, adapting, arranging, or otherwise? 8). Was the product "XXX" used as the basis and source of the work "UCU", in particular, by borrowing ideas, strategies, structures? If so, what exactly is used, borrowed from the work "XXX" when compiling the work "UUU"? 9). Is there a designation "XXX" that is located on the object "A" by reproducing a work "UUU" or a part of it? 10). Is there a "UUU" image placed on the object under investigation, reproducing the character of the work "XXX"? 11). Is the work "XXX" an integral part of the audiovisual work "UUU"? 12). Has there been playback (direct and / or indirect) of performances of "XXX" in a phonogram (videogram) "UUU"? 13). Was there a use of the product in the amount justified by the goal? 14). Is it possible to establish a stylistic affinity for "XXX" and "UUU"? 15). Was the computer program "XXX" decompiled (transformed from the object code into the source text) in order to interact with the computer program "UUU"? 16). Were there any use of the XXX program for any other purpose (indicated with) except for archiving or replacing the purchased copy of "XXX"? 17). Are the carriers of the product (its packaging) manufactured using the same equipment? [3, 4]

In practice, there are not unusual cases when the initiators of the appointment of examinations and studies in this area raises questions about who is the copyright holder of works or phonograms recorded on investigative copies of counterfeit products (who owns copyright and related rights?). The essence of this issue is of a purely legal nature, since the

contractual relations of the right holders with legal entities or individuals are of a dynamic nature in time, territory and circle of individuals, does not require special expertise of the expert and is subject to the establishment of operational and investigative units.

In the decision (decree) on the appointment of the examination, it is necessary to indicate the essence of the case, on the basis of which the expert was appointed; be sure to make a reference to the protocol, indicating the quantitative and qualitative composition of the withdrawn products and carefully describe the package. Together with the decision (decree) on the appointment of an expert assessment, the expert shall be provided with a complete list of research objects, including the electronic version, which are properly packed and sealed, which ensures their storage and integrity from the moment of withdrawal until the examination. Examination related to commercial (branded) denominations, trademarks (trademarks for goods and services), geographic indications.

Objects of research are signs for goods and services, designations affixed to the product, packaging containing such a product, a sign, associated with it, a label, a stylus, a tag or other item attached to a product, commercial (branded) name, indicating the origin of the goods and other materials of the case, which are investigated by the expert for the decision of questions raised to the expert with application of special knowledge.

The subject of examination is the actual data that belong to the properties of material and intangible (information) objects, a comprehensive study of which provides an opportunity to determine their security and other circumstances of the case, relevant for the bodies of pre-trial investigation and court.

Issues solved in research related to the protection of rights to marks for goods and services, brand names, indication of the origin of goods, etc.

Inconsistency with the conditions of granting legal protection

– Is there a sign for goods and services for the certificate of Ukraine No. 000 that does not have a distinctive ability and has not acquired such a result as a result of its use?

– Is a sign for goods and services for the certificate of Ukraine No 000 only for signs that are commonly used as a designation of goods and services of a certain type?

– Is the mark for goods and services for the certificate of Ukraine No 000 only for signs or data that are descriptive when used in relation to them in relation to the goods and services indicated in the application, in particular, indicate the type, quality, composition,

quantity, properties, destination, value of goods and services, place and time of manufacture or sale of goods or provision of services?

– Is there a mark for goods and services for the certificate of Ukraine No. 000 deceitful or deceitful as to the goods, services or person who produces the goods or renders the service?

– Is there a sign for goods and services for the certificate of Ukraine No. 000 only from symbols that are commonly used symbols and terms?

– Is there a mark for goods and services for the certificate of Ukraine No. 000 in such a way that it reflects only the form due to the natural state of the product or the need to obtain a technical result, or which provides the goods with essential value?

– Does the mark for goods and services on the certificate of Ukraine number 000 unobserved elements? [3, 4]

Issuance of a certificate as a result of submission of an application in violation of the rights of third parties

– Is there a sign for goods and services for the certificate of Ukraine No. 111 identical or similar to the extent that it can be confused with a sign for goods and services under the certificate of Ukraine No. 000 (previously registered or filed for registration in Ukraine on behalf of another person for the same or related products and services)?

– Is there a sign for goods and services for the certificate of Ukraine No. 000 identical or similar to the extent that it can be confused with the mark on the certificate No. 222 (a sign of another person, if this sign is protected without registration on the basis of international agreements to which Ukraine is a party, in particular, a sign recognized as well-known in accordance with Article 6 of the Paris Convention for the Protection of Industrial Property)?

– Is a mark for goods and services under the certificate of Ukraine No. 000 identical or similar to the extent that it can be confused with the trademark "XXX" (known in Ukraine and belongs to another person who has been entitled to it before the date of submission to the Office of an application for such themselves or related products and services)?

– Is there a sign for goods and services for the certificate of Ukraine No. 000 identical or similar to the extent that it can be confused with the qualified indication of the origin of the goods "XXX" (protected in accordance with the Law of Ukraine "On the protection of rights to indicate the origin of goods")?

– Is there a mark for goods and services for the certificate of Ukraine No. 000 identical or similar to the extent that it can be confused with the "XXX" (registered in accordance with the established order) conformity marking (certification mark)?

– Does the mark for goods and services reproduce for the certificate of Ukraine No. 000 the title (quotation, character) of the well-known work of science (literature and art) in Ukraine "XXX"?

– Does the trademark for goods and services reproduce the certificate of Ukraine No. 000 of the work of art "XXX" and its fragments?

– Does the trademark for goods and services on the certificate of Ukraine number? 000 surname (name, pseudonym and derivatives from them, portrait, facsimile) of a person known in Ukraine?

– Has the mark for goods and services evolve according to the certificate of Ukraine No. 000 in the designation, which became commonly used as a designation of goods and services of a certain type?

Use of the mark in the form of a registered mark

– Is there a designation "XXX" (affixed to the product, the packaging containing such a product, a sign, associated with it, a label, a stylus, a tag or other item attached to the item, applied at the time of the offer and the provision of any service, for which the sign is registered; applied in business documentation or in advertising and on the Internet, in the domain name of the enterprise "A") using the registered trademark for goods and services under the certificate of Ukraine No. 000 concerning the goods and services indicated on the certificate?

– Is there a designation "XXX" (affixed to the product, the packaging containing such a product, a sign, associated with it, a label, a stylus, a tag or other item attached to the item, applied at the time of the offer and the provision of any service, for which the mark is registered; applied in business documentation or in advertising and on the Internet, in the domain name of the enterprise "A") using the registered trade mark for goods and services under the certificate of Ukraine No. 000 concerning goods and services related to the certificates given, which you can weave Are you deceived about the person who produces the goods or renders services?

Use of a mark in a form different from the registered mark only by individual elements, if it does not change the marking as a whole

– Is there a designation "XXX" (affixed to the product, the packaging containing such a product, a sign, associated with it, a label, a stylus, a tag or other item attached to the item, applied at the time of the offer and the provision of any service, for which the mark is registered; applied in the business documentation or in advertising and on the Internet, in the domain name of the enterprise "A") is similar to the registered trade mark for goods and services under the certificate of Ukraine No. 000, in relation to the goods and services given in the certificate, as a result of which the sign and the sign can be ignored atm?

– Is there a designation "XXX" (affixed to the product, the packaging containing such a product, a sign, associated with it, a label, a stylus, a tag or other item attached to the item, applied at the time of the offer and the provision of any service, for which the sign is registered; applied in business documentation or in advertising and on the Internet, in the domain name of the enterprise "A") is similar to the registered mark for goods and services under the certificate of Ukraine No. 000, concerning goods and services related to the certificates given in the certificate, so that can enter in about Come on people, which produces goods or provides services to, or may be confused?

Violation of rights regarding the brand (commercial) name and qualified indication of the origin of goods

– Are the information in the case file indicating that the commercial (firm) name "XXX" misleads consumers about its true business?

– Is there a commercial (firm) name "XXX" for the identical registered trade mark for goods and services under the certificate of Ukraine No. 000 in relation to the goods and services listed on the certificate?

– Is there a commercial (firm) name "XXX" for the identical registered trademark for goods and services under the certificate of Ukraine No. 000 concerning goods and services related to the certificates given, which may lead to confusion as to the person who produces the goods or provides services?

– Is the commercial (firm) name "XXX" similar to a registered trademark for goods and services under the certificate of Ukraine No. 000, in relation to the goods and services

listed in the certificate, which may lead to confusion between these designations and the mark?

– Is the commercial (firm) name "XXX" similar to the registered trademark for goods and services under the certificate of Ukraine No. 000 concerning goods and services related to the certificates given in such a way as to mislead the person who produces the goods or provides services, or may be confused?

– Are the same commercial (branded) denominations "XXX" and "XXX" (belonging to different persons) to mislead consumers about the goods (services) they produce (sold, provided)?

– Is a mark for goods and services under the certificate of Ukraine No. 000 identical or similar to the extent that it can be confused with the trademark "XXX" (known in Ukraine and belongs to another person who has been entitled to it before the date of submission to the Office of an application for such themselves or related products and services)?

– Does the sign "XXX" have signs that characterize it as a qualified indication of the origin of the goods?

– Does the symbol "XXX" with a qualified indication of the origin of the goods coincide? [3, 4]

The practice of appointing forensic examinations of intellectual property objects testifies to the difficulty in distinguishing the "question of fact" from (and) the "question of law", and as a consequence, the formulation of issues of a legal nature, the resolution of which is determined by the current legislation as the competence of the investigation and the court. For example, the question "Does the sign for goods and services comply with the certificate of Ukraine No. 000 on the conditions of security?" can be resolved in the following volume "Is the mark for goods and services for the certificate of Ukraine No. 000 only for signs that are commonly used symbols and terms? " or to indicate any other ground for refusal to register the mark for goods and services [2]. The main drawback of the preparation of materials in this area is their incompleteness, that is, for expert examination at the disposal of the expert, not all necessary and sufficient materials are provided, in particular: copies of documents issued by public authorities do not have notarized certification by the law (for example, copies of certificates are often submitted not properly certified); the absence of

through-numbering of the case sheets or errors in their numbering; absence of samples (for example, full-color packaging samples, labels).

Thus, the bodies of pre-trial investigation and courts do not demand and submit to the expert institutions application materials, as well as reports on information searches. The materials of the applications are necessary in order to determine whether the object for which the security document was issued, the declared object, as well as for studying the issues regarding the possible grounds for refusal of registration. Not always copies of documents are presented in proper form. For example, certificates for signs for goods and services are presented in the form of photocopies. This does not matter if the sign is registered in black and white. However, if a sign has received legal protection in a certain combination of colors, the image provided for examination of the image must be color-coded.

Conclusions Intellectual property today is a powerful factor in progress, which largely determines the trends of the modern world. Therefore, the protection of intellectual property rights is one of the most important tasks of the state and society, which seeks to take a worthy place in the world community.

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DOI 10.32370/IA_2019_09_13

Implications of Ethnic Frictions and Identity Politics on Inter-Group Relations in Nigeria

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Abstract

The various ethnic groupings in Nigeria had existed before the creation of the Nigeria state in 1914 but ethnicity became politicized and its influence got heightened in the Nigeria political scene in the late 1930's. These diverse groups had their unique systems of administration and relations. The vilification of ethnicity as the scapegoat of all vices associated with the Nigerian body polity has made the subject a dominant theme in the study of Nigerian political economy. This is attached to the various sentiments opened to these various people whom existed and related before the coming of colonialism. This paper examines the composition of the various ethnic groups as well as the diverse ways in which they had related in pre-colonial times. It also pinpoint the havoc in which ethnic identity which was introduced by the colonial authority has done to the peaceful co-existence which earlier existed among the people.

INTRODUCTION

It is no more a contending fact that Nigeria is a multi-ethnic state that has over 250 ethnic groups. Despite variance perceptions on the numbers of these ethnic groups, no scholar has been able to give a definite figure of these ethnic groups.

Prior to the advent of British colonial government, there was no country called Nigeria. Each of these ethnic groups identifies, organises, coordinates and administers itself based on its traditional institutions. Aptly, this made administration simple and promotes transparency, accountability, and good governance.[1]

In Nigeria, most ethnic groups have district customs, traditions, and languages. The Yoruba, Igbo and Hausa/Fulani dominated the political and the larger groups. Apart from these major ethnic groups, there are other ones such as the Ijaw, Urhobo, Igala, Edo, Nupe, Kanuri, Idoma, Ebira, Efik, Junkun, Ibibio and others. It is important to note that each ethnic

[1] Femi Omotoso, "The Nigeria Peoples, Culture and Politics", in Essays on Nigeria Peoples, Culture and Politics (Eds.) A.A. Agagu& Femi Omotoso (Abuja: Panaf Press, 2006), p.1.

group occupies a distinct territory and most of the smaller groups had very little contact with other groups before the imposition of colonial rule.[2]

PEOPLES AND CULTURES IN NIGERIA

All human societies have their different cultures. Culture is an interconnected set of attitudes, feelings, and actions which have been learned and shared by a group of people. Ayodele opined that every society, from Adam, is bound together by prescribed ways of doing things and relate with others for the continuity and development of the community.[3] It is important to state that the primary ingredient that cements every group together is culture. It is the soul, anchor, ability, and identity for stability and change and meaning in people's lives. Anyone could say that any nation that does not value culture has no value for history. Nigeria is rich in culture. Nigeria's rich and varied cultural heritage derives from a mixture of the traits of its different ethnic groups.[4]

Cultural elements include knowledge, belief, values, norms, signs, and symbols. In Nigeria, a number of cultures have developed over time, namely: Nok, Ife, Benin, and Igbo-Ukwu cultures.

HAUSA GROUP

These people found chiefly in north-western Nigeria and adjacent southern Niger. They constitute the largest ethnic group in the area, which also contains another large group, the Fulani, perhaps one-half of whom are settled among the Hausa as a ruling class, having adopted the Hausa language and culture. The language belongs to the Chadic group of the Afro-Asiatic (formerly Hamito-Semitic) family and is infused with many Arabic words as a result of Islāmic influence, which spread during the latter part of the 14th century from the

[2] Ibid p. 2
[3] Ayodele, J.B. "The Nigeria Cultural Heritage: Implications for Development", in A.A. Agagu and Femi Omotosho (eds) Essays on Nigerian Peoples, Culture and Politics (Abuja, Panaf Press: 2006), p.18.
[4] Ibid pp.18-19

kingdom of Mali, profoundly influencing Hausa belief and customs. A small minority of Hausa, known as Maguzawa, or Bunjawa, remained pagan.[5]

Hausa society was, and to a large extent continues to be, politically organized on a feudal basis. The ruler (known as emir) of one of the several Hausa states is surrounded by a number of titled office holders who hold villages as fiefs, from which their agents collect taxes. The administration is aided by an extensive bureaucracy, often utilizing records written in Arabic.

The Hausa economy has rested on the intensive cultivation of sorghum, corn (maize), millet, and many other crops grown on rotation principles and utilizing the manure of Fulani cattle. Agricultural activity has yielded considerably more than subsistence, permitting the Hausa to practice such craft specializations as thatching, leatherworking, weaving, and silver smithing. The range of craft products is large, and trading is extensive, particularly in regularly held markets in the larger towns. Hausa is also famous as long-distance traders and local vendors of Hausa-made leather goods as well as tourist items.[6]

The Hausa have settled in cities (of pre-European origins, such as Kano), towns, and hamlets; but the great majority of the population is rural. A typical farm household consists of two or more men and their families grouped in a mud- or stalk-walled enclosure of some 1,000 square feet (93 square metres) containing small round or rectangular huts with thatched roofs and a larger rectangular hut in the centre for the headman of the compound.

Social structuring is markedly hierarchical; the ranking, both of offices and social classes, is expressed in an elaborate etiquette. Individuals may be ranked as commoners, administrators, or chiefs; and varying degrees of prestige attached to different professions and levels of prosperity. Slaves were formerly numerous, some of them holding important posts in the administration. Noble lineages dominated important official positions.[7]

[5] O. Ikime Ground work on Nigerian History (Ibadan Heinemann Educational Books (Nig) Ltd 1980), p. 58
[6] N. Okwudibia, Ethnicity and development in Nigeria, (Ashgate publishing Limited 1995), p. 121.
[7] O. Ikime Ground work on Nigerian History (Ibadan Heinemann Educational Books (Nig) Ltd 1980), p. 56.

Descent is patrilineal; and close kin, especially cousins, are preferred marriage partners. Divorce, regulated by Muslim law, is frequent.

YORUBA GROUP

Yoruba is one of the three largest ethnic groups of Nigeria concentrated in the south-western part of the country.[8] Most Yoruba men are farmers, growing yams, corn (maize), and millet as staples and plantains, peanuts (groundnuts), beans, and peas as subsidiary crops; cocoa is a major cash crop. Others are traders or craftsmen. Women do little farm work but control much of the complex market system—their status depends more on their own position in the marketplace than on their husbands' status. The Yoruba have traditionally been among the most skilled and productive craftsmen of Africa.[9] They worked at such trades as blacksmithing, weaving, leather working, glassmaking, and ivory and wood carving. In the 13th and 14th centuries, Yoruba bronze casting using the lost-wax (cire-perdue) method reached a peak of technical excellence never subsequently equaled in western Africa. Yoruba women engage in cotton spinning, basketry, and dying.[10]

The Yoruba have shared a common language and culture for centuries but were probably never a single political unit. They seem to have migrated from the east to their present lands west of the lower Niger River more than a millennium ago.[11] They eventually became the most urbanized Africans of pre-colonial times. They formed numerous kingdoms of various sizes, each of which was centred on a capital city or town and ruled by a hereditary king, or *oba*.[12] Their towns became densely populated and eventually grew into the present-day cities of Oyo, Ile-Ife, Ilesha, Ibadan, Ilorin, Ijebu-Ode, Ado-Ekiti, and others. Oyo developed in the 17th century into the largest of the Yoruba kingdoms. Ile-Ife remained a town of potent religious significance as the site of the earth's creation according to Yoruba mythology. Oyo and the other kingdoms declined in the late 18th and 19th centuries owing to disputes among

[8] S. O. Johnson, *History of the Yorubas*. London: Lowe and Brydone printers, 1921 see also J. A. Atanda, An Introduction to Yoruba History. (Ibadan: University of Ibadan Press, 1980)
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[12] K. Balogun, *Government in Old Oyo Empire*, Lagos: Africans publishers and co, 1985, p.64

minor Yoruba rulers and invasions by the Fon of Dahomey (now Benin) and the Muslim Fulani. The traditional Yoruba kingships still survive, but with only a hint of their former political power.[13]

In a traditional Yoruba town the large and elaborate palace of the *oba* lies at the centre, and grouped around it are the compounds of the patrilineages. The palace and the compounds are now often modern structures.

There is much diversity in the social and political organization among the Yoruba, but they share many basic features. Inheritance and succession are based on patrilineal descent; members of the patrilineage live together under the authority of a headman, share certain names and taboos, worship their own deity, and have rights in lineage lands. The Yoruba also have several kinds of voluntary associations, including the *Egbe*, a male recreational association; the *aro*, a mutual-aid association of farmers; and the *esusu*, whose members contribute a fixed amount of money and from which they can receive loans. Political authority is vested in the *oba* and a council of chiefs; constituent towns each have their own ruler, who is subordinate to the *oba*. The *oba* is also a ritual leader and is considered sacred.[14]

Many Yoruba are now Christians or Muslims, but aspects of their traditional religion survive. The traditional Yoruba religion has an elaborate hierarchy of deities, including a supreme creator and some 400 lesser gods and spirits, most of whom are associated with their own cults and priests. The Yoruba language has an extensive literature of poetry, short stories, myths, and proverbs.[15]

IFE CULTURE

[13] Oba is a Yoruba term for King; an Oba is the monarchical head of government in ancient Yorubaland. Some Obas ruled supreme over their kingdoms and subjects with unchecked powers while some had checks and balances like the great Old Oyo Empire (OOE), some have their powers checked as a result of their tributary status to Old Oyo Empire. Their titles vary amongst clans in Yorubaland, for example, the Oba of Oyo is called 'Alaafin of Oyo' (Man of the palace at Oyo), some Obas' titles are attributes to their land, examples are Oluwo of Iwo, Osolo of Isolo and so forth. See also S. O. Johnson, *History of the Yorubas*. (London: Lowe and Brydone printers, 1921,), O. S. Osadola, Government and Political Institutions in Yorubaland up till 1886, International Journal of Humanities and Social Science Letters, 2019

[14] S. O. Johnson, *History of the Yorubas*. (London: Lowe and Brydone printers, 1921,),p. 32

[15] K. Balogun, *Government in Old Oyo Empire*, Lagos: Africans publishers and co, 1985, p.64.

Oral tradition shows that Ife is the cradle of Yoruba culture and the centre of the world in general. However, the early importance of Ife may have been that it was the centre of the iron working of its time. Archaeological discoveries depict that Ife was noted for its bronze making which was said to be one of the best in that period. The terra-cotta figure and portrait sculpture in bronze made in Ife made it be a centre of craft specialization. Most of the archaeological pieces of evidence were discovered by chance through the efforts of Leo Frobenius, a German ethnographer.

By extension, there is a link to Benin between and Ife. The Ogiso dynasty of Benin was said to have been founded by the youngest son of Oduduwa. There is also the similarity in the art of bronze making between the two. Oral traditions say that Benin bronze got its raw materials from Ife. The Benin bronze and sculpture were world famous between the 15th and 19th centuries.[16]

IGBO GROUP

Individuals living mainly in south-eastern Nigeria communicates in Igbo, a language of the Benue – Congo part of the Niger-Congo language family.[17] The Igbo might be gathered into the accompanying fundamental social divisions: northern (Onitsha), southern (Owerri), western (Ika), eastern (Cross River), and north-eastern (Abakaliki). Prior to European colonization, the Igbo were not joined as a solitary people but rather lived in self-governing nearby networks. By the mid-twentieth century, in any case, a feeling of ethnic character was firmly created, and the Igbo-ruled Eastern district of Nigeria attempted to singularly withdraw from Nigeria in 1967 as the free country of Biafra.[18] By the turn of the 21st century, the Igbo numbered around 20 million.[19]

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[16] Ulli Beier, Before Oduduwa, Odu, No 3, 1956, pp.25-32, see also O. S. Osadola, M. Ediagbonya, & S. O. Soetan, Benin-Ekiti Relation: An Onus Of Substantiation, Global Scientific Journal, Vol. 7, Issue 2, 2019, 403-414; T. Dzeka, and O. S. Osadola, Social-Cultural and Institutional Diffusion in Western Nigeria: An Assessment of Benin Influence on Ekiti, Makurdi Journal of Arts and Culture (MAJAC), Vol.13, 2015, pp. 215-225 (Makurdi)

[17] K. Ogbaa,. "Cultural Harmony I: Igboland – the World of Man and the World of Spirits". Understanding Things Fall Apart. Greenwood Publishing. 1999, p. 106.

[18] B. I. Obichere. Studies in Southern Nigerian History: A Festschrift for Joseph Christopher Okwudili Anene 1918–68. Routledge. 1982, p. 207.

[19] B. I. Obichere. Studies in Southern Nigerian History: A Festschrift for Joseph Christopher Okwudili Anene 1918–68. Routledge. 1982, p. 208

Customarily, most Igbo have been subsistence ranchers, their staples being yams, cassava, and taro. Different harvests they develop incorporate corn (maize), melons, okra, pumpkins, and beans. Among those still occupied with horticulture, men are essentially in charge of yam development, ladies for different harvests. The land is claimed collectively by family relationship gatherings and is made accessible to people for cultivating and building. Some domesticated animals, significant as a wellspring of distinction and for use in penances, is kept. The foremost fares are palm oil and palm parts. Exchanging, nearby artworks, and pay work likewise are significant in the Igbo economy, and a high education rate has helped numerous Igbo to wind up government employees and business visionaries in the decades after Nigeria picked up autonomy. It is remarkable that Igbo ladies take part in exchange and are compelling in neighbourhood governmental issues. Aside from the north-eastern gatherings, the Igbo live in rainforest nation. Most Igbo possess towns of scattered mixes, yet in certain regions towns are reduced. The compound is ordinarily a bunch of cabins, every one of which comprises a different family unit. Customarily, the town was generally involved by a patrilineage.[20]

Preceding the happening to British pilgrim organization, the biggest political unit was the town gathering, a league of towns averaging around 5,000 people. Individuals from the gathering shared a typical market and meeting place, a tutelary divinity, and familial cliques that upheld a custom of plummet from a typical precursor or gathering of predecessors. Expert in the town bunch was vested in a chamber of genealogy heads and powerful and rich men. In the eastern districts, these gatherings would in general structure bigger political units, including brought together kingdoms and states.[21]

Conventional Igbo religion incorporates confidence in a maker god, an earth goddess, and various different gods and spirits, just as a faith in precursors who ensure their living relatives. The disclosure of the desire of the gods is looked for by divination and prophets. Numerous Igbo are currently Christians.[22]

KINSHIP INSTITUTIONS

[20] A. E. Afigbo. Groundwork of Igbo history. Lagos: Vista Books. 1992, pp. 522–541.
[21] R. Fardon, Richard; Furniss, Graham. African languages, development and the state. Routledge. 1994, p. 66.
[22] M. P. Mathews,. (2002). Nigeria: Current Issues and Historical Background. Nova Publishers. 2002, p. 38.

Importantly, the kinship institution differentiates one town from another among the western groups and those in the north and elsewhere. This is characteristically different in the eastern part of Nigeria where decentralization was the pre-colonial trend. Patriarchal primogeniture was also common in the west and north while monarchical ascendancy in the Igbo subsection was by achievement. The cultural model of dressing was sectionally similar while gradually showing some level of distinction as the cultural line moves away into another far receding group. In religion, the pre-colonial trend was the worship of ancestors and other gods, with the arrival of the white man Christianity was introduced, but Islamic religion dominated the northern subsection of the country, having been introduced in the early part of the 15th century.[23] Western Education gradually permeated the country through the European missionaries and traders. Colonialism was not able to impact ethnic unity and since independence, there is ethnic disunity and unacceptance. This has continued to affect the polity of the state.

INTER-GROUP / ETHNIC RELATIONS BEFORE CONTACT WITH EUROPEANS

Contrary to the widely held notion that the peoples of Nigeria had nothing in common prior to the country of Europeans, there are plethora of evidences that depict that from time immemorial, the forefathers of the people who today inhabit Nigeria inter-related in many spheres of life, especially through trade, migrations, marriage, religion, and war. These contacts brought the various groups into close contact and understanding with one another.[24]

Trade: This was the most pronounced and one which brought the various groups and communities into closer cooperation. Inter-tribal and inter-regional trade transverse the length and breadth of the Nigerian territory. Prof. Afigbo as cited by Emmanuel Ojo opined four distinct trade routes that linked the Igbo with their immediate neighbours; these include the Igala, Idoma, Ogoja, Effik, Ibibio, Ijaw and Edo. The northward route moved to Igala and Idoma and was serviced by the Akwans Nri while the *Aro* and the Nsukka people played

[23] A. E Afigbo. Groundwork of Igbo history. Lagos: Vista Books. 1992, pp. 522–541.
[24] Emmanuel, O.O. Selected Themes in Nigerian History (Ibadan, King Julius Educational publishers: 2006), p.51

a part. The Igbo carried to these places metal implements like hoes, made by the Akwa, Medicines and ritual ceremonies, glass beads, caps and other apparels (cloths).[25]

However, in those days, trade depended on the geographical area of production. The Niger wards routes moved to Edo from where the Igbo got agricultural produced, slaves and salt which they imported from the Ijaw (a riverine area). There were also eastward routes which moved to Cross River. The Igbo moved slaves to this place, agricultural produce, dried meat and from there, they bought European goods. The fourth route was the southward route which moved to the coast where salt and fish were exchanged for agricultural produce and manpower from Igboland.[26]

The trade contact between north and Yoruba-land during this period as explained by Prof. Atanda depicts that the north supplied horses which the Oyo built their cavalry in exchange for Oyo Kola. Items between these communities or groups show that trade between the south and north has an ancient origin. Both Yoruba and Benin traditions recorded extensive contacts between the two groups through the lagoon from Lagos to the Niger Delta and through overland route from Ekiti area, Eastern Yoruba land traded extensively with Nupe in the North and Benin in the South.

Migrations and Peopling: Most traditions of origin create the impression of a mixture of crops along the migration routes, leading eventually to heterogeneous settlements. The Ijaw people, for instance, claimed that as they were migrating, the mixed up with the Igbo group and inter-married with them. The off-springs of such marriages had Igbo and Ijaw blood.

Similarly, Ibibio claim that while migrating, they settled at Ibom at Arochukwu (probably about 800 BC.) where they established the shrine known as the Long Juju.[27] From this location, they spread to the Ibibio mainland while others remained before they were expelled by the Aro, through warriors. The claims from Tiv stated that they came down to their present country from the hilly district of the south-east where they lived together in one large community before they were attacked by enemies. While going down from the hills to the plains, they came in contact with Fulani and formed a close friendship. Tradition shows

[25] Emmanuel, O.O. Selected Themes in Nigerian History (Ibadan, King Julius Educational publishers: 2006), p.51

[26] O. N. Njoku,. Pre-colonial economic history of Nigeria. Ethiope Publishing Corporation, Benin City, Nigeria. 2002

[27] Emmanuel, O.O. Selected Themes in Nigerian History (Ibadan, King Julius Educational publishers: 2006), p.53

that they also came into contact with Hausa groups, Jukun and Chamba and borrowed some of their cultures. They learned to weave from Hausa, Tiv people learned blacksmithing from the Chambas and obtained political institutions from the Jukun group.

Also, Igala is another prominent group in Nigeria. By its strategic position in Central Nigeria, the Igala came into contact with many Nigerian groups including the Igbo, Edo, Yoruba, Nupe, Idoma, Tiv and Jukun. The area became a meeting point for many Nigerian groups. From these migration processes, it is clear that pre-colonial Nigerian peoples had extensive contacts with one another.[28]

War: In African traditional societies, the war was a continuation of relations order than diplomatic means. In the case of Nigeria, every Nigerian group fought wars with one or more groups. These wars did not only caused dislocation or destruction as a continuation of relations order than diplomatic means. The war intensified contacts in many ways: The language of the people with whom a community was fighting, a war had to be learned to aid fighting. This knowledge did not die at the end of the war but survived and became a means of greater understanding and such peoples or groups. Also, the mode of dressing of the enemy had to be copied as camouflage culture. And, those engaged in the war had to travel outside their own homes to the neighbouring territories in search of allies, medicine men and weapons. Alliance formed during this period had been known to last even after the war. The successful wars integrated many districts. Examples of political entities which were brought together by wars were big empires: Benin, Oyo, Nupe, Jukun and the Kauri which made up of diverse peoples.[29]

Religion: In the religious sphere, there were many contacts, some of which had political overtures. From the 13th century, Islam became a religion which spread across communities and which brought such communities into obedience to whoever was appointed the Amir-al-Mummin (Commander of the faithful).

Religion just as the various Nigerian peoples inter-related in several areas of life, they built for themselves strong economies through which their material, physical and financial needs were met.

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[28] J. O. Aremu, and F. M. Adu,. "The Study of Nigerian History" in C.T. Oluwadare, I.A. Ajayi and L.B. Ajayi, Nigerian Peoples and Culture (eds). (Ibadan: Niyi Comm. and Printing Ventures, 2017), p.05.

[29] O. S. Osadola, "Warfare and Diplomacy the Pre-colonial Ekiti land," *International Journal of Humanities and Social Science Letters*, 2019. See also, Emmanuel, O.O. Selected Themes in Nigerian History (Ibadan, King Julius Educational publishers: 2006), p.51

THE BIRTH OF NIGERIA AS A GEOGRAPHICAL ENTITY

Nigeria lies roughly between latitudes 4^0 N and 14^0 North of the equator. It is surrounded by French-speaking West African States except in the South, where it is bordered by the Atlantic Ocean.[30]

The elongated territory of Benin lies to the West, the semi-arid country of the Niger Republic to the North and sub-equatorial Cameroon to the East. Nigeria has a total area of 923,700 square kilometers. Nigeria is blessed with many natural resources such as gold, bitumen, limestone, tin columbine, kaolin, silver, coal, lead, zinc, gypsum, clay, shale, marble, graphite, iron ore, stone, silicon, natural gas and crude oil amongst others. Interestingly, the country is blessed with a geographic advantage of two large Rivers (rivers Niger and Benue), rich in fish and aquatic life and terminating into the Atlantic Ocean to form a spread of the largest delta fan in Africa. The Nigerian Niger Delta is the second largest wetland is made up of mangrove swamps and low lying alluvial plants; it is one of the richest in water resources worldwide. Other notable rivers include Anambra, Imo, Benin, Ogun, etc.

Aremu and Adu noted that by 1960, Nigerian population was estimated to be about 52 million, in 1963, it grew to 55.7 million, while in 1991, it was projected to be about 88 million by the National Population Commission of Nigeria. It was reviewed in 1997 and put at 88.9 million. By the year 2000, further projections estimated 165 million and 180 million for 2015. As presort, the annual population growth rate estimate has been put at 3.3 percent.[31] Nigeria is no doubt the most populous African country with the largest concentration of black people in the world.

It is apt to say that Nigeria was no always one country as it is today. In the heat of modern politics in Nigeria, the leaders of the various ethnic groups which constitute present-day Nigeria naturally take the existence of these groups for granted. It is almost as if these peoples of Nigeria have always been identified as Igbo, Hausa, Yoruba, Efik, etc. Yet we know that these peoples did not begin to identify themselves in these terms until the emergence of the colonial state of Nigeria. Indeed, it would be right to note that it was

[30] I. A. Eluwa, et al. History of Nigeria (South West Province: Africa-First Publishers, 1988) P. 208.
[31] J. O. Aremu, and F. M. Adu,. "The Study of Nigerian History" in C.T. Oluwadare, I.A. Ajayi and L.B. Ajayi, Nigerian Peoples and Culture (eds). (Ibadan: Niyi Comm. and Printing Ventures, 2017), p.05.

European visitors, traders, and writers, who first began to refer to whole conglomerates terms of the language they speak.[32]

When aliens referred to the Igbo, they meant those who speak the language, not a single politically coherent group. Nigerian ethnic groups are thus eventually linguistic and cultural groups that have been increasingly forced by circumstances of history to act politically in defiance of their interests' vis-à-vis the interests of another competing group in what we now know as Nigeria. Until the emergence of the colonial state of Nigeria, then, what we had were myriads of groups, some of which spoke different forms of the same language and possessed certain common cultural traits.[33]

Nigeria was formerly made up of various states, empires, and kingdoms. The largest and most influential of these was the Fulani Empire, popularly referred to as the Sokoto caliphate which extended over most of Northern Nigeria in the nineteenth century. In the more forested South, where the Fulani cavalry could not easily penetrate, were the Oyo and Benin Empires. East of the Niger lived the Igbo and Ibibio communities who had their own unique system of political organizations.

As a result of British annexation of the territory, the country, Nigeria came into being in 1914 when the then Northern and Southern protectorates were amalgamated by Lord Frederick Lugard. Nigeria attained political independence on 1 October 1960 as a federation made up of three regions. In 1963, she became a Republic. Despite this, however, the struggle to nationhood, after political sovereignty continues, wars are being fought against imperialism, neo-colonialism, illiteracy, tribalism, nepotism, selfishness and greediness. There however good indication that the emergence of a national identity is in sight.[34]

POLITICAL FRICTIONS IN NIGERIA AND THE SEARCH FOR A STABLE SOCIO-POLITICAL ORDER

By 1960, most the African states had become politically independent. Our dear country, Nigeria, is one of them having gained independence on October 1, 1960, from the British Colonial authority. In most of these African countries, hardly had the flags of the erstwhile colonial rulers been lowered than political instability ensued. The rapidity with

[32] T. Falola, et al History of Nigeria 3: Nigeria in the nineteenth Century (Enugu: Longman; 1991) p. 20
[33] T. Falola, et al. History of Nigeria 3: Nigeria in the nineteenth Century (Enugu: Longman; 1991) p. 21
[34] Evolution of Nigeria, 1849-1960. http://www.onlinenigeria.com/history. Retrieved 1/9/18

which political instability engulfed these states has been and still is, a major source of concern to historians and political observers.

Now, what are the roots causes of political frictions in Nigeria?

What are the conditions necessary for political frictions in the country?

A number of factors may be held responsible for the problem of political instability in Nigeria.[35]

Heterogeneous ethnic composition and the resultant problem of ethnicity: One of the most politically sensitive areas of social life in Africa is ethnicity and inter-ethnic relations. Nigeria is made up of numerous ethnic groups numbering to over 250 groups.

Three of these are however dominant – the Yoruba, the Ibo, and the Hausa-Fulani. Some of these groups had, for centuries, experienced various degrees of intermingling, strong ethnic loyalties survived. This had led to the problem of ethnicity which is expressed in the scramble for various posts and promotions in the civil service, competition for job opportunities and Federal appointments in parastatals' boards. Ethnic affiliations rather than merit have been the major criteria used in these situations to the effect that in Nigeria today, you get what you want not on the basis of what you know but whom you know.[36]

So, people tend to see themselves first as Yoruba, Ibo or Hausa and later as Nigerians. All these factors had led to feelings of suspicion, hatred as distrust among members of the various ethnic groups in Nigeria and have retarded political integration.

i. **Education Imbalance:** It is one of the major factors militating against political stability in Nigeria. There are disparities in educational development between the Northern and Southern Nigeria. This inequality has been at the centre of the North-South dichotomy in Nigerian politics till date. It has created a superiority-inferiority complex between the two parts of the country. The consequences of this have been distrust, suspicion and despite. These feelings can best be understood in words of Imam Abubakar as cited by Aremu:

> We (Northerners) despise each other, we call each other ignorant; the South is proud of western knowledge and culture; we are proud of Eastern (culture) … to tell you the truth, the

[35] J. U. Nwachukwu,. Ethnic Politics and Haegemony: An Appraisal of Colonial And Post Colonial Nigeria. Intellectual Archive, Canada, 2019

[36] S. Folarin, "Ethnicity and power politics: From June 12 to Boko Haram", National Mirror, August 15, 2012, p.18

> common people of the North put more confidence on the white man than their black southern brothers…[37]

The above comment therefore socially disorientated and alienated the peoples of Nigeria and is seriously affecting political stability.

ii. **Religious Impatience:** The problem of religious impatience is another obstacle to political stability in Nigeria i.e. unwillingness to recognize and respect differences in opinions or belief of other groups. Nigeria is a secular – state – a multi-religious state, relatively divided geographically with the Northern part being predominantly Muslim and Southern having a near parity of Christian and Muslim population.[38] If the religious intolerance between Muslim and Christian in Nigeria continues this way, there will be no peace and unity in the country.

It is apt to say that fundamental differences in religion, especially between Muslims and Christians, has accounted for the problem of religious intolerance.

The enlistment of Nigeria into O.I.C. in the year 1986 also generated into religious crisis and disturbances in the country. It resulted into suspicion between adherents of these religions.

The facts, therefore, remain that such a tense and unpeaceful atmosphere, with a threat to lives and properties, can never make for unity and stability in a polity.[39]

iii.**Inequalities in size and population of political institutions at independence:** Another important issue that led to the problem of political instability in Nigeria was the nature of the administrative and political institutions that were transferred to Nigeria at independence. Regions in Nigeria were: Northern, Eastern and Western Regions. The appealing point to note about these regions was their unequal sizes.

The Northern region above was larger than the eastern and western regions combined. The 1953-1954 census figures indicated that the North accounted for 70 percent of the territory of the country and 55 percent of its population. One of the consequences of this is that the North has always sought to dominate others, and even seen the political leadership as its "birth-

[37] Aremu, J.O. Introduction to Nigerian History, (unpublished, 2001) p. 13 see also, J. U. Nwachukwu,. Ethnic Politics and Haegemony: An Appraisal of Colonial And Post Colonial Nigeria. Intellectual Archive, Canada, 2019

[38] Aremu, J.O. Introduction to Nigerian History, (unpublished, 2001) p. 13

[39] S. Folarin, "Ethnicity and power politics: From June 12 to Boko Haram", National Mirror, August 15, 2012, p.18

right". This is generating some tensions in the aggrieved regions to unseat the dominant region and may even be said to account for the "inevitability of instability" in Nigerian politics.[40]

iv. The Minority Problem: The problem of minorities in Nigeria has also been a great source of instability. The minorities in each of the regions/states are usually in doubt of their role in a society where an entrenched majority could perpetuate its power and make any democratic change of government impossible. The minority group also feared that they would be discriminated against in employment and in the distribution of other amenities.

Since 1951, minority grievances have been so strong that agitation for states creation followed. Strained relations between the minority and the majority groups have continued to be a source of instability in Nigerian politics and the distribution of resources. The creation of more states in Nigeria over the years has not solved the problem. The last time that more states were created was under the late Head of State General Sani Abacha on 1st October 1996. Namely: Ekiti, Ebonyi, Bayelsa, Nasarawa, Zamfara, and Gombe.[41]

v. **Poverty:** This is another major problem of political instability in Nigeria. The average per-capita income of Nigerians ranks among the lowest in the world. The standard of living of Nigerians is very low. Such a poor citizenry cannot support a lasting democracy and stability. Hence, it has promoted corruption among public office holders and thuggery among the Nigerian youths. This has been militating against stability.

vi. **Economy:** At Independence in 1960, Nigeria opened up with an agro-based economy. Cash crop was the mainstay of the economy. Cocoa was majorly produced in the western Yoruba, while palm oil was dominated by the Igbo in the eastern subsection. The Groundnut pyramids were the historical pride of Northern Nigeria. Foreign exchange from these items held sway to other international currencies without much ado. This gradually changed with the discovery of Petroleum in Oloibiri in Bayelsa State. Petrodollar became the architect of economic troubles as the nation lost the forefront position in agricultural production with the advent of oil wealth.

Anyanwu recorded that, prior to July 1986, Nigeria operated a mixed economy in which government owned and ran most public enterprises, in addition to mining iron and

[40] S. Folarin, "Ethnicity and power politics: From June 12 to Boko Haram", National Mirror, August 15, 2012, p.20

[41] Aremu, J.O. Introduction to Nigerian History, (unpublished, 2001) p. 15

steel. As a consequence to the borrowing of the loan from the World Bank, the IMF-World Bank instituted Structural Adjustment Programme in July 1986, introduced privatization of public enterprises and those not privatized were commercialized.[42]

The conditions necessary for socio-political stability in Nigeria are the promotion of a high sense of discipline; formulation of a national ideology; improvement in the standard of living through economic development and quality of leadership (patriotic leaders).

Conclusion

An inter-ethnic relation is a burning issue in the political and social spheres in Nigeria. Ethnic mixtures-more pronounced in big cities-which were already present in the commercial stage of Nigeria's economic development, are becoming much more evident now since Nigeria is undergoing a series of industrialization. Industry usually attracts immigrants, and industrial firms are a focus of inter-ethnic contacts within the towns and cities.

It is important to state that we Nigerians like to be referred to as Ekitis, Efiks, Fulanis, Binins, Gwaris, Hausas, Ibibios, Ibos, Igalas, Idomas, Igbiras, Ijaws, Itsekiris, Kalabaris, Kanuris, Nupes, Ijeshas, Ogonis, Tiv, Western Ibos, and Yorubas.[43]

[42] Anyanwu, J.C. The Structure of the Nigerian Economy: 1960-1997, Joanne Educational Publishers Ltd. Onitsha, Nigeria, (1997)

[43] Sanda, A.O. "The Ethnic Factor in Urban Social Relations" in Sanda, A.O. (eds) Ethnic Relations in Nigeria. Pp. 175-191.

DOI 10.32370/IA_2019_09_14

Analysis of Scientific and Information Needs of Medical Specialists in the Information and Documentary Support of the Medical Industry

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Abstract

The article analyzes the specificity and diversity of information needs of medical professionals and professional orientation to the communicative needs of the target scientific groups. The author raises questions about the difficulties of using innovative medical technologies in clinical practice of national healthcare, which need to be overcome by an appropriate system of their information support. The author identifies the main features of professional scientific needs, which are important for the organization of information and documentation support of the activities of organizations and individual medical professionals. Presented the factors that shape the information needs and search behavior of the user. The analysis uses the classification of scientific and information needs of the medical user, which was developed by a national scientist A. R. Uvarenko. New scientific areas are offered to study information needs and expand the range of services.

Keywords: scientific and information needs, sources of medical information, documentation, users of information.

Актуальність дослідження. У контексті нашого дослідження ми зупинимося на розгляді формування та задоволення науково-інформаційних потреб медичних фахівців та інших користувачів. Науково-інформаційна діяльність завжди підпорядкована єдиній меті − задоволенню інформаційної потреби науковців та інших користувачів [2; 4; 5; 6; 14; 15; 16], саме тому знання цієї інформаційної категорії, певно, визначає успіх наукової комунікації в реалізації будь-якої форми обслуговування певного користувача. Іншими словами, ефективне використання науково-інформаційних ресурсів неможливе без належних знань науково-інформаційної потреби.

Виклад основного матеріалу. Саме поняття «інформаційна потреба» визначається як потреба особистості (групи людей) в інформації. Насправді під час вирішення управлінських і науково-технічних завдань фахівці відчувають необхідність здобути нові знання, а інформація постає лише як проміжна форма його ланки.

Інформаційні потреби будуть задоволені тільки в тому разі, коли через інформаційне повідомлення (документні або усні) знання автора (авторів) перетворяться на знання користувачів.

Отже, формування інформаційної потреби користувача залежить від багатьох чинників, різноманітних за своєю природою. Для органів науково-технічної інформації, призначення яких саме в інформаційному забезпеченні наукової діяльності, поглиблення в комунікаційну типізацію виглядає зайвим теоретизуванням. Але для наукової інформатики таке теоретизування не тільки не зайве, але просто необхідне, інакше теорія інформаційних потреб зводиться до узагальнення емпіричного досвіду, і не більш того.

Ще в 70–80-ті рр. Е. С. Бернштейном була запропонована ідея «парадигми, що радить» інформаційного сервісу, яка по суті спрямована на перехід від задоволення потреб, характерного для «обслуговуючої парадигми», до орієнтації на абсолютні комунікаційні потреби цільових наукових груп. За даною парадигмою інформаційні служби вирішують завдання не просто знайти в інформаційно-бібліотечних фондах «готове рішення», а оцінити можливість його отримання при сучасному рівні суспільного знання і вказати фахівцям шлях (що і як потрібно робити) для отримання бажаного результату.

Саме тому треба враховувати специфічність інформаційної потреби медичного фахівця, які різноманітні і не обмежуються необхідністю отримання конкретних медичних відомостей, але потрібні і рекомендації, діагностичні та лікувальні методи, нові ліки, та ін.

Більшість медичних фахівців за даними [7, с. 3−6], вважають проблему отримання інформації найскладнішою частиною своєї роботи: вони не в змозі опрацювати існуючий обсяг наукової інформації, не встигають стежити за новою літературою, не мають навиків працювати з нею, адекватно оцінювати її, не знають останніх досягнень медицини і біології. Майже третину свого часу американський лікар проводить за збором інформації.

Потреба в інформації виникає у медичного фахівця при кожній взаємодії з хворим, причому об'єктивно оцінюваний рівень потреб вищий, ніж той, що визначають самі користувачі. Багато питань, що виникають у медичного фахівця, стосуються

методів лікування і призначення лікарських засобів. Часто – це складні, різноаспектні питання [13, с. 46].

Медичні користувачі можуть користуватися різноманітними джерелами медичної інформації, формальними і неформальними, первинними (журнальні статті) і вторинними (довідниками, оглядами, клінічними рекомендаціями, реферативними виданнями). Згідно з даними опитувань, для медичних фахівців особливу роль мають неформальні джерела особистого спілкування з колегами. Цікаво, що виявлена розбіжність між суб'єктивними уявленнями медичного фахівця про джерела інформації, що використовуються ними під час прийому хворих, і об'єктивною ситуацією. Більшість з них вважає, що найчастіше вони використовують друкарські видання на папері (на першому місці — довідники, зокрема фармацевтичні, потім журнали), тоді як насправді більше ніж у половині випадків джерела інформації були неформальними — консультації колег (у першу чергу лікарів вузької спеціалізації, потім — фармацевтів).

Користувачів медичної інформації можна поділити на декілька категорій: 1) вчені-дослідники (зацікавлені переважно в біомедичній інформації); 2) клініцисти і практичні лікарі (зацікавлені перш за все в клінічній інформації); 3) менеджери (організатори) охорони здоров'я (зацікавлені в законодавчій, управлінській, комерційній та іншій інформації); 4) студенти медичних закладів (зацікавлені в науково-методичній інформації, оглядовій з клінічної медицини). Головна відмінність в інформаційній поведінці учених і клініцистів полягає в тому, що вчені вважають за краще працювати з джерелом інформації: особисто читати наукові документи, розмовляти з колегами, тоді як клініцисти хочуть одержувати потрібні їм відомості через посередника, який знайде ці відомості в літературі і надасть їх у зручній формі в потрібний час. Інформаційні потреби вчених зазвичай мають проблемно-тематичний, тобто загальніший, характер, а інформаційні потреби клініцистів набагато конкретніші.

Потреби користувачів клінічної інформації зумовлені, в першу чергу, специфікою і якісними характеристиками необхідної їм інформації.

Складне становище медиків посилюються ускладненим доступом до світових джерел інформації. Залишаються деякі перешкоди, як от: 1) відсутність у бібліотеках

засобів на забезпечення доступу до наукових видань за комерційною моделлю їх придбання; 2) недостатній розвиток телекомунікаційної інфраструктури; 3) незнання лікарями англійської мови.

Крім того, висока завантаженість клінічною роботою не залишає часу і сил на регулярне вивчення первинних джерел. Ситуація така, що пошук інформації і вивчення спеціальної літератури не обмежується основною професійною діяльністю медика.

Утім, в усьому світі лікарі розуміють, що знання останніх досягнень медицини, критичний аналіз і уміння порівняти отримане з літератури з конкретною клінічною ситуацією – необхідні передумови ухвалення правильних клінічних рішень.

Класифікацію науково-інформаційної потреби медичного користувача здійснив А. Р. Уваренко, який виходив з прикладного сенсу їх формування [3, с. 168; 10, с. 96]. *Перша потреба* обмежена динамікою, високою стабільністю за тематикою та низькою вибірковістю. *Друга* потреба характеризується підвищеною вибірковістю та високою стабільністю. *Третя* − високою динамікою, мінімальною стабільністю та високою вибірковістю.

Зрозуміло, що задоволення науково-інформаційної потреби користувачів, які умовно належать до першої групи, не потребує значних затрат сил, ресурсів, часу тощо, як задоволення інформаційних потреб користувачів третьої групи.

Мабуть, з цієї причини науково-інформаційне забезпечення лікаря-практика і складна проблема, котра вирішується у вітчизняній охороні здоров'я поки що незадовільно. Тобто використання медичних інноваційних технологій у клінічній практиці вітчизняної охорони здоров'я має значні труднощі, подолання яких потребує відповідної системи їх інформаційного забезпечення. Через що, основною ознакою професійних наукових потреб, яка має значення для організації інформаційного забезпечення діяльності організації і окремих фахівців, є тематика та наочна сфера, правильне визначення яких має значний вплив на ефективність задоволення інформаційної потреби.

З однієї і тієї ж тематики різним користувачам можуть виявитися необхідними абсолютно різні відомості. Тому іншою важливою ознакою інформаційних потреб є характер необхідної інформації.

З цієї точки зору розрізняють відомості, що відображають результати:

- теоретичних і експериментальних досліджень;
- проектних і дослідно-конструкторських розробок;
- випробування і контролю якості;
- упровадження нового устаткування або технології;
- експлуатації, модернізації і ремонту устаткування;
- маркетингових досліджень ринку і діяльності фірм-конкурентів тощо.

Також *для медичної галузі з урахуванням видової специфіки* одержуваних відомостей можна додати: 1) клінічні випробування; 2) рандомізовані контрольовані дослідження; 3) клінічні випадки; 4) контрольовані клінічні дослідження; 5) багатоцентрові дослідження та ін.

Для організації документаційного забезпечення важливими є час виникнення і період дії потреб. За часом виникнення розрізняють стабільні, тобто вже відомі, виявлені раніше потреби, і нові, ті, що тільки виникли. За періодом дії — разові, що зникають після їх задоволення, і потреби тривалої дії, які потребують систематичного надання необхідної інформації.

Перш за все, важливо визначити, для здійснення якої діяльності потрібна інформація і наскільки новою ця наочна сфера є для користувача. Інакше кажучи, встановлюється збіг тематики інформаційних потреб з базовою освітою користувачів, досвідом роботи в цьому напрямі. З цих позицій розрізняють профільні потреби; потреби в інформації по суміжних галузях або проблемах; потреби в інформації з тих галузей знання або суспільної практики, які індивідові раніше не траплялися.

Профільність інформаційних потреб визначають критерії відбору документів і ступінь докладності інформації, що надається користувачам. При задоволенні потреб за основним профілем діяльності можуть пропонуватися джерела підвищеної складності.

Таким чином, для раціональної організації документаційного забезпечення необхідний систематичний і багатоаспектний аналіз інформаційних потреб, коректованих даними зворотного зв'язку — оцінкою користувачами якості послуг, що надаються.

Щодо методології вивчення інформаційних потреб, то традиційно потреби своїх читачів почали вивчати бібліотеки, використовуючи при цьому статистичні показники: кількість читачів; кількість відвідувань; обсяг книговидачі та ін. Аналізувалися і соціально-демографічні характеристики читачів: стать, вік, соціальний стан, освіта, сфера діяльності та ін., що дозволяло реалізувати «принцип диференційованого підходу» до користувачів бібліотеки. Суть цього принципу в тому, що вплив книги зростає, якщо вона адресується не читачеві взагалі, а певній людині, максимально відповідає його читацькій підготовці, потребам й інтересам [9, с. 44].

Крім опитування, провідним дослідницьким методом вивчення потреб читачів вважається метод аналізу читацьких формулярів, який дозволяє виявити тематику запитів і типово-видову картину читання. У 70-х рр. XX ст. вивчення читачів сприймалося як загальнодержавна проблема, яка вирішувалася
проведенням глобальних соціологічних досліджень.

Водночас у сфері науково-інформаційної діяльності активно розвивався новий науковий напрям, спрямований на вивчення інформаційних потреб. Практикам обслуговування збагатила методами виявлення і характеристики інформаційних потреб, а також уточнення невизначених інформаційних запитів [11, с. 4]. Встановлено відомості, необхідні і достатні для опису інформаційних потреб: тематика, характер інформації, збіг тематики потреб з базовою освітою і профілем попередньої діяльності фахівця; час виникнення потреб і їх стабільність, що визначає підготовленість фахівця до сприйняття нової інформації; місце абонента в системі організаційної комунікації (експерт, інформаційний лідер та ін.) [8, с. 392].

До середини 60-х рр. основна увага в розробці проблеми приділялася спрямованості потреб на конкретні види джерел отримання інформації (первинні і вторинні, опубліковані і неопубліковані та ін.) і допомоги, що надається вченим і фахівцям інформаційними підрозділами і бібліотеками. Найяскравіше виявилося послідовне поєднання аналізу потреб в інформації з вивченням стану їх задоволення.

З поглибленням уявлень про потреби принципово змінювалася процедура вибору режиму і форми обслуговування. Спочатку обслуговування починалося з моменту надходження запиту і (або) закінчувалося на стадії його задоволення, або продовжувалося, тобто переходило в поточний режим.

Вивчення механізму виникнення інформаційної потреби у зв'язку з змістом і етапами наукової діяльності фахівців, а також специфікою вирішуваних ними завдань сприяло формуванню нових уявлень. Виникло і почало використовуватися службами інформації наукових та учбових закладів випереджаюче обслуговування, що припускає інформаційний супровід планів НДР. Пізніше, з розвитком методів аналітико-синтетичної переробки інформації, набуло поширення інформаційне забезпечення науковців, розроблені його концептуальні
основи у системі охорони здоров'я, зокрема медичної науки.

З поглибленим вивченням інформаційних потреб і розширенням асортименту послуг прийшло нове розуміння ефективності обслуговування. Спочатку основним інструментом вивчення задоволеності користувачів був аналіз відмов на літературу, яку вони запитували. Пізніше виникла проблема тематичної відповідності інформаційних потреб, інформаційних запитів і результатів інформаційного обслуговування. Карти зворотного зв'язку стали обов'язковим елементом окремих видів послуг, наприклад, вибіркового розповсюдження інформації.

Цей екскурс в історію вивчення користувачів дозволяє простежити тенденцію поглиблення інтересу до потреб окремої особистості. Об'єктом вивчення спочатку були великі соціальні групи (робітники, жителі сіла), потім вивчалися інформаційні потреби окремих професійних груп (медиків, учителів, учених), − інформаційна поведінка кожної конкретної особистості.

Кількість чинників, що формують нині інформаційні потреби і пошукову поведінку користувачів, значна, причому багато з них раніше взагалі не бралися до уваги бібліотечними фахівцями. Наприклад, чинник консервативності користувачів інформації, який виявляється в тому, що, опанувавши будь-яку систему або програму, користувачі інформації з великим небажанням застосовують вперше нові прийоми пошуку чи подання матеріалу [12, с. 58]. Тому впровадження електронних і телекомунікаційних зв'язків у систему наукових комунікацій не зумовлює істотні зміни в пошуковій поведінці користувачів. У будь-якому разі поведінкові характеристики залишаються досить стійкими: користувачі наукової інформації продовжують сприймати бібліотеку як соціокультурний, а не інформаційний центр.

Процес переробки інформації дослідником характеризується не тільки визначеністю (знайти готові рішення, оцінити рівень виконаних досліджень та ін.), але й пошуком, формуванням, створенням власного рішення [1, с. 304].

Можна також припустити, що на вибір каналів надання інформації і документів впливають особливості сприйняття друкованих текстів і текстів, на електронних носіях. Спостереження бібліотечних фахівців свідчать: коли читання наукової літератури є невід'ємною частиною творчої діяльності, перехід від навиків сприйняття друкарських текстів до електронних здійснюється складніше, ніж при читанні «ділової літератури» (довідкових й інформаційних видань, підручників, практичного керівництва). Очевидно, наукові документи мають інше смислове, емоційне, психологічне і тимчасове навантаження, ніж тексти документів для ділового читання.

Виявлення інформаційних потреб фахівців установ є обов'язковою функцією служби інформації незалежно від її штатних можливостей. Тільки знання тематики професійних потреб і характеру відомостей, необхідних користувачам, дозволяє ефективно здійснювати всі інші напрями інформаційної роботи.

Висновки. Підсумовуючи викладене вище, можна стверджувати, що вивчення потреб користувачів спрямовується на виявлення і аналіз їх професійних відмінностей. Для інформаційних служб це означає, що вивчатися повинні не тільки інформаційні потреби та інформаційна поведінка, але й вимоги користувачів (споживацькі переваги) як до інформаційної продукції, так і до комфортності в цілому.

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Translation of the Title, Abstract and References to the Author's Language

УДК 651:010'5

Тимошенко Інесса. Аналіз науково-інформаційних потреб медичних фахівців при інформаційно-документальному забезпеченні медичної галузі.

У статті аналізуються специфічність та різноманітність інформаційних потреб медичних фахівців і професійної орієнтації на комунікативні потреби цільових наукових груп. Автором піднімаються питання про труднощі використання медичних інноваційних технологій у клінічній практиці вітчизняної охорони здоров'я, подолання яких потребує відповідної системи їх інформаційного забезпечення. Визначено основні ознаки професійних наукових потреб, які мають значення для організації інформаційно-документаційного забезпечення діяльності організацій і окремих медичних фахівців, визначені чинники, що формують інформаційні потреби і пошукову поведінку користувача. Для аналізу використовується класифікація науково-інформаційних потреб медичного користувача, яка була розроблена вітчизняним вченим А. Р. Уваренком. Пропонуються нові наукові напрями, спрямовані на вивчення інформаційних потреб і розширення асортименту послуг.

Ключові слова: науково-інформаційні потреби, джерела медичної інформації, документаційне забезпечення, користувачі інформації.

Тимошенко Инесса. Анализ научно-информационных потребностей медицинских специалистов при информационно-документальном обеспечении медицинской отрасли.

В статье анализируются специфика и разнообразие информационных потребностей медицинских специалистов и профессиональной ориентации на коммуникативные потребности целевых научных групп. Автором поднимаются вопросы о трудностях использования медицинских инновационных технологий в клинической практике отечественного здравоохранения, преодоление которых требует соответствующей системы их информационного обеспечения. Определены основные признаки профессиональных научных потребностей, которые имеют значение для организации информационно-документационного обеспечения деятельности организаций и отдельных медицинских специалистов, описаны факторы, формирующие информационные потребности и поисковое поведение пользователя. Для анализа используется классификация научно-информационных потребностей медицинского пользователя, разработанная отечественным ученым А. Р. Уваренко. Представлены новые научные направления, направленные на изучение

информационных потребностей и расширения ассортимента услуг.

Ключевые слова: научно-информационные потребности, источники медицинской информации, документационное обеспечение, пользователи информации.

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DOI 10.32370/IA_2019_09_15

Transformation of Aerodynamic Capture Principle to Dynamic Activation of Fuel Mixture principle, Program and Associated Method of Preliminary Tests

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Abstract

In the device for testing of air-fuel mixture activation method it is suggested to use the real structural system of aerodynamic jet grip which is connected to a compressor and inserted to the pipeline of a specific configuration that is filled with gasoline. While inside a pipeline with gasoline, the aerodynamic jet grip foams it and the foam goes up the pipe from where it can be collected for analyzes and experiments. In this device it is possible to adjust the most important parameters such as compressed air pressure and cross-sectional area of the pipeline, where the second fuel component is stored, which give specific properties for activated fuel mixture. Furthermore, adjustment of some other dimensional parameters and proportions of aerodynamic jet grip details can result in different levels of fuel mixture activation.

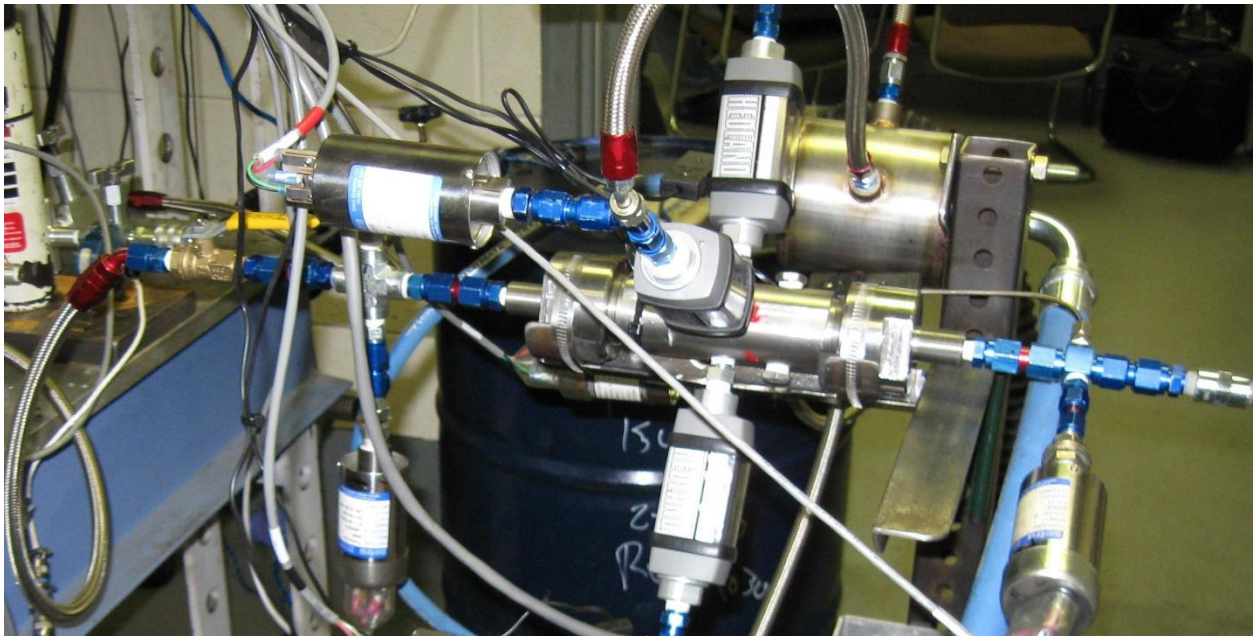

Figure 1. Part of testing rig with apparatus for dynamic activation of fuel mixture

1. Brief Description of imitation method principle.

Imitation of aerodynamic fuel mixture activation method is a process of controlled supply of compressed air into the enclosed volume of fuel mixture that is located in the pipeline of testing device. The device structure has a particular structure of pipelines which is connected with atmosphere in the vertical parts of the pipeline.

2. Main tests of mixing proportions of fuel mixture components.

Aerodynamic principle for mixing different components of fuel mixture can be used in the device. In order to do so, the control tap should be opened by eighth, fourth, half and three fourth from the fully opened state while maintaining the compressed air pressure. In each state of the tap the activated foamed mixture is collected for analysis, kept for the required reactivation time and then volume and weight proportions of the fuel mixture components are measured.

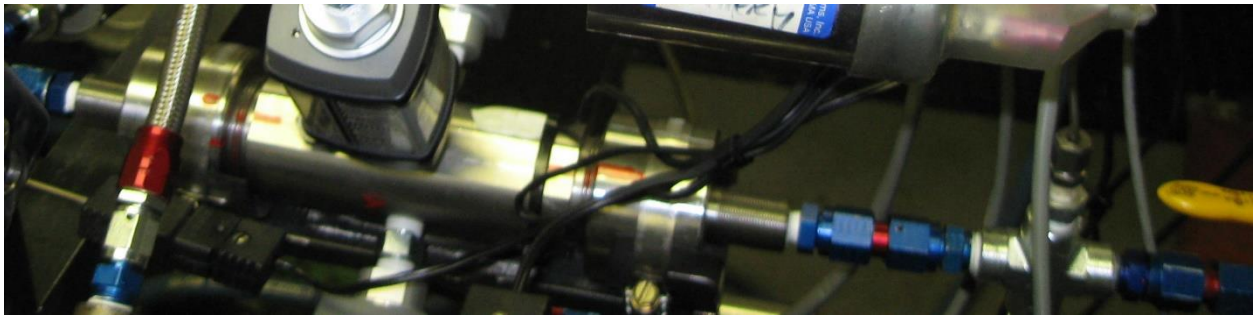

Figure 2. Construction for fuel mixture dynamic activation

3. Main tests of volume proportions of fuel mixture components as a function of compressed air pressure.

For this test, given a particular position of the control tap, a compressed air pressure is changed in the following range: 4 bar, 5 bar, 6 bar, 7 bar and 8 bar. For each of aforementioned pressures a sample of activated fuel mixture is taken, kept for the required reactivation time and after that volume and weight proportions of the fuel mixture components are measured.

4. Main tests of stability preservation time of the fuel mixture in foamed state as a function of compressed air pressure.

For these series of tests the same device preparation is needed as described in item 3 and an activated fuel mixture sample is collected and the time which is required for its complete reactivation is measured.

5. Main tests of stability preservation time of the fuel mixture in foamed state as a function of components proportion.

For these series of tests the proportion of fuel mixture components is changed using the control tap and controlling the compressed air pressure. For each case a sample of activated fuel mixture is taken and the time which is required for its complete reactivation is measured.

6. Main tests of stability preservation time of the fuel mixture in foamed state as a function of components temperature.

For these series of tests the device is filled with the components having the temperature in the following range (in Celsius): 20 degrees, 30 degrees, 40 degrees and 50 degrees. For each of the aforementioned temperatures a sample of activated fuel mixture is taken and the time which is required for its complete reactivation is measured.

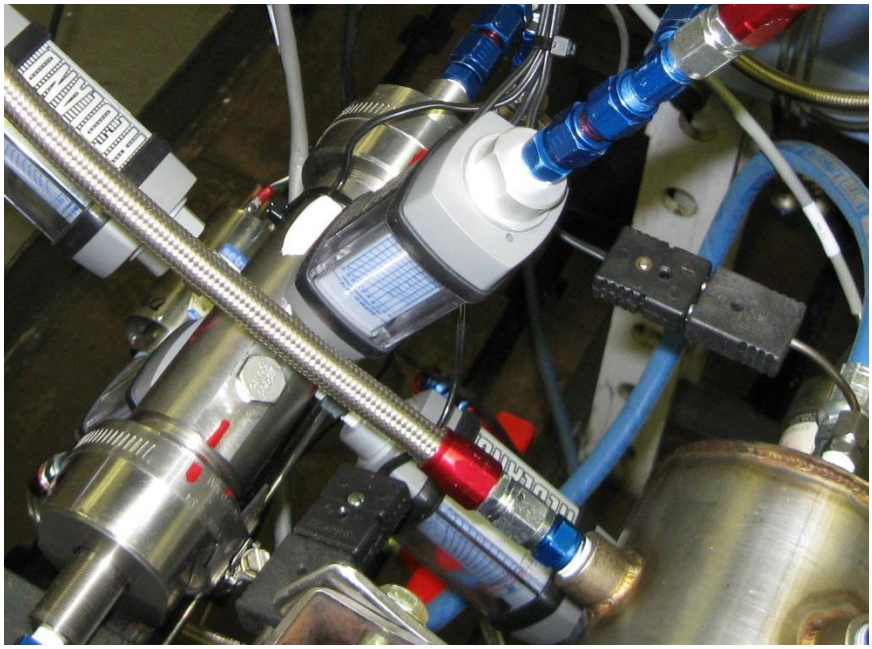

Figure 3. Construction of device for dynamic fuel mixture activation with compressed gas consumption sensors.

7. Main tests of heating effect of fuel mixture for different values of the compressed air pressure.

For this test the same device preparation and setup is needed as described in item 3. Then a sample of fuel mixture is collected and burned in laboratory reactor and heating effect parameters and time transients are determined in accordance with laboratory instruments specification.

8. Main tests of heating effect of fuel mixture for different concentrations of its organic components.

   For this test different organic components of fuel mixture such as gasoline, etanol and diesel fuel are mixed, then the resulted mixture is activated and the heating effect of the fuel mixture is determined in accordance with procedure described in item 7.

9. Main tests of heating effect of fuel mixture for different mixture proportion of its organic and anorganic components.

For this test the device for changing proportions in fuel mixture components is prepared. For each proportion a sample of activated fuel mixture is collected and burned in the laboratory reactor and heating effect parameters are determined in accordance with instructions specified

in the laboratory instruments specification. For mixing the main component (gasoline, etanol or diesel fuel) with an auxiliary component which is water. The water in each experiment should have different properties such as tap water, purified water, water without ions, condensed water vapor from any air conditioning system, water containing brass ions of concentration 10 milligrams/liter, water containing brass ions of concentration 20 milligrams/liter, water obtained from desalination of sea water and water mixed with alcohol in different proportions.

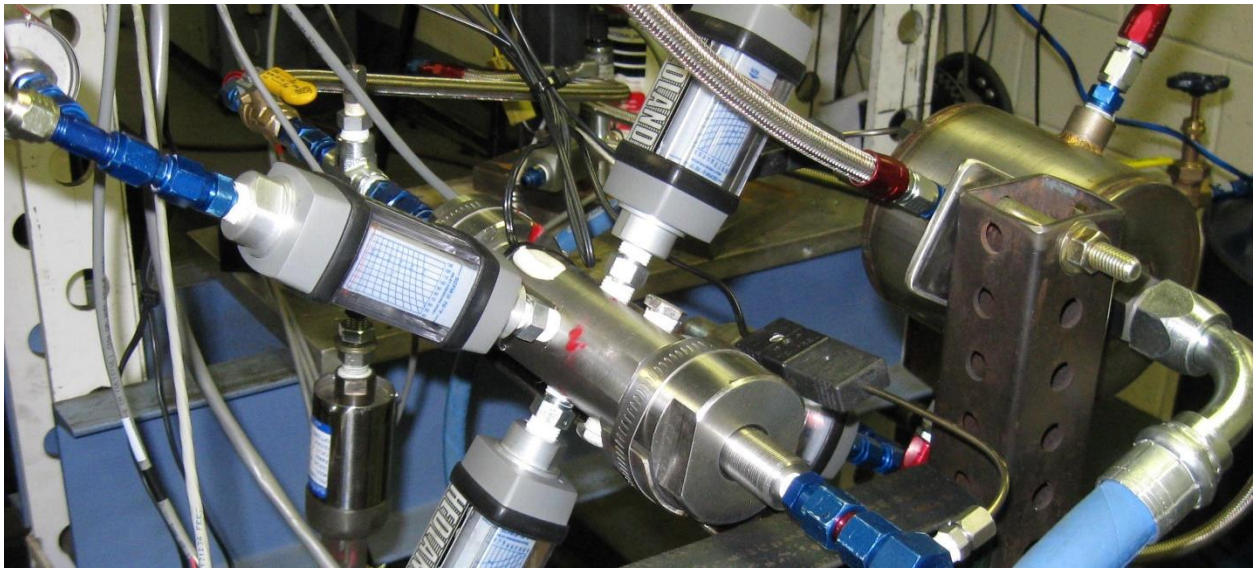

Figure 4. Device for dynamic manipulation on fuel mixture via homogeneous dynamic mixing of fuel mixture stream with compressed air.

10. Main parameters tests for items 3-9 for different constructions of aerodynamic activator case.

In construction of the aerodynamic activator case variable parameters may take place resulting in different output parameters and traits of all aerodynamic activator. These parameters are:

- Diameter of holes in the case;
- Number of holes in the case;
- Diameter of the case head, where the membrane is mounted;

Diameter of holes in the case may vary in the following range: 1 mm, 2.5 mm and 2 mm;

Number of holes in the case may vary in the following range: 6 holes, 8 holes and 12 holes.

Diameter of the case head, where the membrane is mounted may vary in the following range: 15 mm, 20 mm and 25 mm.

11. Main tests of fuel mixture parameters for items 3-9 for different constructions of aerodynamic activator membrane.

In aerodynamic activator membrane construction functional abilities can be changed via the following variable parameters:

- Membrane thickness;
- Distance from membrane to aerodynamic activator case;
- Membrane diameter;
- Active area of the membrane;

All of aforementioned parameters effect to different extent the efficiency of membrane operation and the whole aerodynamic activator. Adjustment of these parameters results in different levels of foaming efficiency and different values of fuel mixture parameters from items 3-9.

Parameters values:

- Membrane thickness: 0,25 mm; 0,35 mm; 0,5 mm; 0,75 mm;
- Distance from membrane to aerodynamic activator case: 0,05 mm; 0,1 mm; 0,15 mm; 0,2 mm;
- Membrane diameter: 15 mm; 20 mm; 25 mm;
- Active area of the membrane: 30%; 40%; 50%;

12. Test of NOx gas concentration that is remained after burning of a fuel mixture sample for different constructions of a testing device and different parameters and results of a fuel mixture activation process.

For each of the cases the concentration of specified gas that is remained after burning of an activated fuel mixture sample is determined using the laboratory equipment.

13. Test of NOx gas concentration that is remained after burning of a fuel mixture sample for different mixing proportions of organic and anorganic components of fuel mixture.

Mixing proportions:

- Gasoline: 95%; water: 5% ;
- Gasoline: 90%; water: 10%;

- Gasoline: 80%; water: 20%;

For every provided mixing proportion the activated fuel mixture sample is collected and the specified gas concentration after burning of activated fuel mixture is measured using laboratory sensors for gas concentration analysis.

14. Test of NOx gas concentration that is remained after burning of a fuel mixture sample for different mixing proportions of organic components of fuel mixture.

This test should be performed using the analogous procedure to item 13.

Main distinctive characteristics of a complex device for fuel mixtures activation:

1. The device has a complex combined effect on the fuel mixture and its components.

2. The device has several consecutive functions of fuel mixture type and properties transformations. Furthermore, all steps of the specified transformations are held inside a device in a state of constant motion of the base material and additional fuel mixture components.

3. While manipulating the fuel mixture components, the device can operate simultaneously with liquid and gas mediums, i.e. at any time of working cycle there is a simultaneous and synchronous manipulation on both liquid and gas fuel mixture components. Furthermore, each of the components by itself manipulates and effects the characteristics of other components and resulting characteristics of a fuel mixture when it is injected into the combustion chamber.

4. Effect of mixture components as parts of activated fuel mixture on its properties and characteristics, conditions of operation and its efficiency are preserved even after injection into the combustion chamber.

5. Addition of both liquid and gas components to the stream of fuel mixture is done via tangential channels with creation of a swirling effect.

6. A device for complex activation has 10 consecutive interrelated steps of shape and cross-section transformation that only in combination achieve the specified goals and attempts of examining them separately without fully functional connection with others is erroneous.

7. The purpose of the device is not an increase of turbulence level, but complex effect, which includes several crucial technological methods such as transformation of input stream shape and characteristics, forming a zone with high level of local turbulence and addition to this zone of additional liquid fuel components via swirling effect, following by formation in this zone of a second spot of rarefication via addition of a compressed air stream with preliminary formed turbulence level and swirling effect, which completes the formation of activated fuel mixture and provides its dispersive separation after injection into combustion chamber.

8. By the physics laws and principles it is known that inside a pipeline the motion of a liquid that contacts the pipeline wall has a developed turbulence structure.

9. In the device the purpose of stream cross-section shape transformation is to transform the stream shape from circular to annular which leads to the x2.5 increase of a contact perimeter and to the consequent increase of a stream turbulent properties.

10. As compressed gas is added to the device in a state of a developed turbulent stream via swirling principle, the rate of accumulated turbulence and kinetic energy in fuel mixture grows exponentially.

11. As the stream of compressed gas is added into the hermetic volume under the initial pressure of 20 atmospheres and at the device input it creates a local annular zone which has main properties of a locally rarefication in accordance with Bernoulli principle and eponymous theorem, the air bubbles are detached from the stream and they are covered by a coat of liquid fuel mixture components. Furthermore, the pressure grows inside a

bubble because a liquid is incompressible and during the time of a pause between injections, the air is still added which leads to increase of number of bubbles and the pressure inside them also increases. As a result, there is an unstable turbulent state in the mixture, which after the injection into the combustion chamber leads to destruction of bubble walls and increase in dispersity level of fuel mixture before ignition.

LIST OF LITERATURE, PATENTED AND LICENSED MATERIALS

APPENDIX 1

United States Patent Application	**20190161188**
Kind Code	**A1**
Zapata; Frankie	**May 30, 2019**

Device for Propelling a Passenger

Abstract

The invention relates to a device for propelling a passenger, comprising a body arranged to receive said passenger and cooperating with a ***fuel***-fed thrust unit. The arrangement of such a device enables great freedom of movement in the ***air***. More specifically, the thrust unit comprises at least one thrust sub-unit, each advantageously comprising at least two thrusters and secondary course-correction and/attitude-correction thrusters.

APPENDIX 2

United States Patent Application	**20190153965**
Kind Code	**A1**
ASAI; Go	**May 23, 2019**

CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE AND CONTROL METHOD FOR INTERNAL COMBUSTION ENGINE

Abstract

An internal combustion engine in which when an ECU receives an engine stop command by an ON-operation of an engine stop switch, a supply of ***fuel*** from an injector to a ***fuel*** reformation chamber is stopped while a supply of ***fuel*** from an injector to a combustion chamber is continued, and the residual amount of a reformed ***fuel*** in passages is estimated, in this state. When the estimated residual amount reaches a predetermined amount or zero, the ***fuel*** supply from the injector to the combustion chamber is stopped, and an internal combustion engine is stopped.

APPENDIX 3

United States Patent Application	**20190145342**
Kind Code	**A1**
JACOBSSON; Susanna ; et al.	**May 16, 2019**

METHOD AND SYSTEM FOR CONTROLLING THE AMOUNT OF FUEL IN CONNECTION TO OPERATING AN INTERNAL COMBUSTION ENGINE

Abstract

The present invention relates to a system, method, and computer program product for controlling the amount of ***fuel*** in connection to operating an internal combustion engine based upon engine boost pressure and engine operational conditions using a map function. The engine operational conditions comprise engine speed and ambient ***air*** pressure. The method comprises: for low and/or negative engine boost pressures using a map function specifying torque values so as to determine an available torque based upon an exhaust gas smoke limit taking driveability into account; and determining a maximum allowable ***fuel*** amount based upon said determined available torque considering losses and combustion efficiency.

APPENDIX 4

United States Patent Application	**20190107040**
Kind Code	**A1**
Tsumura; Yuichiro	**April 11, 2019**

CONTROL DEVICE FOR COMPRESSION SELF-IGNITION ENGINE

Abstract

A compression self-ignition engine performs a SI combustion in which an ***air-fuel*** mixture is combusted due to flame propagation triggered by spark ignition, and a CI combustion in which the ***air-fuel*** mixture is combusted due to self-ignition induced by the flame propagation. An ECU comprises a first control means for controlling a SI ratio serving as an index relating to a ratio of a heat amount generated in the SI combustion with respect to a total heat amount generated in the SI and CI combustions or a heat amount generated in the CI combustion; and a second control means for controlling an in-cylinder temperature before the SI combustion. The ECU is configured to change a combustion state of each of the SI and CI combustions by both the first and second control means according to the operating state of the engine.

APPENDIX 5

United States Patent Application	**20190055485**
Kind Code	**A1**
Kasai; Jun ; et al.	**February 21, 2019**

PULVERIZED-FUEL SUPPLY UNIT AND METHOD, AND INTEGRATED GASIFICATION COMBINED CYCLE

Abstract

A pulverized-***fuel*** supply unit includes a hopper, first nozzles, second nozzles, a pressurizing-gas supply device, a fluidization-gas supply device, and a pulverized-***fuel*** supply line. The hopper has a hollow to store therein pulverized ***fuel***. The first nozzles are provided to the hopper. The second nozzles are provided to a vertically lower part of the hopper below the plurality of first nozzles. The pressurizing-gas supply device is configured to supply pressurizing gas to increase internal pressure of the hopper. The fluidization-gas supply device is configured to supply fluidization gas to fluidize the pulverized ***fuel*** in the hopper. The pulverized-***fuel*** supply line is provided to a vertically lower part of the hopper. The pressurizing-gas supply device supplies pressurizing gas to the first nozzles and the second nozzles. The fluidization-gas supply device supplies fluidization gas to the second nozzles.

APPENDIX 6

United States Patent Application	**20190078517**
Kind Code	**A1**
HEBERT; Jeremie ; et al.	**March 14, 2019**

METHOD AND SYSTEM FOR DIRECTING FUEL FLOW TO AN ENGINE

Abstract

Systems and methods for directing ***fuel*** flow to an engine when the engine is in an electronic manual override mode are described herein. In accordance with an aspect, a commanded ***fuel*** flow to the engine is determined from a ***fuel*** schedule based on the position on an engine control lever; a limit is applied on the commanded ***fuel*** flow when the commanded ***fuel*** flow exceeds a maximum ***fuel*** flow threshold; and ***fuel*** flow is directed to the engine based on the commanded ***fuel*** flow.

APPENDIX 7

United States Patent Application	**20180306125**
Kind Code	**A1**
RENOLD-SMITH; William ; et al.	**October 25, 2018**

FUEL CONTROL SYSTEM

Abstract

A ***fuel*** control system is provided for a gas turbine engine having a core engine comprising at least one core engine spool in which a compressor and a turbine are interconnected by a shaft. The system includes a first engine sensor which determines a power output of the engine. The system further includes a control unit which is configured to compare the determined power output with a value of a power threshold, and to command a reduction in ***fuel*** supplied to the engine when the determined power output exceeds the power threshold value. The system further includes a second engine sensor which measures the rate of change of rotational speed of the core engine spool. The control unit is further configured to adjust the power threshold value as a function of the measured rate of change of speed of the core engine spool.

APPENDIX 8

United States Patent Application	**20190003406**
Kind Code	**A1**
Kjemtrup; Niels ; et al.	**January 3, 2019**

LARGE TWO-STROKE COMPRESSION-IGNITED INTERNAL COMBUSTION ENGINE WITH FUEL INJECTION SYSTEM FOR LOW FLASHPOINT FUEL AND A FUEL VALVE THEREFORE

Abstract

A large two-stroke turbocharged compression-ignited internal combustion crosshead engine with a plurality of cylinders has at least one pressure booster for each cylinder for boosting ***fuel*** pressure, two or more electronically controlled ***fuel*** valves for each cylinder with an inlet of the two or more electronically controlled ***fuel*** valves being connected to an outlet of the at least one pressure booster. An electronic control unit is connected to the at least one pressure booster and the two or more electronically controlled ***fuel*** valves. The electronic control unit is configured to determine a start time for a ***fuel*** injection event, activate the at least one pressure booster ahead of the determined start time and pen the two or more electronically controlled ***fuel*** valves at the determined start time.

DOI 10.32370/IA_2019_09_16

Features and Capabilities of the Digital Art Community

Olga Perova

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Abstract

The online community of digital artists includes several tens of millions of people - registered members and active users of the largest online galleries of digital art and social networks for artists. The opportunity to publish their work on the Internet is often for emerging artists the only way to get the attention of the audience and gain their fans. An amateur artist is able to bring his work to a professional level, to turn it into a main source of income — by selling the rights to his work, producing products based on it, or by financially supporting active users of the community.

Unfortunately, publicity is fraught with certain risks. For example, sharply negative and offensive comments and harassment in social networks. Unfriendly reception in the community can be a cause for the artist to forever engage with creativity. Criticism of a work of art is not always objective and justified; Often it is a catalyst for scandals, with accusations of racism, sexism and so on.

With all the advantages and disadvantages, it should be noted that the online art community is a force capable of influencing the modern entertainment industry.

Keywords: online community, digital painting, gallery, visual arts

The key factors that influenced the formation of the existing online community of digital artists and art fans were the spread of the worldwide Internet and the availability of personal computers with professional software (graphic editors).

In 1991, the World Wide Web became publicly available on the Internet; in 2019, the number of Internet users is 4.388 billion [1]. In parallel with the growth of the network, graphic editors such as Adobe Photoshop were developed and improved. Its first version appeared in 1987; To date, version 20 is available to users.

The number of registered users of the largest online communities for artists amounts to tens of millions of people. For example: DevaintArt - 44 million people; Pixiv - more than 20 million people; Behance - more than 10 million people. The number of active users of social Internet service and photo hosting Pinterest, which allows you to add images online, is approaching 300 million people per month. Finally, Instagram is an application for sharing photos and videos with elements of a social network, for 2018 there were 1.1 billion registered users, which is about 15% of the population of the Earth. Most of the Instagram

content is made up of photos and videos, however, many professional digital artists and digital creativity lovers also have Instagram accounts and regularly publish their work there.

Online communities allow creative people to publish their work, regardless of the professional level of the artist. This is what distinguishes them from traditional art galleries, where it is quite difficult for a beginner to demonstrate his work. The possibility of publishing in an online gallery can have both positive and negative effects.

In the first case, the artist collects positive comments and gets his first audience. The presence of a positive audience response has a tremendous motivational effect. In addition to the incentive to further work, the artist can more accurately determine the tastes and needs of the audience, in order to then commercially orient his work. For greater efficiency, it makes sense to engage in a kind of self-promotion, that is, to share your work in all available social networks and creative communities.

In the second case (negative effect), the artist runs the risk of facing a negative in relation to his art. Unfortunately, “toxicity” on the Internet has become a real problem; bullying and harassment in the comments lead to the saddest consequences. A few derogatory harsh words are able to forever discourage the desire to continue to engage in creativity.

Developing the topic of publishing artwork in online galleries, you need to mention this kind of creativity as "fan art". Fan art is a derivative work based on any original work. As a rule, the artist draws a character from a video game, film, cartoon, and so on. There are no detailed studies and reports on the percentage of fan-art in the work of digital artists, but just look at the DeviantArt Gallery’s “Popular 24 Hours” collection to find out that the share of fan-art among the works is at least 50% of the total numbers [2].

Formed a scheme in which the artist is obliged to closely monitor current trends in popular culture and draw all the emerging characters as quickly as possible, until they passed their popularity. The resulting fan-art is published in online galleries; the community, which the new character has not yet bored, favorably accepts fan-art; the artist gets a new audience; character gets extra advertising and gaining popularity.

Most often, the described scheme applies to video games. For example, when the company "Nintendo" adds a new character - a pokemon (a "pokemon" - a pocket monster, a magical creature) to one of its "Pokemon" games, then literally in a few hours the first

pictures with this character begin to appear on the network. As long as this character is interesting to fans of Pokemon games - fan art with its participation will be popular.

Fig.1. On the left is the original pokemon; right - fan art by Cássio Yoshiyaki

In other words, the artist must always be alert and quickly draw all the newest. Of course, this statement is true only for fan-art and does not concern those who draw original works.

But both fan art and original artwork published in online communities are not the end point. They, in turn, give impetus to the production of goods (figures, souvenirs, printed materials) or are embodied in the costumes of cosplayers ("cosplay" is a popular hobby, which consists in dressing up computer games, cinema, etc. characters) in costumes.

It is obvious that the audience of online communities does not consist only of fans and amateur artists. Representatives of the entertainment industry and manufacturers of goods are in search of good and sought-after ideas, new talents. The most popular illustrations can bring to their creator a one-time or multiple income by selling copyrights or deducting interest from the sale of goods created on the basis of this illustration.

Returning to the issue of criticism in the community, it should be noted that in exceptional cases the community opinion becomes an influential force. A good example is shown by the story of a film based on the Sonic the Hedgehog video game series, the rights to create and distribute which in 2013 were acquired by Sony Pictures Entertainment [3].

In 2018, the trailer for the film came out, but most of Sonic's fans were unhappy with his image: face and proportions were the most criticized. The illustrator LadyGT has published a revised version of Sonic on social networks.

Fig.2. On the left is Sonic the hedgehog proposed by the filmmakers; on the right - an option from the artist LadyGT

Then similar offers from other digital artists and designers began to appear. Probably, the criticism would not have been heard, if the artists had not supported their opinion with images of the "correct" Sonic. As a result, the film studio decided to remake the character design according to the wishes of the fans.

But criticism is not always constructive. Multi-million community can not be unanimous on all issues. Periodically, the work of artists provoke scandals on objectification, racism and others. So, in 2018, digital artist working under the nickname Evulchibi, published a fan-art on the superhero "Black Panther". However, the artist portrayed the hero as white, while the original character is a black African.

This work provoked a wave of angry comments; for several days, the author was accused of racism, colonization, hypocrisy and the infringement of the rights of black people. The discussion ended when it turned out that the artist himself was black [4].

From all this, it follows that the online art community is heterogeneous. But its undoubted advantage in the opening opportunities:

- to help novice artists to gain recognition and popularity;
- directly or indirectly influence the entertainment industry and its products;

- to be a place of communication for connoisseurs of modern art in general, and digital painting in particular.

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DOI 10.32370/IA_2019_09_17

Technological and Compositional Features of the Interaction of Light Coatings with the Built Environment

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Abstract

Today, in the design of the built environment the number of examples of using light materials and coatings is increasing. There are several types of materials that have completely different technological principles of action as the basis of their luminous properties but produce the same visual effect. Accordingly, this circumstance requires the differentiation of light coatings, depending on their technological features, followed by their combination into a single group in the analysis of the compositional features of the interaction of such coatings with the built environment. In the process of research it was found that technological features of the interaction of light coatings with the built environment consist in detecting their luminous properties when using radiation of different ranges of the optical spectrum – ultraviolet or visible. In this case, in both instances of interaction with the built environment, the following features of the visual composition are observed: increased contrast and color saturation; silhouette of composition elements; visual smoothing of gradual tone transitions; lack of influence of air perspective on color perception; visual perception of perspective due to physically moving objects further or with the help of the dimensional proportions of composition elements.

Keywords: light coatings, technological features, compositional features, built environment.

Постановка проблеми. На сьогодні, у дизайні середовища збільшується кількість прикладів застосування світних матеріалів і покриттів. Під час споглядданні у темряві поверхня об’єкта з таким покриттям при певних умовах виглядає такою, що світиться. Проте, існує декілька типів матеріалів, які мають в основі своїх світних властивостей абсолютно різні технологічні принципи дії при однаковому візуальному ефекті. Відповідно, ця обставина вимагає розрізнення світних покриттів залежно від їх технологічних особливостей, з подальшим поєднанням в єдину групу у процесі аналізу композиційних особливостей взаємодії таких покриттів із середовищем.

Аналіз останніх досліджень і публікацій. Загалом, до технологічних характеристик світних матеріалів найчастіше зверталися у публікаціях світлотехнічного спрямування [10; 4; 6], а художнім аспектам застосування матеріалів з такими властивостями найбільше уваги приділялося у виданнях, присвячених

сценічному освітленню [1; 9]. Так, Мандельберг Е. М., керуючи лабораторією люмінесцентно-декоративного живопису, вбачав основні її завдання у створенні спеціальної живописної техніки та методу люмінесцентно-живописної трансформації, заснованих на поєднанні багатокольорових люмінофорів з наповнювачами із звичайних фарб [9, с. 69–72]. Однак, процес і візуальний результат взаємодії світних покриттів із сучасним внутрішнім і зовнішнім середовищем у попередніх публікаціях не розглядався, що **актуалізує** необхідність такого дослідження.

Формулювання цілей статті. Метою даної роботи є визначення технологічних і композиційних особливостей взаємодії світних покриттів із середовищем, на основі аналізу прикладів їх застосування на поверхнях, що належать до різних масштабних рівнів (архітектура, об'єкти, люди) внутрішнього і зовнішнього середовища.

Виклад основного матеріалу. У дизайні середовища найпоширенішими світними матеріалами є різні типи фарб, що світяться. В основі світності, притаманної таким фарбам, лежить явище люмінесценції. Традиційно, під люмінесценцією розуміють «випромінювання світла тілами (надлишкове над тепловим), яке збуджується різними факторами і має тривалість, більшу за період світлових хвиль», а речовини, які дають люмінесцентне світіння, прийнято називати люмінофорами [2, с. 177]. Згідно класифікації за типом збудження в основі світних фарб лежить явище фотолюмінесценції і до їх складу, відповідно, входять фотолюмінофори (речовини, які збуджуються ультрафіолетовим чи видимим випромінюванням [4, с. 48–52]).

Згідно класифікації за часовими характеристиками (тривалістю світіння) розрізняють такі види люмінесценції як флуоресценція (швидко затухаюча люмінесценція) і фосфоресценція (тривала люмінесценція) [6, с. 11]. У першому випадку, для виявлення світних властивостей матеріалу впродовж тривалого періоду, є необхідним його постійне опромінення. Найчастіше флуоресцентні світні покриття (фарби) застосовуються разом з джерелами ультрафіолетового випромінювання в середовищах, призначення яких передбачає або повну відсутність, або наявність мінімального освітлення, наприклад, в інтер'єрах нічних клубів чи у сценічному просторі Black Light театрів (Black Light Theatre Image [3]). Для виявлення світних властивостей покриттів (фарб) з фосфоресценцією необхідне їх попереднє тривале опромінення природними або штучними джерелами випромінювання видимого

діапазону. Тому, такий тип покриттів найчастіше застосовується для декору або світлових вказівників у житлових і громадських інтер'єрах, опромінюючись протягом дня звичайним світлом і продукуючи люмінесцентне світіння в темний період доби, без супроводу будь-якого додаткового опромінювання.

На відміну від перших художніх експериментів з люмінесцентним живописом середини XX століття [9], сучасні художники не намагаються передати засобами світних фарб точне відображення навколишньої реальності, а навпаки, використовуючи їх величезний потенціал щодо візуальних ілюзій, створюють відчуття іншої реальності. Приклади сучасного візуального мистецтва із застосуванням флуоресцентних матеріалів та фарб, як площинного, так і об'ємно-просторового характеру, демонструвалися на спеціалізованій виставці, що проходила у Львові в рамках фестивалю Lviv Lumines Festival 2011 [8].

Зовсім інший принцип (світлозавертальне відбивання – retroreflection [7, с. 56]) лежить в основі світності матеріалів, що повертають світло, хоча вони так само справляють враження таких, що світяться. Зеленков І. А. пояснює це так: «Матеріали, що повертають світло, складаються з оптичних елементів у вигляді мікроскопічних скляних кульок, розподілених рівним щільним шаром у полімерній плівці. Матеріал може мати різні конструктивні рішення, за яких забезпечується щільна упаковка кульок. З боку тильної поверхні цього матеріалу має бути дзеркальне покриття. Робоча поверхня матеріалу захищається прозорою вологостійкою плівкою. Якщо на поверхню матеріалу, що повертає світло, подають пучок світла, то він з невеликим розсіюванням відбивається назад у напрямку падаючого світлового потоку» [10, с. 74].

Завдяки вищезазначеним властивостям такі матеріали найчастіше застосовуються в зовнішньому середовищі міста на дорогах і поблизу доріг, де фари дорожнього-транспортних засобів можуть виконувати функцію джерел світла для забезпечення світлозавертального відбивання. Матеріали, що повертають світло, широко застосовуються для світлосигнальних дорожніх знаків та світло-маркувальних елементів на одязі велосипедистів, мотоциклістів, дорожніх робітників. Яскравим прикладом застосування таких матеріалів на рівні архітектури є проект Gates of Light [5], розробниками якого є Studio Roosegaarde. В основі цього інноваційного проекту освітлення дамби у Нідерландах лежить розміщення на стінах шлюзів тонких смужок з

матеріалу, що повертає світло. Таке світлове рішення візуально підкреслює конструктивні межі споруд при русі автомобілів по дамбі в обох напрямках. Основною перевагою застосування світлозавертального відбивання на дорогах і в межах середовища міста є те, що цей спосіб використання світла не вимагає додаткової енергії і не сприяє світловому забрудненню, забезпечуючи присутність світла лише у потрібний час за рахунок освітлення поверхонь архітектурних об'єктів фарами проїжджаючих автомобілів.

Загалом, властивість світлозавертального відбивання зберігається і за суттєвих змін напрямку надходження випромінювання [7, с. 56]. У результаті, цей вид світного покриття, як і світне покриття на основі люмінофорів, дає майже рівну яскравість усіх елементів композиції. У першому випадку, колір випромінювання (повернутого світла) залежить від кольору падаючого світла, у другому випадку – від характеру і складу люмінофора. У обох випадках ефекти повітряної перспективи нівелюються при сприйнятті тону і кольору за рахунок явища світіння, проте, посилюється чіткість сприйняття перспективних скорочень під час фактичного віддалення об'єктів, або імітації віддалення за рахунок моделювання розмірних співвідношень між різними елементами композиції. Відповідно, кольори випромінювання зберігають високу насиченість, а абриси елементів композиції – підвищену контрастність, сприймаючись як силуети.

Висновки. Отже, у процесі дослідження встановлено, що технологічні особливості взаємодії світних покриттів із середовищем полягають у виявленні їх світних властивостей при застосуванні випромінювання різних діапазонів оптичного спектру – ультрафіолетового або видимого. У обох випадках взаємодії із середовищем спостерігаються наступні особливості візуальної композиції:

- підвищена контрастність і насиченість кольору;
- силуетність композиційних елементів;
- візуальне нівелювання плавних тонових переходів;
- відсутність впливу повітряної перспективи на сприйняття кольору;
- візуальне сприйняття перспективи за рахунок фізичного віддалення об'єктів або за рахунок розмірних співвідношень композиційних елементів.

У подальших публікаціях подібного спрямування доцільно дослідити технологічні і композиційні особливості взаємодії снопів світла із середовищем.

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DOI 10.32370/IA_2019_09_18

UDK 78.07.1(470)+784.3

Performing Traditions of Tatiana's Party in P. Tchaikovsky's Opera "Eugene Onegin" (History of Stage Interpretations)

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Abstract

The world-famous masterpieces include Tatiana Larina's opera party is the central character of Peter Tchaikovsky's work. With a large amount of scientific literature on the characterization of the opera "Eugene Onegin" performance problems and analysis of stage versions, vocal interpretations of outstanding singers remains beyond the attention of researchers. But understanding these aspects is able to provide an intellectual foundation for the vocalist's performance. The purpose of the article is to highlight the performing traditions of Tatiana's party in P. Tchaikovsky's opera "Eugene Onegin" and to reveal the historical contribution of their sponsors in the Slavic and world opera space. For disclosure it is necessary to solve the problem: to systematize historical information about the productions of the National Opera of Ukraine of the second half of the twentieth century; to characterize the leading performing concepts of the Bolshoi Theater of Russia at the beginning of the 21st century; to outline features of the image of Tatiana in the production of Metropolitan Opera 2007; to ascertain the traditions and innovations in the reading of the main vocal role of Tchaikovsky's opera. As a result, I state that the lyric-psychological genre of opera places on the main place the true reproduction of the characters, feelings and destiny of the heroes. This explains the exceptional importance of performing all the composer's remarks in the perspective of P. Tchaikovsky's style of music. Consideration of vocal and stage interpretation allows us to conclude on an important component for the vocalist-performer - the presence of acting talent. Tatiana's party requires not only a significant vocal and technical base, but also certain knowledge in the field of acting, which in turn provides a great opportunity for various readings to the main character of the opera P. Tchaikovsky.

Keywords: opera, vocal interpretation, stage version, psychology, genre, style.

Постановка проблеми. У класі академічного співу вищого мистецького навчального закладу класичному вокальному репертуару відводиться значне місце. При цьому найбільшою складністю вирізняються пошуки стратегії власної виконавської інтерпретації найбільш популярних, відомих шедеврів. До їх числа належить оперна партія Тетяни Ларіної – центрального персонажу твору Петра Чайковського. При великій кількості наукової літератури щодо опери «Євгеній Онєгін» виконавська проблематика та аналіз сценічних версій, вокальних інтерпретацій видатних співаків залишається поза увагою дослідників. Але осмислення зазначених аспектів у змозі надати інтелектуальне підґрунтя виконавській діяльності вокаліста.

Аналіз останніх досліджень і публікацій. Шедевр оперної творчості П. Чайковського привертає увагу багатьох дослідників, але "вокально-виконавська

історія" партії Тетяни досі не стала об’єктом спеціального дослідження. Окремі сторінки, що торкаються зазначеної проблеми, містить класична монографія середини минулого століття російських авторів В. Протопопова, Н. Туманіної [2]. Внеску українських співачок у виконавську традицію вистав "Євгеній Онєгін" Київської та Львівської Національних опер України присвячені стаття Н. Регеши [3] та окремі розділи досліджень Ю. Станішевського [4]. Електронні ресурси театрів світу містять інформацію щодо особливостей постановок опери в Європі та Америці. Лише декілька джерел зосереджені на аналізі психологічних особливостях жіночих персонажів як бази для виконавської інтерпретації образу Тетяни [1], тому вкрай необхідним видається доповнити і розкрити задані аспекти.

Особлива значимість опери Чайковського для світової музичної спадщини, висока репертуарність та популярність твору, а також відсутність у великому переліку спеціальних джерел саме таких досліджень які б торкалися різних аспектів сценічних та виконавських інтерпретацій образу головної героїні (Тетяни Ларіної) визначили актуальність статті.

Мета статті – зазначити виконавські традиції партії Тетяни в опері П. Чайковського "Євгеній Онєгін" та розкрити історичний внесок їх фундаторів у слов’янському та світовому оперному просторі. Цій меті підпорядковано декілька завдань: 1) систематизувати історичні відомості щодо постановок Національної опери України другої половини ХХ ст.; 2) надати характеристику провідним виконавським концепціям Великого театру Росії початку ХХІ ст; 3)окреслити особливості втілення образу Тетяни у постановці Metropolitan Opera 2007 року; 4)констатувати традиції та новації у прочитанні головної вокальної ролі опери Чайковського.

Виклад основного матеріалу. Партія Тетяни відрізняється особливим поетичним змістом та лірикою, що вимагає від виконавиці емоційної яскравості, технічної чистоти, змістовної наповненості. Тетяна – глибока цілісна натура, що здатна на сильні почуття. Оригінальність трактування головного образу опери може викликати на сцені суттєві складнощі виконавиць партії неймовірної художньої досконалості, створеної з особливою любов'ю П. Чайковським.

З нашого виконавського досвіду витікає, що у втіленні образу Тетяни співачці слід приділити увагу створенню інтонаційного та драматургічного контрасту між

трактуванням персонажу у I та III діях опери. Також, – в особливій увазі до кантиленного виконання партії, широкому диханню. Неймовірно важливою є увага виконавиці до психологічних підтекстів, ремарок композитора у партитурі і в тексті літературного джерела в партії Тетяни (особливо в сцені на балу в Петербурзі). При ліричній орієнтації тонусу музики, її популярності та наспівності, особливого музичного значення у ролі, тим не менш, набувають інтонаційні складнощі вокалу: у партії Тетяни достатньо представлені незручні стрибки на широкі дисонансні інтервали, непідготовлені неакордові звуки, її душевний смуток підтримує оркестрова лінія партитури, сповнена інтенсивним рухом гармонії (особлива прикраса та складність – відхилення та модуляційні процеси).

Опера Чайковського "Євгеній Онєгін" в прочитанні українських вокалістів починає свою історію іще за життя композитора. "Відомо, що почасти історія написання славетного сценічного шедевру має українське коріння: композитор працював над оперою у Москві (травень 1877 р.), Сан-Ремо (лютий 1878 р.) та в селі Кам'янці, що на Черкащині – у маєтку своєї сестри Олександри Іллівни, дружини сина декабриста Льва Давидова. Тут, а також у селі Вірбівці, що за 12 км від Кам'янки…" [3, с. 133]. Дослідник Юрій Станішевський вказує, що київська прем'єра опери відбулася навіть раніше петербурзької – 11 жовтня 1884 року за участю інтепретатора та диригента Йосипа Прибика. "Головні ролі виконували відомі артисти В. Зарудна (Татьяна) та І. Тартаков (Онєгін), які не лише зрозуміли неповторний ліричний стиль автора, а й гранично щиро передали почуття своїх героїв. У 1889 р. спеціально до приїзду Петра Чайковський в Київ постановку було оновлено …"[4, с. 68]. Тоді опера прозвучала у сценічній версії професора Петербурзької консерваторії, відомого співака Іполіта Прянишникова; у цьому тандемі диригентом був навіть сам композитор, який спеціально приїзжав у Київ у 1891 році. П. Чайковським у Києві були закладені певні виконавські традиції партії Тетяни у коментуваннях постановного процесу "від першої особи" самим Петром Іллічем, які були безжалісно порушені у 20-х рр. минулого століття. У той час – відмічає Ю. Станішевський (історик Київської опери), – панує "примітивна, спрощена інтерпретація, де про творчість і художність втілення говорити не доводиться. Загальний недолік – однотонність вираження, безбарвність фрази, вимученість жесту, відсутність захоплення... " [4, 136]. У 50- х рр. минулого століття у Київську оперу

повертається унікальна традиція сценічної інтерпретації та прочитання шедевру саме на засадах стильової відповідності авторському визначенню жанру опери як "ліричних сцен", яку започаткував ректор консерваторії та досвідчений диригент Олександр Климов – глибокий знавець творчості й стилю П. Чайковського. Головні жіночі партії у сезоні 1951/1952 рр. виконували Т. Пономаренко (Тетяна), Н. Гончаренко (Ольга). У наступні десятиріччя з'являються й експериментальні постановки, які надають змогу розкрити свій вокальний та артистичний дар відомим співачкам київської опери. Перш за все, це: Є. Мірошниченко, Б. Руденко, З. Христич, Л. Чконія, Г. Туфтіна, Т. Пономаренко, Л. Лобанова, Н. Гончаренко та велична Лариса Архипівна Руденко – викладачка Київської консерваторії, визначна співачка та педагог спеціального класу сольного співу авторки цієї статті. До речі, внесок двох поколінь київських вокалісток Світлани та Наталії Кислих в трактування мецо-сопранових партій опери "Євгеній Онєгін" відзначено багатьма дослідниками. Особливо плідний творчий результат на їх погляд виникає із багатьма поколіннями відомих режисерів та диригентів, серед яких: І. Молостова та С. Турчак, М. Третяк та Л. Венедиктов, диригенти В. Кожухар та А. Кульбаба. Преса відмічала як найбільш вдалий за усю історію Київської опери творчий тандем видатних майстрів української сцени. Вдамося до цитати: "Образ розсудливого, егоїстичного, а згодом закоханого Євгенія Онєгіна, створив М. Коваль. В партії Татьяни виступила артистка Т. Анісімова, Ольги – солістка театру С. Кисла, їх матері – владної, але привітної поміщиці Ларіної – О. Яценко" [4, с. 138]. Як найбільш майстерно відшліфована вистава у режисерській інтерпретації І. Молостової опера живе на провідних сценах України, а у її виконанні беруть участь відомі співачки С. Добронравова, Ж. Закрасняна (партія поміщиці Ларіної); Н. Николаїшин, В. Ченська, Т. Ганіна, Т. Калінкіна, С. Годлевська (партія Татьяни); Т. Пімінова, А. Швачка, Н. Кисла, І. Петрова (партія Ольги), Т. Кузьминова, М. Березовська, Н. Кисла, (партія Няні). З чоловічих ролей вдалими є інтерпретації, які здійснюють М. Кірішев, В. Опенько, П. Приймак, О. Киреєв (у ролі Євгенія Онєгіна); О. Дяченко, Ю. Аврамчук, М. Шуляк (Ленський); С. Магера, Т. Штонда, Б. Тарас, Д. Агеєв, С. Ковнір (князь Гремін). Цей виконавський склад та вокальна сольна та ансамблева манера є еталонними за "…мистецькою гармонією всіх виражальних компонентів, злагодженим виконавським

ансамблем і тонким відтворенням стилістики геніальних ліричних сцен П. Чайковського" [5, с. 636].

Цікаво, що рушійною силою видатних та стилістично відповідних сценічних інтерпретації опери Чайковського "Євгеній Онєгін" іще з минулого століття є творчий тандем російських та українських вокалістів. Так, доленосним для виходу з кризової постановочної ситуації в історії опери, виявився приїзд та участь у спектаклях корифеїв Великого театру, які співали українською мовою. Таким чином відбулося зрощення традицій слов'янського оперного мистецтва (з часів Леоніда Собінова та Пантелеймона Норцова, 20-30-х рр. XX ст.). Наразі у Великому театрі відбувається неоднозначний за підсумком процес розвитку цієї традиції.

Спектакль 2000 року на сцені Великого театру представляє собою реставраційну версію радянської постановки 1944 роки (декорації П. Вільямс). Режисером, як і в 1944 році, став Борис Олександрович Покровський. Виконавиця партії Тетяни Ларіної Марія Гаврилова получила досить неоднозначні відгуки преси після прем'єрного показу вистави. Ігнорування ремарок композитора, сталих традицій інтерпретацій та засобів психологізації образу робить її героїню абсолютно байдужою до сценічної дії. Це призводить до не-відтворення певного емоційного спектра оперної партії, відсутності насичення вокалу тембральними барвами та почуттями порухів душі.

Інша постановка опери Великого театру здіснена у 2006 році силами відомого російського режисера Дмитра Чернякова радикально оновила театральну традицію та прочитання партії головної героїні. За жанром це трагікомедія, що оголює пороки російського суспільства (алкоголізм), надає особливої гостроти і сучасності багатьом сценам (наприклад, сцені дуелі). Акторське та співацьке втілення виконавиці партії Тетяни – Тетяною Моногаровою зводилося до екзальтованих емоцій божевілля, нервовості, що надавало особливих барв її чистому ліричному тембру. Задум режисера щодо втілення пограничних станів в образі, на наш погляд, виконаний Т. Моногаровою повністю. Співочий голос виконавиці доволі звучний, верхні ноти діапазону звучать об'ємно, не галасливо, а емоційне наповнення відповідає змісту тексту. Створюється цілісний образ: цікавий, правдивий і переконливий. Напевно, це один з рідкісних випадків, коли новаторське прочитання популярного твору оперної класики не викликає відторгнення, а по-новому висвітлює грані образу пушкінської героїні.

Постановка 2007 року в американській Metropolitan Opera привертає увагу складом виконавців: Онєгін – Дмитро Хворостовський, Тетяна – Рене Флемінг, Ленський – Рамон Варгас, за диригентським пультом – Валерій Гергієв. Рене Флемінг співала російською і зуміла точно передати динаміку образу героїні від початку до кінця твору, що укупі з приголомшливими вокальними навичками дозволило створити одну з переконливих світових версій виконання партії Тетяни Ларіної.

Висновки. Таким чином, лірико-психологічний жанр опери ставить на основне місце завдання правдивого відтворення характерів, почуттів і долі героїв. Це пояснює виняткову важливість точного відтворення партії головної героїні твору Тетяни Ларіної згідно ремарок композитора та у ракурсі стильової відповідності музиці П. Чайковського. Розгляд стратегії втілення головного образу по двом напрямам вокальної та сценічної інтерпретації дозволяє зробити висновок щодо важливого компоненту для вокалістки-виконавиці – наявності акторського обдарування. Партія Тетяни вимагає наявності у виконавиці не тільки значної вокально-технічної бази, а й певних знань в області акторської майстерності, що надає у свою чергу велику можливість різноваріантних прочитань головного образу опери П.І. Чайковського.

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DOI 10.32370/IA_2019_09_19

The Structure of Research Activity Development in Preparing Future Foreign Language Teachers

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Abstract

This article deals with the problem of readiness formation for scientific research activity of future foreign language teachers. For this purpose, the authors investigated scientific literature and developed the structure of readiness formation, using modelling approach. The structure consists of five stages of professional training of future teachers of foreign languages to conduct the scientific research: *objective, methodological, substantial, operationally-procedural, efficiently-diagnostic*. The objective stage consists of the *aim* and *task* definition. The methodological stage is formed by *methodological approaches* and *principles*. The substantial stage includes the process of formation of the list of professional competences of the modern teacher of foreign languages. The operational-procedural stage consists of defining the *pedagogical conditions* and the stages of preparation for scientific research activity of future foreign language teachers. The pedagogical condition "*stimulation of motivation for educational-cognitive activity*" provides formation of *value-motivational component* and *motivational criteria* of readiness. *Digital literacy* and *21st century skills development* contribute formation of the *cognitive component* and *cognitive-investigational criterion* of readiness formation. *Education through investigation* and *scientific-research work activation* ensure the formation of the *operational-procedural component* and *creative and activity oriented criterion.* Depending on the degree of actualization of the above-mentioned criteria and their indicators, we determine the system of the estimation of levels of readiness for scientific research of future foreign languages teacher: *reproductive (low), structural (middle), reflexive-creative (high) levels,* what represents the *efficiently-diagnostic stage* of readiness formation.

Key words: structure of readiness, readiness formation, scientific research, foreign language teacher.

In the current conditions of educational development, the system of scientific research activity, which is the basis for effective future specialists' training, becomes important. A crucial requirement for effective scientific activity is a readiness of future teachers for scientific research activity.

Analysis of recent research and publications. The theoretical issues of general readiness formation investigated O. Kovalyova, K. Platonova, M. Levitova, O. Vedenova. The problem of professional readiness formation for pedagogical activity researched V. Slastyonin, N. Klokar, N. Denysova, L. Kondrashova.

The essence and conditions of effective readiness formation for scientific research of future teachers was covered in the investigations by V. Borysov, L. Pet'ko, N. Stavrinova, N. Sychkova, G. Shyshkina, Z. Isayeva, H. Turchynova.

Due to the analysis of scientific sources on this problem we may define that nowadays there is no general opinion concerning the structure of readiness formation for scientific research activity in future foreign language teachers.

The purpose of the article is to define the main components of the structure of readiness formation (components, criteria and levels) for scientific research activity of future foreign language teachers.

Presenting main material. To achieve the goal of the article we use the modelling approach.

Modelling approach is widely used in modern pedagogical researches by scientists I. Bohdanova, N. Bulhakova, S. Savchenko, N. Kondakov, O. Matviienko, L. Novikova, etc.

In opinion of V. Krayevsky modelling is one of the theoretical methods which contributes learning the structure and mechanisms of the studying and educational processes, logical structures of studying material. Model – is a result of an abstract generalization of practical experience, but not direct result of experiment [3].

According to Collins English Dictionary *model* is a system that is being used and that people might want to copy in order to achieve similar results; *a model* of a system or process is a theoretical description that can help you understand how the system or process works, or how it might work [13].

A term "model" means a certain system (standard, example, character, construction), that represents certain properties and relationships with other system that is named "an original", and substitutes it to some extent.

The scientists V.Davidiv and O.Rakhimov define model as a material object or an object that appears in the process of thinking. In research it substitutes an object-original so that it's direct study provides new knowledges about an object-original [2].

Modelling procedure consists of several stages: actualization of the accumulated knowledges about the object of research and choosing from the variety of existent models one that the most adequately represents the essence of the investigated object [11; 21].

According to the analyses of investigated scientific sources we may define *the model of readiness formation for scientific research activity of future foreign language teachers* as a complex of interrelated components of pedagogical process at every stage of higher education that provides students with the necessary level of readiness for scientific research activity.

The model of our research consists five stages of professional training future teachers of foreign languages to conduct the scientific research: *objective, methodological, substantial, operationally-procedural, efficiently-diagnostic*.

The objective stage consists the *aim* and *task* definition. The general aim of our research is to form readiness for scientific research activity of future foreign language teachers and the task is to form value-motivational, cognitive and operationally-procedural components.

The methodological stage is formed by *methodological approaches* and *principles*.

The methodological approach essentially aims to understand the subjective and changing world of human experience. To make sense of this world, and the phenomena that are encountered, individuals construct their own realities and interpretations for this purpose [14].

The developed pedagogical model is based on the *competence approach,* which is the principle one. A realization of the competence approach in the sphere of professional training helps to investigate a problem of training future foreign language teacher from a different perspective.

The basic idea of this approach in our research is that the essential result of teacher's education is not acquisition of separate knowledges, abilities and values but the capability and readiness (and the level of this readiness) of students to conduct scientific research.

A realization of *personal and action related approach* is implemented by taking into consideration the individual peculiarities of a future foreign language teacher and his/her possibilities in the process of individual educational activity.

An *informational approach* is based on the development and improvement of informational skills and digital literacy of future teachers for effective organization of the educational process, scientific research activity and professional communication.

A realization of *investigative approach* is performed by enhancing research skills of teachers which are necessary for qualitative and productive organization of scientific research during their future professional performance.

Methodological principles are universally desirable instructional design features, motivated by theory and research findings, educational psychology, general educational curriculum design, and elsewhere, which show them either to be necessary for scientific research and language learning or facilitative of it [10; 15].

The analysis of scientific sources allows us to distinguish and characterize next basic principles of the future foreign language teachers' preparation for scientific research activity: *the systemic, the scientific, the educational-investigative, the integrity of educational process, the innovativeness, the individualization, the collaboration, the activity, the professional mobility, the variability, the creativity, the continuity principles* [16].

The principles – are the final clauses, which contribute choosing the forms, methods and substance of education.

The systemic principle is the primary one, which provides that every phenomenon, process, object is correlated with other objects and processes, and form a single unit. The process of preparing future foreign language teachers for scientific research activity is considered a set of interrelated elements.

The scientific principle provides the conformity of the substance of education with the level of modern science development. This principle ensures the process of the future foreign language teachers' preparation for scientific research activity based on scientific knowledges.

The educational-investigative principle provides the engagement of future teachers of foreign languages to effective cognitive activity, development of creative potential of student, thinking culture education, possession of science methodology, investigative competencies and abilities formation.

The principle of educational process integrity is based on integrity and cooperation of educational and scientific activities of future teachers of foreign languages, when scientific activity complements educational and vice versa [1, p. 15; 16].

The principle of innovativeness envisages the integration of innovative, pedagogical and informative technologies, that provides better quality of future teachers of foreign languages preparation in accordance with the requirements of modern informative society.

The principle of individualization provides organization of educational process, when the future teacher of foreign languages has the opportunity to choose independently the forms,

methods, educational tools and pedagogical technologies, depending on his/her individual capabilities, age, necessities and interests.

The principle of collaboration envisages development of subject-subjective relations between the participants of educational process, that are based on equivalence, respect, trust, responsibility, mutual help, self-actualization, self-development, self-realization.

According to *the principle of activity*, the future foreign language teachers' preparation for scientific research activity is based on the positive result of the personal activity of a student, that is aimed at the receipt of new knowledges, abilities, realization of pedagogical values [17].

The principle of professional mobility is based on the readiness and ability of future teachers of foreign languages to grasp the achievements of pedagogical technologies and philology, to implement knowledges into pedagogical practice, to react quickly on the innovations, to be engaged in the self-education and professional training.

The principle of variability is based on the ability in the process of professional preparation the future teachers of foreign languages to use innovative educational resources, various kinds and forms of educational materials' presentation, independent choice of individual educational plan, methods of tasks decision, time of studying.

The creativity principle envisages the capacity of future teacher of foreign languages to act creatively, the necessity in initiativeness, originality in tasks solving and ideas generation [4; 6; 8; 9; 20].

The continuity principle is based on the desire of future teacher of foreign languages to permanent personal development, that contributes development and implementation the own trajectory of personal and professional improvement [1, p. 15].

The substantial stage includes the process of formation of the list of professional competences of the modern teacher of foreign languages. Special attention we pay to the innovative competences. The peculiarity of the substantial stage is its dynamism as the result of continuous changes in the professional and pedagogical activities of foreign language teacher due to fast development of linguistic and information society.

The concept "professional competence" (investigated by D. Ushakova, V. Miheev, J. Dasyuk) we understand as a complex personal resource, which allows cooperate effectively with the surrounding world in one or another professional sphere, for realization of which we need certain spectrum of professional competences. While the concept "professional

competence of teacher of foreign languages" is determined as a system of cultural, discursive, strategic, linguistic and social-linguistic abilities, knowledges and skills, which gives an opportunity to the communication participants to co-operate effectively in certain socially defined communicative situations, for getting skills and ability to apply knowledges in psychology, pedagogics and methodology of foreign language teaching.

On the basis of analysis of scientific literature, we define key competences of teacher: *pedagogical, psychological, reflexive, organizational, creative, investigative, native language communicative competences. In addition, the foreign language teacher must develop foreign language communicative competence, methodical, linguistic, literary, informational competences.*

Taking into consideration the conditions of educational system development in modern informative society we define the *key innovative competencies* of the foreign language teacher: *communicative* (includes linguistic, pragmatic, social-linguistic knowledges and abilities), *informational* (includes informational knowledges and abilities), *constructive* (includes constructive abilities) and *investigative* (includes analytical-synthetical, diagnostical, prognostic-projective, creative-innovational abilities).

All this professional competencies future teacher of foreign languages may improve by taking part in *individual* (tutoring, distance education, self-education, virtually-methodical platform), *collective* (refresher courses, modal courses, conferences) and *individually-collective* (internship, scientific-applied project, informal refresher courses, consultations) forms of professional activities.

The operational-procedural stage consists of defining the pedagogical conditions and the stages of preparation for scientific research activity of future foreign language teachers. In our investigation we define *five pedagogical conditions: stimulation of motivation for educational-cognitive activity, education through investigation, 21st century skills development, digital literacy, scientific-research work activation.*

The efficient-diagnostic stage is formed by the components, criteria and levels of readiness formation of future teachers.

The first pedagogical condition "*stimulation of motivation for educational-cognitive activity*" provides formation of *value-motivational component* and *motivational criteria* of readiness.

The value-motivational component is presented by the system of the value orientations, professional values and motives. *The motivational criterion* includes next indicators as positive attitude of future teacher towards research activity; level of formed motivation; value orientations; commitment to scientific research; developed cognitive, creative and searching interests; tendency for independent and continuous development and perfection of knowledges; investigative style of thinking; orientation
on innovations, creativity.

Using cognitive, strong-willed, social and emotional methods of stimulation motivation [5, p. 105] for educational-cognitive activity influences positively on discovering identity of future teacher, his/her individual and creative development, aims determination in future professional activity.

Digital literacy and *21st century skills development* contribute formation of the *cognitive component* and *cognitive-investigational criterion* of readiness formation.

Cognitive component is presented by the system of analytical, prognostic, projective, reflexive, investigative skills. *The cognitive-investigational criterion* is based on the next indicators: the level of formed system of knowledges (investigative, methodical, psychological-pedagogical, professional, philological); understanding the logic of scientific research; knowing the principles of research organization.

Education through investigation and *scientific-research work activation* ensure the formation of the *operational-procedural component* and *creative and activity oriented criterion. The operational-procedural component* consists of the complex of science and investigation oriented actions. The creative and activity oriented criterion is based on the next indicators: a level of formed research skills (communicative, investigative, analytical, organizational) necessary for realization of scientific researches; ability to search, accumulate, critically estimate information, forecast the ways of problem development; ability to apply effective technologies and models; ability to apply statistical methods correctly; ability to use facilities of information technologies).

Depending on the degree of actualization of the above-mentioned criteria and their indicators, we determine the system of the estimation of levels of readiness for scientific research of future foreign languages teacher: *reproductive (low), structural (middle), reflexive-creative (high) levels,* what represents the *efficiently-diagnostic stage* of readiness formation.

Conclusions and prospects of research. On the basis of the analysis of the psychological and pedagogical literature we may determine that the readiness formation for scientific research activity of future foreign language teachers is a complex personal formation that ensures the effective functioning of scientific research activity and covers knowledges, skills, experience, individual peculiarities and attitudes towards scientific research activity. The components of readiness for scientific research activity are value-motivational, cognitive and operational-procedural. Further research of the problem we define in looking the ways of the readiness formation for scientific research activity of future foreign language teachers in practice.

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Translation of the Title, Abstract and References to the Author's Language

УДК 37.211.24

Баранова Ю.В., Матвієнко О.В. Структура формування готовності до науково-дослідної роботи у майбутніх вчителів іноземних мов.

У статті розглядається проблема формування у майбутніх вчителів іноземних мов готовності до науково-дослідної роботи. З цією метою авторами були досліджені наукові джерела з цього питання та розроблена структура формування готовності, застосовуючи метод моделювання. Структура формування готовності складається з п'яти етапів: *цільового, методологічного, змістового, операційно-процесуального, результативно-діагностичного.* Цільовий етап передбачає визначення *мети* і *завдання*. На методологічному етапі визначаються *методологічні підходи* та *принципи*. Змістовий етап складається з формування ряду *професійних компетенцій* сучасного вчителя іноземних мов. Операційно-процесуальний етап передбачає визначення *педагогічних умов* та стадій підготовки майбутніх вчителів іноземних мов до науково-дослідної роботи. Педагогічна умова *«стимулювання мотивації до пізнавально-навчальної діяльності»* забезпечує формування *ціннісно-мотиваційного компонента* і *мотиваційного критерію* сформованості готовності. *Цифрова грамотність* та *розвиток навичок 21 століття* сприяють формуванню *когнітивного компоненту* та *когнітивно-дослідницькій критерії*. *Навчання як дослідження* та *активація науково-дослідної роботи* сприяють формуванню операційно-процесуального компонента та креативно-діяльнісного критерія. Залежно від ступеня актуалізації вищезазначених критеріїв та їх показників, нами сформована система оцінки у майбутніх вчителів іноземних мов рівнів готовності до науково-дослідної роботи: *репродуктивний (низький), конструктивний (середній) та рефлексивно-творчій (високий).*

Ключові слова: структура готовності, формування готовності, науково-дослідна робота, вчителі іноземних мов.

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DOI 10.32370/IA_2019_09_20

A Conceptual Approach to Student Study Printing: The Role and Place of Creative Composition

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Abstract

The article reveals that in the formation of creative thinking, printed graphics - prints occupy a special place. It turns out that the issues of teaching creative composition in printed graphics - printmaking under the conditions of the art and graphic faculties of pedagogical universities are not sufficiently disclosed. The conceptual approach to teaching students of the art-graphic faculty of creative composition is shown. Of all the variety of methodological means of activating the process of teaching creative prints, special attention is paid to the following: highlighting in the program basic, leading theoretical knowledge and artistic and practical skills that reflect both the foundations of the traditional course of academic drawing and the specifics of the specialty; the use of special educational tasks (both in the image from nature and from memory) for creative associations with decorative images; the use of special educational tasks for the development of creative imagination in the process of drawing from life and performing artistic compositions. It is emphasized that in the conceptual approach to the creative composition was attached to the concept of the artistic image and the principles of image formation, and an important stage of the work was to create a sketch of the creative composition, which is based on the artistic image. Based on the conceptual approach to teaching students of the art-graphic faculty of creative composition, the established fundamental conditions for its use are indicated. The conclusions prove that the conceptual approach to teaching students of the art-graphic faculty of creative composition is based on certain provisions. It is argued that the role and place of the creative composition is manifested in the creation of conditions for understanding that the basics of the synthesis of such important components as the theme, idea and emotional evaluation of the depicted phenomena are the content of the work of art. The creative composition provides students with an understanding that works of art are contingent, and their conventions are permissible to a certain face, and artistic images in them are conditional with admission to a certain face.

Keywords: printed graphics, printmaking, creative thinking, artistic image, composition, creative composition.

Introduction. Relevance of research. In the complex of tasks related to the training of artists - educators, those installations that lay the foundations of special art and graphic skill are always relevant. Systematic studies of various types and subspecies of printed graphics, studying the technique and technology of print art actively influence the process of formation of students' compositional vision. In the process of educational and creative activities in the workshop of graphics, students of art and graphic faculties of pedagogical universities receive theoretical knowledge and practical skills in creating graphic compositions, get acquainted with

the traditions and techniques of art and print graphics. The practical activities of students in the workshop of graphics in the study of printmaking are fundamental, as they actively promote art education, develop creative abilities in the field of graphic composition, and activate creative thinking.

In the formation of creative thinking, printed graphics - prints occupy a special place. In theory, this is knowledge; in practice, it is the ability to freely operate this knowledge, the ability to create a creative atmosphere, and to observe consistency in the implementation of tasks. Compositional and creative activities and the educational process in the workshops of graphic workshops at the graphic arts faculties of pedagogical universities require a comprehensive study and in-depth study of all their aspects, conceptual approaches to the process itself. In this regard, every research that reveals the theory and practice of teaching and educating students in print classes is important.

The degree of development of the problem. An analysis of the psychological and pedagogical literature and the practical experience of artists and educators shows that many researchers have addressed the problem of using art and printed graphics in pedagogical practice. Such creative scientists, psychologists as B. G. Ananyev, D. B. have devoted their works to the problem of creative, productive thinking and creativity. Epiphany A.V. Brushlinsky, L.C. Vygotsky, V.V. Davydov, S.V. Konovets, A.M. Matyushkin, S.L. Rubinstein, B.M. Teplov, Ya.V. Ponomarev, O.K. Tikhomirov, P.M. Jacobson and others. Certain aspects of creative thinking, as a kind of specific generalization in art, in the fine arts of students of art schools, schoolchildren are considered in studies, publications by N.N. Volkova, E.I. Ignatiev, B.C. Cousin, B.G. Lukyanova, V.K. Lebedko, S.P. Lomova, L. G. Medvedev, I.M. Ryazantseva, N.N. Rostovtseva, N.I. Reznichenko and others.

The determination of the state-of-the-art education of students and youth by means of art and printed graphics, as well as the process of educational and creative activity during practical classes in the graphic workshop, is paid attention to the works of N.N. Anisimov, A.D. Alekhina, G.G. Vinogradova, V.K. Lebedko, V.V. Koreshkova, V.S. Kuzin, B.T. Likhachev, N.S. Bogolyubov, N.N. Rostovtsev, N.I. Tkachenko, A.S. others. The role of art and printed graphics in the classes of students of graphic arts faculties is reflected in the writings of B.

Klabunovsky, V. A. Eremina, M.I. Sukharev, A. Mazhug, V. Yesipov, N. Alimasova and others.

Insufficiently highlighted aspects of the problem. Current practice demonstrates the lack of a comprehensive study of the conceptual possibilities of printmaking. The issues of teaching creative composition in printed graphics - printmaking under the conditions of the art and graphic faculties of pedagogical universities are not sufficiently disclosed.

The purpose of the study is to reveal the theoretical foundations of a conceptual approach to teaching students printmaking and identify the stages of the formation of creative thinking when performing a composition of graphic works. To substantiate the role and place of creative composition in the process of practical engraving.

The main content (research methodology). In the modern art - pedagogical methodology of teaching, a great deal of attention is paid to creative educational projects, which in fact can be a characteristic of every composite decision - creative in its essence. In this connection, IV Pastir points out, "the most effective component of teaching methods for future teachers - artists, is an important factor in the development of their creative abilities, imaginative thinking, aesthetic taste, and so on. we consider the method of creative educational projects based on the research and search activities of students in the process of solving problems of a problematic nature "[1, p. 224].

The general methodological base and theoretical research is the work on the problems of art education, where the following methods and approaches are fundamental: the study, analysis and generalization of scientific methodological work on the issue; study and analysis of curricula of higher educational institutions; the study of dissertation research, periodicals; pedagogical observations, conversations, questionnaires during the period of experimental studies; analysis of the educational and creative activities of students in the graphic workshop, as well as analysis of the creative work of professional graphic artists, famous masters of printed graphics; experimental work in the workshop of graphic arts of the graphic arts faculty; analysis of the composition of modern creative works in print technique [1, 2, 3, 4, 5].

Of all the variety of methodological means of activating the process of teaching creative prints, special attention is paid to the following: highlighting in the program basic, leading

theoretical knowledge and artistic and practical skills that reflect both the foundations of the traditional course of academic drawing and the specifics of the specialty; the use of special educational tasks (both in the image from nature and from memory) for creative associations with decorative images; the use of special educational tasks for the development of creative imagination in the process of drawing from life and performing artistic compositions.

The main content (Discussion). The study of dissertation research, work experience at the Faculty of Graphic Arts in the graphic print workshop allowed us to conclude the relevance of the formation of creative thinking among students. According to D.K. Gagishvili, the tasks of effectively forming creative thinking among students of art majors and making significant adjustments require the development of new methods for teaching a course in graphics, and this, in turn, determines the need for a number of experimental studies [2]. In agreement with R. Ch. Barshits, we highlight the position that classes with a "creative graphic composition" can be an effective means of aesthetic education and art education of students, provided that printmaking will be presented as a special form of artistic (graphic) comprehension of the world and the reality surrounding us ; studying the history of prints will address the most important tasks of creative education; the theory and practice of teaching print-making to students of art-graphic departments should be based on advanced technologies of the psychological, pedagogical, aesthetic and philosophical sciences of the past and present; The methodological model of teaching and educating students of graphic arts faculties in printmaking classes will be substantiated and confirmed both theoretically and practically - by the results of many experimental studies conducted at different times and in different universities [3].

The conceptual approach to teaching students of the art-graphic faculty of creative composition consisted of the following: the initial level of development of art and graphic preparation for a compositional solution was determined; studied the level of compositional vision in practical exercises on the printmaking technique; training was monitored; analyzed the level of development of aesthetic taste. The additions were: the study and development of some hidden aspects of the manifestation of students' creative activity during classes in a graphic composition in a print workshop; determination of the level of development of students' creative abilities (the embodiment of the idea of ??graphic composition in a particular printed material) by the method of psychological attitudes; study and analysis of the results of

educational and creative activities of students in the workshop of graphics in order to determine their compositional and creative activity in the field of prints.

Step by step, the conceptual approach was as follows. There was a general idea that printmaking is one of the branches of graphics, and printmaking means a graphic work, printed from any printing form, processed in one way or another, printing: in a machine or by hand, and an independent value, with that. The circulation of received prints can range from several pieces to several thousand copies, with all prints being considered as originals.

Subsequently, attention was paid to a general understanding of the composition and its basic capabilities. Students were advised that composition is the arrangement of all parts of the work in space, that there is no uniquely theory of composition, there are only general principles, rules and techniques. From the outset it was stated: formats of a plane composition. Of great importance for flat (standard printing) compositions is the boundary of the image field. The elements of the composition, located near the center, are perceived to lie deep, and the flat field becomes spacious. Elements located on a homogeneous field close to the edge, except lying on the surface, in the plane of the frame; The most common image formats are rectangular, round, oval. The rectangular, elongated vertical format gives the feeling of height, aspiration up. The most commonly used is the rectangular gold section format. It is the most balanced and closed.

In our conceptual approach to creative composition, the concept of artistic image and the principles of image formation were of great importance. So it was stated that works of art are conditional, their conventions are admissible to a certain face, and artistic images in them are conditional with admission to a certain face. Artistic convention loses itself as soon as it becomes reality, and the distance between real emotions in relation to artistic convention may increase or decrease depending on the specificity of the image, as well as on the historical tradition of the cultures. It was reported that the peculiarity of the artistic image lies in the fact that it is an ideal system (closed, integral) - a kind of micro-world, and also that it belongs to the macrosystem of culture. The capacity for a certain imagination is an integral part of the perception of the image, it is the interdependent facets of a single process, since the process of creating an image with the help of imagination prompts and activates the author to add something invisible, or to say something incomplete - a hint.

In the course of training it is emphasized that an important stage of work is the creation of a sketch of a creative composition, which is based on an artistic image. The sketch should be well thought out and worked, it is necessary to find out where there will be light, and where - dark places. From the conceptual approach to teaching students of the art-graphic faculty of creative composition, it is possible to distinguish the established fundamental principles of graphic education and their application: special graphic development of objects, their parts, which have a special purpose for creating an artistic image in a creative composition; getting skills in imagination; development of skills of abstraction of specific subject visual forms, fluency in th e abstracted image method according to the representation and translation of a specific objective image into abstract; development of skills for generalizing tonal gradations, translating a tonal-volumetric image into a silhouette or linear-planar; mastery of special compositional techniques of a decorative nature using color, ornament; mastering the widest possible range of technical means, materials and methods of work in terms of creative search for their special and decorative capabilities.

Based on the conceptual approach to teaching students of the art-graphic faculty of creative composition, it is possible to distinguish the established fundamental conditions for its use: disclosing the scientific and theoretical foundations for the formation of students' creative thinking and psychological patterns of performing graphic works as a creative expression of a student's personality; understanding of each student's creative thinking as the most important factor in the development of his personality, artistic abilities and the conditions for successful work in creating a creative composition; development and pedagogical experimental model for the development of creative thinking of students by means of graphics; identify individual psychological characteristics in the professional and artistic development of students in the classroom graphics; development and experimental testing of methodological ways and means of enhancing the learning process of graphic means of image based on developed creative thinking.

Conclusions. On the basis of the conducted research it is possible to make certain generalizations:

- The conceptual approach to teaching students of the art-graphic faculty of creative composition is based on the following principles: success in teaching creative composition in

art and print graphic prints is due to the creative use of the relationships between different types of fine art, the optimal ratio of theoretical and practical studies, degree in comprehension and mastering the language of graphic art, the ability to apply acquired knowledge and technical skills in creative works; Art and print graphics in combination with classes in other special types of visual arts (painting, graphics, sculpture, arts and crafts, literature, music) have great potential creative opportunities in the systematic development of creative abilities. The purposeful substantiated realization of these opportunities in practical exercises in the workshop of printed graphics acts as a pedagogical necessity; The developed and tested method of pedagogical installation activates the development of students' creative abilities in the classroom.

- From our conceptual approach to the beginning of creative composition of students, the important goal was to create an artistic image. The role of this small number of creative compositions is manifested in the fact that you can learn more about thinking about the basics of synthesizing such important components, such as the theme, the idea and the idea of evaluating the images of the creatures, as well as the artistic creation. Creative work is needed for students who want to create music, and music is permissible to the extent of singing, and artistically represent them in admission to the limit of singing.

Prospects for further research. In our opinion necessary new approach to printed graphics in the educational process as a type of artistic art is important, which has a significant influence on the education of a creative personality - students of pedagogical universities.

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DOI 10.32370/IA_2019_09_21

Educational and Informational Space of the Educational Establishment as a Pedagogical Condition for the Formation of Students' Social Activity

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Abstract

The article describes the features of the educational and informational space of educational institutions for the formation of students' social activity. Analysis of scientific literature made it possible to clarify the essence of the concept of "educational and informational space" for the formation of social activity of students as a pedagogically expediently organized space of life, which contributes to the development of a socially active person; an integrated means of accumulation and realization of educational, developing and socializing potential of institutions of general secondary education. The features of a specially organized educational and informational space for the formation of social activity of the individual in educational institutions in the article are considered through the participation of students in social activities, in particular, in children's associations.

The social space of a socially oriented children's association is considered in the composition of three subsystems, which also changes the social role of the child, and the nature of his activity: interpersonal interaction of the educational environment of the children's association, in which the child acts as a participant in the educational process; the social environment of a children's association, representing the space of creative self-expression and self-realization, in which the child acts as the subject of his creativity and education; an external socializing space in which the child acts as a citizen of a society.

Formation of social activity of students in the article is considered on the example of children's associations created in the experimental educational institutions of Chernihiv region "Erudit", "Euroclub", "Traveler's Club", "Jura", "Ecopatral", "Volunteer". The ideas underlying this experience are the formation of active life positions in students, an indifferent attitude to the environment and society, the comprehensive development of the individual as a result: the organization of the interaction of children's associations in experimental educational institutions with the aim of creating a space of social interaction for the development of social activity of children and young people; creation of a unified database of methodological materials on the organization of activity of children's associations on the basis of schools, necessary for use in practical work; creation of the necessary conditions for constructive dialogue, network interaction between educational institutions and children's associations on issues related to the organization of joint activities on relevant areas of work for the exchange of experience through the organization of seminars and roundtables; creation of in-school children's children's associations.

Key words: education and information space, pedagogical condition, social activity of pupils, children's associations, establishments of general secondary education.

Актуальність дослідження. На сучасному етапі суспільного розвитку суттєво розширився соціальний простір, у якому проходить життєдіяльність людини. Поза активним включенням людини в багатоманітні відносини в процесі діяльності, яка ускладнюється, з установкою на «зміни оточуючої дійсності з позиції перетворюючої

участі» [15, с. 35] повноцінний соціальний розвиток сучасної людини є неможливим. Таким чином, основою таких якостей, як колективізм, підприємливість, конкурентоспроможність є соціальна активність. Соціальна активність виступає умовою самовизначення особистості в суспільстві і свідомої регуляції поведінки; проявляється в різних сферах життєдіяльності людини: трудовій, громадсько-політичній, освітньо-дозвіллєвій, соціально-побутовій. Вона реалізується в різних формах не лише як індивідуальна, а й як групова чи колективна, спрямована на реалізацію можливостей та потенціалу тих чи інших соціальних груп [9, с. 64; 18; 19; 20].

У контексті формування соціально активної особистості особливого значення набуває проблема створення освітньо-інформаційного простору в закладах загальної середньої освіти (ЗЗСО).

Особливості формування соціально активної особистості знайшли відображення в дослідженнях І. Беха [2; 3], Л. Канішевської [9; 10;11; 12; 14; 26], І. Гавриш [6], Т. Мальковської [15], Л. Петько [16; 18], В. Рахманова [22] та ін.

Проте, не зважаючи на широке відображення проблеми в спеціальній літературі, питання створення освітньо-інформаційного простору для формування соціальної активності учнів не достатньо висвітлено в наукових дослідженнях.

Мета статті – розкрити одну із педагогічних умов формування соціальної активності в учнів закладів загальної середньої освіти, а саме – створення освітньо-інформаційного простору закладу освіти.

Виклад основного матеріалу. Під освітньо-інформаційним простором закладів загальної середньої освіти О. Разуменко [21], В. Рахманов [22], Н. Рибка [23], А. Цимбалару [25] та ін. розуміють сукупність соціальних, культурних і спеціальних (змодельованих) психолого-педагогічних умов для «вирощування» особистісних якостей учнів, сформованих при адекватному використанні можливостей інформаційного ресурсу й «максимальної віддачі» всіх компонентів інформаційної моделі освітнього процесу закладу загальної середньої освіти [22].

Теоретичний аналіз наукової літератури з проблеми дослідження дозволив нам уточнити сутність поняття «освітньо-інформаційний простір» для формування соціальної активності учнів, як педагогічно доцільний організований простір

життєдіяльності, який сприяє розвитку соціально активної особистості; є інтегрованим засобом накопичення й реалізації освітнього, розвиваючого та соціалізуючого потенціалу закладів загальної середньої освіти [4].

Освітньо-інформаційний простір на рівні закладу загальної середньої освіти забезпечує обмін потоками інформації та взаємодію між усіма учасниками освітнього процесу всередині ЗЗСО, а також обмін інформацією та взаємодію з зовнішніми структурами – освітніми установами, бібліотеками, навчальними й інформаційними центрами та іншими організаціями [4].

Особливості спеціально організованого освітньо-інформаційного простору для формування соціальної активності особистості в закладах освіти розглянемо через призму участі школярів в соціальній діяльності, зокрема, в дитячих об'єднаннях. Саме завдяки залученню до конструктивної діяльності в дитячому колективі учні набувають первинного досвіду взаємодії в соціумі [14]. При цьому цілі діяльності дитячих об'єднань представляють собою поєднання цілей дітей і виховних цілей дорослих; опосередкованість виховання через колективну діяльність, систему ділової та міжособистісної взаємодії як компонент корпоративної культури організації; специфіка суб'єктів виховання в дитячих об'єднаннях визначає характер керівництва нею на основі педагогічного супроводу організації дітей [24].

Саме ці особливості розкривають виховні можливості дитячих об'єднань. Соціальний простір соціально спрямованого дитячого об'єднання розглядаємо в складі наступних трьох підсистем, в яких змінюється й соціальна роль дитини, і характер її діяльності:

– міжособистісна взаємодія виховного середовища дитячого об'єднання, в якому дитина виступає в ролі учасника виховного процесу. Можливість реалізації форм соціального виховання дітей, в яких інтегрується процес розвитку особистості засобами навчання, виховання, соціалізації, самовиховання, самоосвіти, сприяє формуванню особистісно значущих цінностей, розвитку соціальної активності дитини, її суб'єктної позиції;

– суспільне середовище дитячого об'єднання, що представляє собою простір творчого самовираження й самореалізації, в якому дитина виступає в ролі суб'єкта своєї творчості й виховання. Таке середовище надає дитині можливість отримати

особистий життєвий досвід самостійності, спілкування, уміння працювати в команді, колективної спільної діяльності з однолітками, виступає засобом емоційного розвитку в колі товаришів, однодумців;

– зовнішній соціалізаційний простір, в якому дитина виступає в ролі громадянина суспільства. Розумно організована спільна діяльність дітей за підтримки дорослих в середовищі їх життєдіяльності, соціум, в якому дитина реально може проявити себе як суб'єкт діяльності в різних статусах, ролях, позиціях, в індивідуальній та колективній, виконавчій і творчій діяльності як особистість зі своєю громадянською позицією допомагає їй отримати досвід залучення до майбутніх державних і громадських структур [8].

Дослідники виховного потенціалу дитячих об'єднань [1; 5; 6; 7; 8; 14; 24] підкреслюють соціальну сутність дитячої організації, яка включає дітей в широкий спектр суспільних відносин, що виводить їх на освоєння певних соціальних ролей, норм, позицій; загальну спрямованість діяльності дитячої організації, в якій реалізуються найважливіші потреби дітей, що відображають їх прагнення до дорослості; самодіяльний характер життєдіяльності дітей в організації, що передбачає саморозвиток особистості; суб'єкт-суб'єктний характер відносин в дитячій організації, що передбачає реалізацію виховних функцій в системі взаємодії дітей один з одним [4].

На думку Н. Коляди, в дитячому об'єднанні виховна функція реалізується за допомогою визначення прав і обов'язків, як дітей, так і дорослих його членів. При цьому права виступають в ролі норм поведінки, які регулюють життєдіяльність та взаємовідносини між членами об'єднання. Свобода, в даному контексті, виступає як право вибору виду діяльності й норм вираження ставлення до своїх друзів, колективу, оточуючих людей. [14]. А обов'язки, в цьому випадку – певні моральні вимоги до всіх членів організації, які виступають як обов'язок кожного. Вони характеризують вимоги й відносяться до всіх членів об'єднання без винятку [8].

У процесі дослідно-експериментальної роботи у закладах освіти Чернігівської області (Комунального закладу загальної середньої освіти I–III ступеня «Варвинський ліцей № 2»; Михайло-Коцюбинської гімназії; Ніжинських гімназіях № 2 та № 3; Ніжинської загальноосвітньої школи № 11; Срібнянської загальноосвітньої школи; загальноосвітніх шкіл у м. Чернігові № 3 та № 19) були створені дитячі об'єднання

соціального спрямування, які взаємодіяли між собою і громадськими організаціями населених пунктів. У дитячих об'єднаннях, створених на базі закладів загальної середньої освіти на сьогодні накопичено певний досвід організації виховного простору, сформованого в результаті цілеспрямованих педагогічних зусиль в організації спільної суспільно значущої діяльності дітей та учнівської молоді. Прикладами такого досвіду є внутрішньошкільні дитячі об'єднання: «Ерудит», «Євроклуб», «Клуб мандрівників», «Джура», «Екопатруль», «Волонтер».

Так, учасники інтелектуального об'єднання «Ерудит» неодноразово змагалися в брейн-рингах, віртуальних вікторинах, квестах. Налагоджена діяльність міжшкільного «Євроклубу», учасники якого мали змогу відвідати Хорватію, активно спілкуються із учнями школи невеликого угорського містечка Дьондьош, беруть участь у міжнародних конкурсах, створюють соціальні проекти іноземними мовами (англійською та німецькою).

Щоб допомогти учням в опануванні іноземними мовами, при закладах освіти створено пришкільні літні табори, в яких учні, за участі іноземних волонтерів, як носіїв мови, набувають соціального досвіду та формують комунікативні вміння.

«Клуб мандрівників» об'єднує туристів закладів загальної середньої освіти. Так, учні експериментальних шкіл м. Ніжина здійснили спільний піший похід від витоку річки Остер до м. Ніжин; вони стали постійними учасниками туристичних змагань; влітку учні експериментальних закладів освіти, створивши дві групи, подорожували на байдарках по річках Снов та Удай.

Учасники дитячого об'єднання «Джура» мають досвід співпраці з різними навчальними закладами та громадською організацією «Чернігівське земляцтво». Змагання на кшталт «Козацькі розваги» є традиційними. Окрім того, з ініціативи учнів-учасників «Джури», в Ніжинській гімназії № 3 відкрили пришкільний літній табір військово-патріотичного спрямування, в якому діти мають змогу спробувати себе в ролі курсантів військових закладів освіти. Постійними гостями віртуального тиру в гімназії (єдиного в області) є учні різних шкіл Чернігівської області. Тож учасники «Джури» часто виступають в ролі інструкторів зі стрільби.

Організаторами багатьох загальноміських та загальношкільних екологічних акцій є учасники дитячого об'єднання «Екопатруль». З метою привернення уваги

громадськості до екологічних проблем вони влаштовують загальноміські конкурси малюнку «SOS! Планета Земля!», конкурси соціальних проектів «Збережемо тепло!», «Домашній улюбленець в біді!».

Учасники дитячого об'єднання «Екопатруль» звернулися до міської влади з проханням облаштувати притулки для тварин, допомагали в облаштуванні трьох екостежок в регіональному ландшафтному парку «Ніжинський», на яких також проводили наукові дослідження тощо.

Ініціаторами благодійних акцій та соціальних проектів постійно виступають учасники дитячого об'єднання «Волонтер». Учні аналогічних об'єднань з інших закладів загальної середньої освіти часто співпрацюють для вирішення питань допомоги в лікуванні учнів чи інших людей, допомоги нужденним, воїнам АТО тощо. Об'єднуючи зусилля вони досягають вражаючих результатів. Так, за їх ініціативи було куплено 3 тепловізора, 12 бронежилетів, надано грошову допомогу багатьом онкохворим та погорільцям, малозабезпеченим сім'ям тощо. У соціальних мережах вони створили групу «Ми допоможемо», де розміщують відповідну інформацію.

Ідеї, покладені в основу цього досвіду – це формування в учнів активної життєвої позиції, небайдужого ставлення до оточуючого середовища й соціуму, всебічний розвиток особистості в результаті: організації взаємодії дитячих об'єднань експериментальних ЗЗСО з метою створення простору соціальної взаємодії для розвитку соціальної активності дітей та молоді; створення єдиної бази методичних матеріалів з організації діяльності дитячих об'єднань на базі ЗЗСО, необхідних для використання в практичній роботі; створення необхідних умов для побудови конструктивного діалогу, мережевої взаємодії між освітніми установами та дитячими об'єднаннями з питань, пов'язаних з організацією спільної діяльності з актуальних напрямів роботи з метою обміну досвідом шляхом організації семінарів і круглих столів; створення внутрішньошкільних дочірних дитячих об'єднань.

Висновки. Отже, створення освітньо-інформаційного простору закладу освіти є однією з основних умов для формування соціальної активності учнів. Дитячі об'єднання, як складова цього простору, за умови організації роботи з урахуванням інтересів і пріоритетів спільної діяльності та збереження традицій ЗЗСО у поєднанні з інноваційними технологіями, можуть виступати фактором розвитку соціальної

активності особистості.

Аналіз проблеми формування соціальної активності учнів ЗЗСО потребує подальшого й різнопланового дослідження, зокрема, теоретичного обґрунтування та експериментальної перевірки педагогічних умов формування соціальної активності учнів закладів загальної середньої освіти.

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Translation of the Title, Abstract and References to the Author's Language

УДК 37.01.33

Булавенко Світлана Дмитрівна. Освітньо-інформаційний простір закладу освіти як педагогічна умова формування соціальної активності учнів.

У статті розглядаються особливості освітньо-інформаційного простору закладів освіти для формування соціальної активності учнів. Уточнено сутність освітньо-інформаційного простору для формування соціальної активності учнів та основні його характеристики. Особливості спеціально організованого освітньо-інформаційного простору для формування соціальної активності особистості в закладах освіти у статті розглянуто через участь школярів у дитячих об'єднаннях. Визначено, що дитячі об'єднання сприяють формуванню в учнів активної життєвої позиції, небайдужого ставлення до оточуючого середовища й соціуму. В освітньо-інформаційному просторі формування соціальної активності учнів можливе завдяки: організації взаємодії дитячих об'єднань експериментальних закладів освіти; створення єдиної бази методичних матеріалів з організації діяльності дитячих об'єднань на базі шкіл, необхідних для використання в практичній роботі; створення необхідних умов для побудови конструктивного діалогу, мережевої взаємодії між освітніми установами та дитячими об'єднаннями з питань, пов'язаних з організацією спільної діяльності з актуальних напрямів роботи з метою обміну досвідом шляхом організації семінарів і круглих столів; створення внутрішньошкільних дочірних дитячих об'єднань.

Ключові слова: освітньо-інформаційний простір, педагогічні умови, формування соціальної активності учнів, дитячі об'єднання, заклади загальної середньої освіти.

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DOI 10.32370/IA_2019_09_22

IMPROVING THE ART OF EDUCATION IN THE DAILY ACTIVITIES OF A WALDORF TEACHER

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Abstract

The article discuss the question of the teacher's professional development in accordance to the modern education challenges. Waldorf Education is taken as an example of effective teachers' professional on-going development. Rudolf Steiner (1861-1925), an Austrian philosopher and thinker, a founder of the first Waldorf School (die Freie Waldorfschule) in Stuttgart (Germany) in 1919, considered education not just as a science but also as an art. He stated that the art of education could be brought to life "through observation and contemplation of the cosmos and its connection with the human being" [4]. Steiner gave certain practical advices in the teachers' training, practice and feedback to provide adequate follow-up support in order to create the teachers' learning communities. The article observes the initial training of Waldorf teachers in their daily activities that include weekly teachers' conferences, child observation and class observation exercises, artistic workshops, lectures, seminars etc. The discussed problem is an essential part within the wider context of education reforms in Ukraine.

Key words: teacher's professional development, Rudolf Steiner, Waldorf School, Waldorf Teacher.

Актуальність дослідження. Особистість педагога – проблема, яка є центром соціальних та наукових дискусій не одне століття. В. Андрущенко зазначає, що «підґрунтям моделювання педагогічного образу ідеального вчителя виступають філософські концепції про ідеал людини – мудрої, доброї та справедливої, здатної передати свої знання дітям, виховати у них високі духовні якості. В основі цього ідеалу містилися, послідовно змінюючи одне одного, роздуми про людину античних мислителів, філософів середніх віків, епохи Відродження, нового і новітнього часу, класичних та модернізаційних філософських систем». [1]

Сучасна вітчизняна наукова думка, глибоко осмислюючи проблему формування особистості сучасного вчителя (Н. Абашкіна, В. Андрущенко, І. Бех, С. Гончаренко, В. Гончаров, М. Євтух, Ю. Завалевський, І. Зязюн, В. Кремень, О. Савченко, С. Сисоєва, В. Огнев'юк, В. Чайка та ін.), визначила широкий спектр особистісних якостей педагога, компетентностей, кваліфікаційних вимог, моделей формування, складових педагогічної майстерності тощо. Нова гуманістична парадигма освіти базується на засадах

демократії, людиноцентризму, педагогічної свободи [3], яку Рудольф Штайнер (1861-1925) відстоював на початку ХХ ст., будуючи Вальдорфську школу.

Виклад основного матеріалу. Важливим принципом вальдорфської педагогіки є ідея класного вчителя, духовного наставника, який супроводжує розвиток дитини та становлення її особистості протягом 8 років, викладаючи якомога більше предметів. Узагальнюючи сучасні підходи щодо особистості й діяльності педагога та аналізуючи ідеї Р. Штайнера, [4, 5, 6, 7, 8], визначаємо *«портрет вальдорфського вчителя»,* який, за задумом автора Вальдорфської школи, є *вчитель-поліфункціоніст*. Він\вона:

Вчитель-митець, який, реалізовуючи ідеї мистецтва виховання художньо, творчо вирішує педагогічні задачі;

Вчитель-духовний наставник, який власним моральним прикладом, природним авторитетом веде дитину до істинної свободи у її дорослому житті;

Вчитель-ерудит, який викладає більшість (або всі навчальні предмети), орієнтуючись на вік дитини, а не сповідує позицію фахівця окремого предмета;

Вчитель-терапевт, який педагогічними засобами зцілює фізичне та душевне дитини;

Вчитель-консультант, який поєднує психолого-педагогічний супровід не тільки дитини, я й усієї родини;

Вчитель, водночас *соціальний педагог,* який дбаючи про індивідуальне, формує соціальні якості особистості;

Вчитель-менеджер, який дбає про соціальний організм школи, вправляючись в управління різними сферами шкільного життя.

Високі вимоги до ідеалу педагога на сьогодні зупиняють молодь у виборі цієї професії. Дослідники вальдорфської педагогіки зазначають, що, як правило, у Вальдорфську школу приходять люди, які мають життєвий дослід, які приводять до школи своїх власних дітей або ж самі заходяться у пошуках життєвого шляху. Працюючи у Вальдорфській школі, можна спостерігати, що більшість вчителів отримують другу педагогічну освіту, свідомо обираючи професію вчителя.

Рудольф Штайнер у своїх лекціях та доповідях, зустрічах з педагогами, формуючи високий ідеал вальдорфського вчителя, дає конкретні поради щодо підготовки педагогів та удосконалення педагогічної майстерності. Австралійський дослідник А. Маззоне [9] узагальнив теоретичні аспекти підготовки вальдорфських вчителів та, проаналізувавши існуючий досвід з цієї проблеми, визначив основні *компоненти* теоретичної та практичної підготовки педагогів для роботи у Вальдорфських навчальних закладах, а саме:

1. Основи антропософії.
2. Теоретичні та практичні аспекти вальдорфської педагогіки (розвиток дитини, зміст і методи навчання).
3. Мистецтво (живопис, ліплення, музика)
4. Мистецтво мовлення, театр.
5. Мистецтво руху (евритмія, ботмерівська гімнастика, спорт, соціальні ігри).
6. Ремесла.
7. Шкільний менеджмент (теорія соціальної трикомпонентності суспільства, робота педагогічної колегії, формування соціальних відносин).
8. Предметно-просторова організація класної кімнати.
9. Педагогічна практика.

При цьому автор зазначає, що «Вальдорфські школи не обмежують своїх співробітників прийняттям виключно антропософії, проте очікують від них симпатії щодо ідей та цінностей вальдорфської педагогіки. Прийняття ідей Штайнера щодо природи людини, розвитку дитини та широких аспектів навчальної програми Вальдорфської школи можливе без занурення в детальний аналіз філософських ідей Штайнера». [9]

Велике значення у вальдорфській педагогіці приділяється «внутрішній роботі» вчителя. Узагальнюючи рекомендації Р. Штайнера та досвід колегіальної роботи вчителів різних Вальдорфських шкіл щодо самовдосконалення та саморозвитку, маємо наступні форми:

Педагогічні колегії (конференції за Штайнером) – регулярні, щотижневі (як правило щочетверга) зустрічі усіх педагогічних працівників школи. Метою

таких зустрічей є, за рекомендаціями Штайнера, вивчення людинознавства, удосконалення педагогічної майстерності через спільну педагогічну роботу. Ці конференції є *поточною вищою школою* для вчителів, постійно діючою педагогічною семінарією, де обговорюються фундаментальні питання педагогіки, методики та дидактики, психології, антропології розвитку, відбувається обмін практичним досвідом навчальної та виховної роботи, самонавчання, самовиховання та саморозвиток вчителів. Важливою умовою є відкритість та свобода кожного учасника колегії: ніхто не має права дорікати чи критикувати, педагоги обмінюються не тільки досягненнями, а й невдачами, помилками чи проблемами. Р. Штайнер [6, 7] неодноразово говорив, що *Педагогічна конференція* (засідання педагогічної колегії) є «серцем», яке своєю «кров'ю» живить усю роботу школи.

Важливо зазначити, що такі педагогічні колегії мають свою структуру та складаються з наступних компонентів:

Перша частина. *Педагогічні читання* - простір для саморозвитку в теоретичних підвалинах вальдорфської педагогіки. Філософські праці Р. Штайнера є непростими для опрацювання, а отже *Педагогічні читання* здійснюються за певною технологією, поволі, осмислюючи абзац за абзацом. Важливим у такій роботі є не просто приймати на віру слова Штайнера, інакше вони, стають «мертвими методичними рекомендаціями», що підкреслював автор педагогіки з самого початку, а ставити запитання, зрозуміти, внутрішньо перевірити, погодити з власною позицією або ж не погодитись і шукати відповідь.

Друга частина. *Психолого-педагогічні колегії-консиліуми «Розгляд дитини»* - організаційна форма, в рамках якої відбувається розробка і планування психолого-педагогічного супроводу учня. *Колегія-консиліум* об'єднує інформацію про окрему дитину, якою володіють вчителі-предметними, класні керівники, шкільний медичний працівник, психолог, соціальний педагог, арт-терапевт, вихователь дитячого садка, який відвідувала дитина до школи, та ін. Такий розгляд дитини має свою чітку структуру та методику проведення,

готується заздалегідь, як правило, класним вчителем (класним керівником), глибоко занурюючись у деталі, особливості розвитку дитини від народження. На основі цілісного бачення проблеми, розробляється загальна педагогічна стратегія психолого-педагогічних впливів.

Психолого-педагогічні колегії-консиліуми «Ретроспектива життєдіяльності класів» - організаційна форма, в рамках якої відбувається розробка і планування психолого-педагогічного супроводу визначених учнівських груп та класів. *Колегія-консиліум* об'єднує інформацію про окремий клас, ступінь (молодший, середній, старший) школи, якою володіють вчителі-предметними, класні вчителі, вчитель групи подовженого дня, психолог, соціальний педагог. На основі цілісного бачення проблеми розробляється загальна педагогічна стратегія роботи з класом.

Психолого-педагогічні колегії-консиліуми проводяться у ритмі чергування (через четвер, або ж за потребою чи домовленістю).

В залежності від потреб, можливостей, розміру педагогічної колегії в 2-й частині можуть проходити художні заняття (евритмія, живопис, співи, соціальні вправи тощо), обговорення методичних питань або питання, на яким працює школа протягом навчального року, тощо.

Третя частина. *Організаційна.* Тут обговорюються нагальні потреби школи: відбувається представлення нових вчителів, розробляються концепції шкільних свят, соціальних проектів, створюються робочі групи з вирішення окремих задач, конфліктних ситуацій тощо. Дана частина засідання Педагогічної колегії є простором інформування та прийняття важливих організаційних рішень щодо життєдіяльності школи. На засідання для вирішення спільних завдань запрошуються представники Батьківського активу, педагоги інших шкіл та громадських об’єднань.

Педагогічні колегії класів. Проводяться у кожному класі 1 раз на чверть (за потребою зустрічі можуть бути більш регулярними). До складу такої колегії входять усі педагоги, які працюють в класі, психолог, терапевти. На таких засіданнях обговорюються вікові особливості учнів, тематичне наповнення

навчального плану, погоджуються спільні проекти, розглядаються складні ситуації, індивідуальні ситуації учнів, розробляється загальна педагогічна стратегія роботи з класом.

Предметні методичні об'єднання. Завданням таких об'єднань є:

- актуалізація завдань предметів, що вивчаються, з позицій вальдорфської педагогіки,
- розробка окремих уроків;
- обмін власними методичними розробками та педагогічними знахідками;
- взаємовідвідування уроків, виховних заходів;
- організація різноманітних проектів, участь в заходах різного рівню;
- методичний супровід нових вчителів та епох класних вчителів спеціалістами;
- створення умов для методичного вдосконалення педагогічних працівників;
- висвітлення тематичної інформації.

Індивідуальні консультації організовуються за запитом педагогів у довільній формі.

Вільні педагогічні ініціативи – це простір для вільного обміну педагогічним досвідом та саморозвитку вчителів, відритий як для педагогів школи, так і для тих, кого цікавлять теми, що обговорюються (батьки, студенти вальдорфського семінару, колеги з інших шкіл). Така вільна ініціатива може бути присвячена дослідженню загально педагогічного питання, вивченню літератури, лекціям у контексті світоглядних питань тощо.

Художньо-практичні ініціативи – це простір для саморозвитку педагога через мистецтво, відритий як для педагогів школи, так і колег з інших шкіл, батьків, студентів вальдорфського педагогічного семінару (художні майстерні, живописні студії, архітектурні проекти тощо.)

Творчі об'єднання – вільні ініціативи, простір для саморозвитку вчителя, відритий як для педагогів школи, так і для батьків, студентів

вальдорфського педагогічного семінару. Такі об'єднання можуть створюватись для постановки п'єси до свята, концерту, творчого вечора тощо. Так, наприклад, традицією кожної Вальдорфської школи є постановка п'єси «Різдвяна гра», яка стає центральним дійством зимових свят. Акторам стають саме вчителі, батьки та друзі школи. Це завжди довгоочікувана подія. Незважаючи на те, що така вистава ставиться щороку, кожного разу уся спільнота з нетерпіння чекає на неї, адже кожного разу акторський склад змінюється, а це означає, що можна побачити у виставі свого вчителя чи свою маму.

Робочі групи створюються для організації свят, відкритих заходів, конференцій тощо, є тимчасовим об'єднанням педагогів для виконання поставленої задачі. В завдання такої групи входить педагогічне осмислення цілей заходу, виховне наповнення, складання плану або сценарію, розподіл обов'язків між усіма педагогами, звернення за допомогою до адміністрації, батьків тощо.

Методичний тиждень проводиться двічі на рік - в кінці навчального року (червень) та перед початком нового (серпень) й включає в себе наступні компоненти: педагогічні читання, аналіз життєдіяльності та психолого-педагогічних особливостей класів (або ж планування року відповідно до вікових потреб учнів), опрацювання методичної теми, саморозвиток через художньо-практичну діяльність та соціальні ігри, обмін досвідом тощо. Така форма роботи передбачає щоденну інтенсивну роботу (з 9.00 до 16.00) та є джерелом самовдосконалення, роботи з новими педагогами, самоаналізу та соціальної взаємодії вчителів.

Окрім зазначених вище форм організації методичної підтримки та саморозвитку вчителів на базі Вальдорфських шкіл організовують лекції та семінари з питань педагогіки, історії, культури тощо. Вчителі, як правило, щороку відвідують міжнародні семінари, конференції, конгреси з питань вальдорфської педагогіки, де створюється простір для міжнародного обміну

досвідом. Часто школа сама стає організатором регіональних семінарів для підготовки вчителі для роботи у Вальдорфських навчальних закладів.

Так, скажімо, в Україні на сьогодні єдиною можливістю отримати цілісну підготовку з питань вальдорфської педагогіки є Всеукраїнський вальдорфський педагогічний семінар, що проводиться ВГО «Асоціація вальдорфських ініціатив в Україні» за підтримки ІАО (Міжнародна Асоціація Вальдорфської педагогіки в Центральній та Східній Європі). Базою даного постійно діючого семінару є існуючі Вальдорфські школи України, Педагогічною колегією – вчителі Вальдорфських шкіл. Семінар працює у режимі очно-заочного навчання, з 4 сесіями на рік, кожна з яких проводиться на базі однієї зі шкіл. На такі інтенсивні сесії приїжджають учасники з усієї України, що дозволяє використати ресурси навчальних закладів (досвідчені педагоги школи, викладачі мистецтв, приміщення, матеріали тощо) та запрошуються колеги з-за кордону, які мають досвід у викладанні людинознавчих предметів або ж досвідчені вальдорфські класні вчителі.

Висновки. Говорячи про вільну Вальдорфську школу, перш за все, мають на увазі свободу, яку має педагог у своїй педагогічній діяльності. «…Дуже важлива умова – свобода ініціативи педагога. <…> Ви можете побачити, як один і той самий предмет викладається в паралельних класах різними методами. Чому ми так чинимо? Тому що суттєвий елемент навчання - індивідуальність вчителя. Урок може бути гармонійним тільки при живому і міцному контакті вчителя з усім класом», зазначав Р. Штайнер [7]. На думку автора Вальдорфської школи абстрактно можна скласти чудові навчальні програми, зовсім інша справа – реалізовувати їх, оскільки в житті з’являється елемент індивідуальності. Тож, маючи педагогічну свободу, вчитель працює в педагогічній колегії, яка захищає навчальний процес від анархії. Працюючи разом глибоко над педагогічними, методичними, діагностичними, терапевтичними проблемами, вчителі, розвиваючись самі, краще пізнають своїх колег, їхні сильні та слабкі сторони, якості характеру, особливості

темпераменту. А отже, колегія може порадити, застерегти або навіть перешкодити прийняти невірне рішення, супроводжувати ті чи інші процеси.

Сьогодні, на нашу думку, прогресивним кроком в реформуванні системи освіти України стали такі нововведення в Законі України про освіту як *академічна свобода* та *автономія навчального закладу*, що за словами чинного Міністра освіти і науки України Л. Гриневич [2] «мають поліпшити умови праці вчителя за рахунок зменшення бюрократичного контролю, розширення академічних свобод і формування простору для творчої праці. Буде обмежено втручання державних органів і органів місцевого самоврядування в освітній процес». Вальдорфська педагогіка має вже майже столітній досвід впровадження цих положень Закону про освіту України.

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Translation of the Title, Abstract and References to the Author's Language

Олена Мезенцева. Удосконалення мистецтва виховання в повсякденній діяльності вчителя Вальдорфської школи.

У статті розглянуто питання професійного розвитку вчителя у відповідності до сучасних освітніх викликів. Автор розглядає вальдорфську педагогіку як приклад ефективної системи професійного розвитку вчителів. Рудольф Штайнер (1861-1925), австрійський філософ і мислитель, засновник Першої Вальдорфської школи (die Freie Waldorfschule) у Штутгарті (Німеччина) у 1919 р., розглядав освіту не лише як науку, а й як мистецтво. Він зокрема зазначав, що мистецтво виховання може бути реалізовано «шляхом спостереження та споглядання космосу та його зв'язку з людиною» [4]. Штайнер дав ряд практичних порад щодо навчання вчителів, педагогічної практики та системи зворотного зв'язку педагогів, задля забезпечення ефективної підтримки професійного розвитку вчителя та створення педагогічної спільноти, що навчається та розвивається. У статті упорядковано систему заходів щодо удосконалення мистецтва виховання у повсякденній діяльності вальдорфського вчителя. яка включає щотижневі педагогічні конференції, спостереження за дітьми та спостереження за класом, художні майстер-класи, лекції, семінари тощо. Представлена проблема є важливою частиною широкого контексту освітніх реформ в Україні.

Ключові слова: професійний розвиток вчителя, Рудольф Штайнер, Вальдорфська школа, вальдорфський вчитель.

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DOI 10.32370/IA_2019_09_23

Formation of Artistic Orientations of Senior Pupils in the Context of Modern Methodological Approaches

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Abstract

The article describes the methodological approaches of forming the artistic orientations of senior pupils in secondary school. The importance of the Art education of senior pupils as an opportunity of awareness of the value of human experience is identified. Personal perception of art values is provided by artistic orientations in the world of culture. The essence of the category "value" is given. The author presents methodological approaches of forming the artistic orientations of senior pupils. Methodological landmarks of the Art in secondary school in the context of the universal, national and personal values are defined. Proved that of forming the artistic orientations of senior pupils in art education opens opportunities for the inner development of young people in the way of using arts as a means of the senior pupils' personal development.

Key words: art, artistic education, methodological approaches, values, senior pupils.

Постановка проблеми. Розвиток сучасної мистецької освіти все більш спрямовується на формування особистості, її духовних орієнтирів, світогляду, гуманістичного ставлення до навколишньої дійсності.

Мистецтво завжди було зверненим до людини, до її внутрішнього світу, транслюючи духовні цінності та ідеали багатьох поколінь. Теоретики мистецької освіти (Е. Абдуллін, Л. Масол, О. Отич, Г. Падалка, О. Рудницька, О. Щолокова та ін.) наголошують, що художні образи безпосередньо звернені до сенсорної сфери людини, її емоцій та почуттів, спонукають до їх особистісного переживання і тим самим забезпечують чуттєвість та глибинність впливу на становлення особистості, формування її свідомості. Тож, глибина сприймання мистецтва регулюється потребою реципієнта у спілкуванні з художніми образами, що в свою чергу загострює питання вибіркового ставлення особистості до них як художніх цінностей, усвідомлення власних неповторних переживань емоційного змісту художніх творів, індивідуального оцінювання художніх образів. Надання переваги тим чи іншим видам мистецтва (музика, хореографія, живопис, література, театр та ін.), його жанрам та напрямкам забезпечується багатьма чинниками індивідуального сприйняття (художні нахили,

здібності та ін.) та художніми орієнтаціями особистості, що визначають художні потреби, інтереси, ідеали, уподобання.

Саме через художні орієнтації актуалізуються художні та естетичні цінності, що є важливим чинником духовного розвитку особистості. З огляду на це, формування художніх орієнтацій учнів є важливою проблемою сучасної мистецької освіти. Особливого значення вона набуває в мистецькому навчанні старшокласників, коли активно формується особистість, її внутрішній світ, життєві цінності та ідеали, загострюються питання самовизначення.

Формування художніх орієнтацій старшокласників – складний і неоднозначний процес, потребує значних зусиль педагога щодо широкого ознайомлення учнів із явищами художньої культури, зосередженості на індивідуальних реакціях особистості на художні образи, розвитку критичного мислення в оцінюванні художніх творів. При цьому, ефективність педагогічного процесу, як наголошують вчені-педагоги (В. Андрущенко, С. Гончаренко, В. Краєвський, Т. Кун, В. Курило, О. Сухомлинська, Є. Хриков та ін.), забезпечується визначеністю та обґрунтованістю методології досліджуваного явища, від якої залежить вибір стратегій і методів педагогічної роботи означеного напрямку.

Мета статті − розглянути сучасні методологічні підходи щодо формування художніх орієнтацій старшокласників в умовах мистецької освіти в загальноосвітній школі.

Виклад основного матеріалу. Художніх орієнтації є феноменом, що забезпечує вибірковість ставлення особистості до того чи іншого різновиду, жанру мистецтва, художньої діяльності, зумовлюється художньо-естетичними потребами, художньою інформованістю, сформованістю почуттєвої сфери, наявністю досвіду спілкування з художніми образами мистецтва. Художні орієнтації становлять, з одного боку взаємозв’язок елементів психологічної спрямованості особистості (інтересів, смаків, потреб, уподобань, установок), а з іншого – виступають як відображення певного художнього досвіду, поінформованості в царині мистецтва та художньої культури. Отже, художні орієнтації створюють змістовну сторону спрямованості особистості до вивчення різноманіття мистецтва і виражають внутрішню характеристику особистісного ставлення до художніх образів.

Ефективність формування художніх орієнтацій старшокласників значною мірою обумовлюється обґрунтуванням методологічних підходів, що визначають головні ідеї та стратегії педагогічного процесу, як «принципів і способів організації і побудови теоретичної і практичної діяльності» [1, с. 163]. За словами О. Отич, «методологічні підходи дозволяють не лише проаналізувати й описати досліджуваний процес, виявивши певний аспект розуміння сутності досліджуваних освітніх явищ, але й передбачити можливі варіанти його розвитку, ідентифікувати феномени освіти, використовуючи інформаційні модулі, що становлять її змістове ядро й визначають наукові та світоглядні орієнтири її реалізації» [2, с. 180].

У мистецькій педагогіці існує велика кількість методологічних підходів, які визначають спрямованість досліджень різноманітної художньо-освітньої проблематики та відображають специфіку педагогічних явищ. Оскільки мистецьке навчання має по своїй суті особистісне спрямування, базовим підходом у педагогічних дослідженнях мистецької галузі є *особистісний,* який ґрунтується на положеннях гуманістичної парадигми освіти, що охоплює ідеї людиноцентризму, а учня визнає центром освітнього процесу. Формування художніх орієнтацій старшокласників з позицій цього підходу розглядається як процес художнього розвитку особистості учня, виявлення та реалізації його творчого потенціалу через залучення до різних видів художньої творчості.

Важливим методологічним підходом у мистецько-педагогічних дослідженнях є к*ультурологічний,* що наповнює мистецьку освіту культурними смислами, орієнтує навчальний процес на широке ознайомлення учнів з культурними цінностями мистецтва, передбачає спонукання учнів до пізнання різних художніх напрямків та різновидів мистецтва, систематичного збагачення і розширення мистецького досвіду як засобу формування особистісної культури. У контексті культурологічного підходу мистецька освіта постає як продукт культури, результат культурно-історичного розвитку людства, а вчителі та учні, не тільки як споживачі, а й як творці культури.

Культурологічний підхід є ключовим у формуванні художніх орієнтацій старшокласників, оскільки спрямовує на пізнання учнями художньої культури як явища суспільного буття, ознайомлення з широкою панорамою художніх образів мистецтва та усвідомлення їх ціннісного значення.

Спрямованість на осмислення духовних цінностей художньої культури забезпечує *аксіологічний* підхід. Мистецтво залучає людину до естетичних і художніх цінностей, примушує її переживати і усвідомлювати ці цінності лише за умови самовизначення в цих цінностях, «переробки» їх у власній душі. Повнота сприймання та засвоєння художніх та естетичних цінностей мистецтва залежить від контакту з чуттєвою сферою реципієнта. Однак, емоційність переживання художнього образу [5] повною мірою зумовлена особистісним ставленням реципієнта до нього. Звісно, вибірковість ставлень до художніх образів формується на основі досвіду спілкування з художніми творами, орієнтацій у царині мистецтва, поінформованості учнів щодо його різновидів, жанрів і стилів, що є основою формування художніх орієнтацій особистості. Аксіологічний підхід у формуванні художніх орієнтацій старшокласників передбачає вивчення художніх явищ з позиції їх цінності для розвитку особистості, формування її світогляду, гуманістичного ставлення до навколишнього світу.

Комунікативний підхід, як один із системоутворюючих чинників сучасної моделі мистецької освіти, у формуванні художніх орієнтацій старшокласників орієнтує на опанування принципами, нормами, способами, уміннями міжособистісної та художньої комунікації на засадах суб'єктності та діалогу, толерантності та емпатії, критичного мислення й ціннісної інтерпретації художніх текстів. У зв'язку з цим увага фокусується на взаємозв'язках між суб'єктами художнього спілкування та внутрішнього діалогу з художніми творами як джерела духовного збагачення, естетичного удосконалення особистості.

Формування художніх орієнтацій старшокласників ґрунтується як на загальновизнаних мистецькою педагогікою методологічних підходах, та і враховує новітні методологічні орієнтири мистецької освіти. *До таких методологічних підходів відносимо синергетичний, екзистенційний, феноменологічний, гедоністичний підходи.* Розглянемо їх детальніше.

Визначення важливості *синергетичного підходу* пов'язано з тим, що формування художніх орієнтацій старшокласників є не лише поступовим, лінійним, безконфліктним процесом, а й супроводжується складними трансформаційними змінами самосвідомості учня, передбачає самопізнання та самовиховання. Це обумовлює важливість процесів самоорганізації, які пояснює та виявляє синергетика (з

грецьк. synergetikos («со» − «спільно» і «ергос» − «дія»). Синергетика пояснює хаотичний рух як можливість самоорганізації. Особливості хаотичного руху всередині системи як створення можливостей її самоорганізації виявив німецький вчений Г. Хакен. Він довів, що неупорядкованість (хаотичність) є не тимчасовий недолік, який потрібно подолати, а нормальний стан природних, соціальних і психічних явищ і процесів, що самоорганізуються і саморозвиваються [8]. Саме з таких позицій вчені-педагоги (О. Бочкарьов, С. Клепко, В. Кремень, В. Кушнір, М. Поташник та ін.) обґрунтовують доцільність синергетичного підходу в педагогічних дослідженнях. Цей підхід визначає множинність нелінійних законів та варіантність вибору шляхів самоорганізації в педагогічному процесі. Це створення умов і надання широких можливостей кожному суб'єкту освітнього процесу щодо самоорганізації та саморозвитку, стимулювання до самостійного і відповідального прийняття рішень, визначення індивідуальної траєкторії освіти, темпу навчання, творчих завдань та ін.

Синергетичний підхід має особливе значення в мистецькій освіті, оскільки художній творчості, художньому мисленню завжди притаманний інтуїтивний пошук, неформальна логіка. Мистецька освіта, що інтегрує різноманітні художні знання, уявлення, цінності, з позиції синергетичного підходу має допомогти учневі в самоорганізації цих знань, уявлень, цінностей.

Так, на початковому етапі формування художніх орієнтацій старшокласник заглиблюється у безмежний світ художньої культури. Багатоманітність мистецьких явищ створює певний хаос у його свідомості. Систематичність мистецького навчання, художня комунікація з приводу мистецьких вражень та ін. сприяє упорядкуванню думок школяра, формуванню художнього мислення, критичної оцінки, визначенню власних уподобань та художніх орієнтацій в культурі, а також усвідомлення та окреслення шляхів власного саморозвитку в художній творчості.

Акцентуація саморозвитку старшокласника в процесі формування його художніх орієнтацій обумовлює виокремлення *екзистенційного підходу* у дослідженні означеної проблеми. Зазначимо, що екзисенційний підхід (від лат. exsistentia – існування) у педагогіці ґрунтується на ідеях філософського екзистенціалізму (філософії існування) – повернення людини до самої себе, пізнання внутрішнього світу, відкриття «інтимної

самості» (М. Бердяєв, М. Гайдеггер, С. К'єркегор, Р.Марсель, Ж.-П. Сартр, К. Ясперс та ін.).

У формуванні художніх орієнтацій старшокласників екзистенційний підхід зумовлює визнання свободи самовизначеності учня у світі художньої культури, звернення до власного внутрішнього життя, безпосередніх переживань художніх образів, що відкривають вищі смисли існування людини та її відносини зі світом.

Формування художніх орієнтацій старшокласників передбачає особистісне сприймання художніх образів учнями. З огляду на це, постає необхідність виокремлення *феноменологічного підходу* (від грецьк. phainomenol – «те, що з'являється» та logos – «вчення»), що дає змогу виявляти акти свідомості у сприйнятті художнього твору, передбачає урахування особливостей неповторно-індивідуального досвіду сприйняття мистецтва. Феноменологічний підхід орієнтує на те, що художній твір переживається людиною більш реально, якщо вона сама шукає смисл художнього твору і цей смисл у нього вкладає, а не отримує його від іншого. Це акцентує суб'єктивний смисл художніх орієнтацій.

Вивчення явищ художньої культури є неможливим без отримання насолоди від спілкування з художніми творами. Акцентує роль естетичного задоволення у вивченні мистецтва *гедоністичний підхід* (від грецьк. hedone –задоволення). Відчуття краси, переживання гармонії, досконалості, усвідомлення прекрасного як духовного піднесення – неодмінні характеристики художніх орієнтацій. Поза гедоністичним ставленням процес формування художніх орієнтацій неможливий, як і повноцінне сприйняття художніх творів, різновидів мистецтва.

Формування художніх орієнтацій старшокласника передбачає не лише повноцінне сприйняття творів мистецтва, визначення пріоритетів у художній культурі, а й самовизначеність школяра в художньо-творчій діяльності та самореалізацію в ній. Сферу практичної творчої діяльності учня, що забезпечує реалізації його творчих можливостей визначає *діяльнісний підхід***.** Він забезпечує старшокласнику вільний вибір виду художньої творчості, відповідно до власних здібностей, інтересів, нахилів, та досягнення позитивних змін у саморозвитку, самореалізації.

Висновки. Отже, формування художніх орієнтацій старшокласників є складний і багатогранний процес, що враховує як традиції мистецької освіти так і нові ідеї її

розвитку. Сучасні методологічні підходи формування художніх орієнтацій (особистісний, культурологічний, аксіологічний, комунікативний, синергетичний, екзистенційний, феноменологічний, гедоністичний, діяльнісний) спрямовують педагогічний процес на розвиток духовного світу молоді шляхом самовизначення в художній культурі та саморозвитку і самореалізації в художній творчості.

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Translation of the Title, Name and Abstract to Author's language

УДК 37.013.73

Паньків Л. І. Формування художніх орієнтацій старшокласників у контексті сучасних методологічних підходів.

У статті висвітлюється проблематика мистецького навчання старшокласників. Визначено значення мистецької освіти у формуванні особистості, її світогляду, духовного світу. Розглянуто сутність і значення художніх орієнтацій особистості.

Визначено сучасні методологічні підходи формування художніх орієнтацій старшокласників. Доведено, що формування художніх орієнтацій старшокласників відкриває нові можливості для духовного розвитку молоді на шляху використання мистецтва як засобу особистісного зростання.

Ключові слова: художня культура, мистецтво, мистецьке навчання, художні орієнтації, методологічні підходи, цінності, старшокласники.

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DOI 10.32370/IA_2019_09_24

INFLUENCE OF LIQUID LEVEL ON REATE OF HEAT TRANSFER DURING PROPANE BOILING ON SURFACE WITH CAPILLAR-POROUS STRUCTURE

Vitali Litvinenka

The liquid level above the heat-liberating surface has essential impact on the rate of heat transfer in the field of low thermal loads (by 2 kW/m^2), therefore, the study of this phenomenon is a relevant task.

This paper contains the results of experiments for heat transfer during propane boiling in a large volume and on a partially submerged copper tube with the sintered capillary-porous structure. Researches were conducted at saturation temperature 20^{o}C, what conforms to saturation pressure p = 8.4 bars = 8.4x10^5 Pa ($p^* = p/p_{kp}$ = 0.197), in the area of thermal loads from 0.03 kW/m^2 to 78 kW/m^2. Height of the propane level in relation to the lower generating line of the tube fluctuated from 75 to 0 mm. Experiments showed that liquid level reduction down to 5 mm above the upper generating line does not considerably influence the rate of heat transfer. With the propane level, commensurate with the diameter of bubbles at departure, heat transfer coefficients were 1.5 times higher than with the same level of thermal loads under conditions of a large volume. Reduction of overheating of the boiling process beginning by (2.5 – 3)^{o}C was noted as compared with the respective values of heat flux densities during boiling in a big volume. Increase of heat transfer coefficients by 3 times in the area of small thermal loads was fixed at a partially submerged sample. This is explained by various heat exchange mechanisms during steam generation inside the porous layer under conditions of a big volume and during replenishment supply of the heating surface with the liquid phase with the aid of capillary forces.

The further reduction of the liquid level up to the lower generating line of the tube negatively influences the rate of heat transfer at thermal loads above 10 kW/m^2. This is due to the growth of mean overheating of the heat-liberating surface in

relation to saturation temperature, which is the consequence of worse conditions of liquid delivery to the surface of evaporation with capillary forces.

The obtained results may have important practical value during the design of heat exchangers of the evaporative type, as small sizes and operating efficiency of industrial equipment depend on density of heat flux.

DOI 10.32370/IA_2019_09_25

The great Theorem of Pierre de Fermat as a special case abc conjecture and the proof of Andrew Beal hypothesis. Part 2.

Of course Mr. Pierre de Fermat did not know the ABC hypothesis, let alone hypothesis Taniyama-Shimura. He simply wrote that there is no solution in integers $x^n + y^n = z^n$ if n $\succ 2$
He understood the essence of the proof, but did not even begin to uncover it, assuming it is elementary. It even went as far that some asserted that Mr. Pierre de Fermat had been mistaken in the simplicity of the theorem. Some even say that it is impossible to prove the Great Theorem. Those are very brave and self-confident allegations.
However Mr. Fermat was a genius and that which seemed impossible to some, to him was obvious and simple. So how could he have realized how it looks like in one moment?

Perhaps like this:

$$x^n + y^n = z^n$$

a) $\sqrt{x^n} = \sqrt{z^n - y^n}$ if $n \succ 2 \Rightarrow \sqrt{x^n} = x\sqrt{x^{n-2}}$

$\sqrt{y^n} = \sqrt{z^n - x^n}$ if $n \succ 2 \Rightarrow \sqrt{y^n} = y\sqrt{y^{n-2}}$

$\sqrt{z^n} = \sqrt{x^n + y^n}$ if $n \succ 2 \Rightarrow \sqrt{z^n} = z\sqrt{z^{n-2}}$

b) $$\frac{x\sqrt{x^{n-2}}}{y\sqrt{y^{n-2}}} = \frac{\sqrt{z^n - y^n}}{\sqrt{z^n - x^n}} \Rightarrow \frac{x}{y} = \frac{\sqrt{y^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{z^n - x^n}}$$

c) $$\frac{x\sqrt{x^{n-2}}}{z\sqrt{z^{n-2}}} = \frac{\sqrt{z^n - y^n}}{\sqrt{y^n + x^n}} \Rightarrow \frac{x}{z} = \frac{\sqrt{z^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{y^n + x^n}}$$

d) $$(\sqrt{z^n})^2 = (\sqrt{x^n})^2 + (\sqrt{y^n})^2 \Rightarrow \frac{\sqrt{x^n}}{\sqrt{z^n}} = \cos\beta$$

$$\frac{x}{z} = \frac{\sqrt{z^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{y^n + x^n}} = \frac{\sqrt{z^{n-2}}}{\sqrt{x^{n-2}}}\cos\beta \Rightarrow$$

$$kz = \sqrt{x^{n-2}}, \Rightarrow k = \frac{\sqrt{x^{n-2}}}{z}, (x,z) = 1 \Rightarrow k \notin N \Rightarrow z = \sqrt{x^{n-2}}, but (x,z) = 1 \Rightarrow Q.E.D.$$

$$and:$$

$$kx = \sqrt{z^{n-2}}\cos\beta \Rightarrow k = \frac{\sqrt{z^{n-2}}\sqrt{x^n}}{x\sqrt{z^n}} \Rightarrow \frac{\sqrt{x^{x-2}}}{z} = \frac{\sqrt{z^{n-2}}\sqrt{x^n}}{x\sqrt{z^n}}, \sqrt{x^{n-2}} \prec \sqrt{z^{n-2}}\sqrt{x^n} \Rightarrow$$

$$\sqrt{z^{n-2}}\sqrt{x^n} = K\sqrt{x^{n-2}} \Rightarrow K = \frac{\sqrt{z^{n-2}}\sqrt{x^n}}{\sqrt{x^{n-2}}} = \frac{\sqrt{z^{n-2}}}{x} \notin N \Rightarrow K = 1$$

but

$(x,z)=1\Rightarrow Q.E.D.$

and:

$$x\sqrt{z^n}=Kz\Rightarrow K=\frac{x\sqrt{z^n}}{z}\Rightarrow\frac{x\sqrt{z^n}}{z}=\frac{\sqrt{z^{n-2}}}{x}\Rightarrow x^2\sqrt{z^{n-2}}=\sqrt{z^{n-2}}\Rightarrow x^2=1$$

but

$x\succ 1\Rightarrow K=1$

AND:

If $K=1\Rightarrow\sqrt{z^{n-2}}\sqrt{x^n}=\sqrt{x^{n-2}}\Rightarrow\frac{\sqrt{z^n}}{z}=\frac{\sqrt{x^{n-2}}}{\sqrt{x^n}}\prec 1\Rightarrow\frac{\sqrt{z^n}}{z}\prec 1,$

But $n\succ 2$

Q.E.D.

I am convinced that there can be still be many ways found how to define the relationship between x, y and z, proving that Mr. Fermat is correct.
Also Andrew Beal's hypothesis cannot be forgotten, his genius statement cannot be left without awe. How he managed to do it I cannot comprehend – beautifully and with elegance! This proof confirms that Andrew Beal's hypothesis is true.

Edvins Kozlovskis p.k 1209**-12***
Jurmala, LATVIA
30.10.2016

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1. All submitted papers **must** contain the Title, Name of author(s), Affiliation (if any), Abstract and List of References (Literature) **written in English**. The Abstract must count not less than 100 and not more than 300 words and must be the good representation of your article. Optionally paper may also contain this information duplicated in another language.

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