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STEM(STEAM) AND LOGOTHERAPY: INTERSECTION OF DIMENSIONAL ONTOLOGY AND MULTIDIMENSIONALITY OF SCIENTIFIC EDUCATION (and their acute relevance in the context of war)

Summary.

The events of the last year in Ukraine against the background of the military invasion of the Russian Federation have put the Ukrainian people in front of many challenges, the answers to which must be sought in the context of crisis situations in all spheres of life, including education. Ever since the pandemic, reality has been constantly and rapidly changing, calling for rapid adaptation. For these changes to consider the unpredictability of the future, in our opinion, we should rely on values that stand above such temporary concepts as war, crisis, survival, lack of resources, fear of death, any loss, etc. For this, in each of the spheres of human existence – from the microcosm of the family to global transformations at the level of the state and the world as a whole – we must be guided by a map of values that considers a person not only in the dimension of psychophysical, manifested being, but primarily at the level of the unmanifested, eternal one – in the dimension of the noetic. The noetic level allows one to rise above the multidirectionality and unpredictability of both human psychophysics and any events unfolding around. The inclusion of the noetic dimension in the understanding of human ontology has been tested by events that, unfortunately, have not remained forever in the past, but are unfolding here and now on the territory of Ukraine, namely the Second World War and the Auschwitz camps. Logotherapy, a direction in psychology originated there, was started by the Austrian psychiatrist and concentration camp prisoner Viktor Frankl, which is based on a detailed theory of existential analysis and understanding that mental and physical a person possesses, while the spiritual, or noetic, he is. This allows him to stand up to any, even contradictory, psycho-physical differences, discover self-distancing and self-transcendence in himself, and reconcile even the most intolerable realities of his existence into a whole.

We propose to consider the principles and laws of dimensional ontology, which is the foundation of logotherapy, in the context of education. In particular, in our opinion, enriching educational programs with tools and approaches that affirm the principles of noetic will contribute to the development and strengthening of this dimension both in each individual and in the growing generation. Which, in turn, will make it possible to raise a generation of individuals, free from survival strategies and aimed at affirming values that are not subject to war, fear of death, or any destruction.

Keywords: logotherapy; existential analysis; Viktor Frankl; dimensional ontology; noetic; STEM education; education during the war

In addition to intellectual and social vectors, scientific education provides an environment for the involvement and development of another very important parameter or dimension of human existence – the noetic sphere. If earlier it was enough for us to focus only on academic indicators and social parameters, now we live in such times and experience such challenges to rethinking values, which prompts us to include in the understanding of human nature a dimension that is not only above the psychophysical one, but in which the psychophysics is united into a whole and is kept from destruction under the influence of external factors. This is the **noetic dimension**. And military events in Ukraine in recent months call for paying attention to what cannot be destroyed.

So, what is the noetic dimension? Its anthropological foundation is dimensional ontology. This term was introduced by Viktor Frankl, the founder of such a direction in psychology as logotherapy, which originates from the concentration camps of the Second World War. The term “dimensional”



itself claims that a person is a three-dimensional being not only in a spatial relationship, but also in an ontological one (body, soul, spirit). A person contains the somatic (physical), mental and noetic (spiritual) dimensions. Frankl deliberately replaced the word “spiritual” with “noetic” to avoid an exclusively religious interpretation. Under noetic, he considered such human abilities as the ability to take a position regarding one’s existence, to think about the meaning of one’s existence, as well as everything related to humour, love, compassion, conscience. Frankl was not the first to consider a person from a three-dimensional perspective. Before him, these ideas were developed by anthropologists Max Scheler and Nicolai Hartmann. Existential criterion is contained in a number of well-known theories of personality developed in different traditions of psychology and psychotherapy. This criterion is implicitly present in the personality theory of Sigmund Freud (1963a, 1963b, 1964), toward the *existential dichotomy of nature – culture*; in the personality theory of Alfred Adler (2007, 2011) toward the *existential dichotomy of superiority – community*; in the personality theory of Carl Jung (1914, 1969, 1971, 1972), toward the *existential dichotomy of opposites*, and in the personality theory of Carl Rogers (1959, 1965, 1995), toward the *existential dichotomy of self-actualization – conditional value*.

The distinguishing characteristic of human existence is the coexistence between anthropological unity and ontological differences, between the unified human manner of being and the diverse constitutive elements of being of which it is a part (Frankl, 1990, p. 48). Even though a person is represented on three levels at the same time, thanks to the noetic dimension, he can rise above his psychophysics and in a certain way relate to both physical states and mental processes.

Spirituality (or noeticism) is not intelligence, nor is it ordinary religiosity. Spirituality is expressed phenomenologically as personality and anthropologically as existentiality. The spiritual or noetic dimension includes beliefs, free expression of will, intentions, interests, creative expression, ethical perception, understanding of value, search for meaning, faith. Everything material in a person relates to the somatic (health of the body, need for food, sleep, etc.). Feelings of one’s welcoming power, pleasure, and lack of tension are related to the mental. The mental dimension is expressed in psychodynamic drives, moods, emotions, affects that do not obey the free will of a person. A person experiences the noetic dimension as an inner spiritual force and at the same time as a source of motivation – a desire for meaning. This dimension refers to the deep inner essence of a person, to what is actually human, which distinguishes it from an animal.

Frankl explains this view with a geometrical analogy. Pluralism of diverse forms of human existence can be compared to an integral dimensional figure, presented on a chart as three projections in orthogonal dimensions. Each of these projections, taken separately, characterizes some essential feature of this geometrical figure, but only one-sidedly, because a dimensional figure cannot be identified as only one of its projections. Adequate and full representation of the form exists only in the unity of its diverse projections. Thus, dimensional ontology relies on two laws, the laws dimension. The first of them states that the same object, projected from its dimension into dimensions lower than it, is reflected in these projections in such a way that different projections can contradict each other (Figure 1).

For example, if I project a glass, the geometric shape of which is a cylinder, from three-dimensional onto two-dimensional planes corresponding to its transverse and longitudinal sections, then in one case it turns out to be a circle, and in the other a rectangle. In addition to this discrepancy, the projections are contradictory because in both cases we have closed figures in front of us, while the glass is an open vessel.

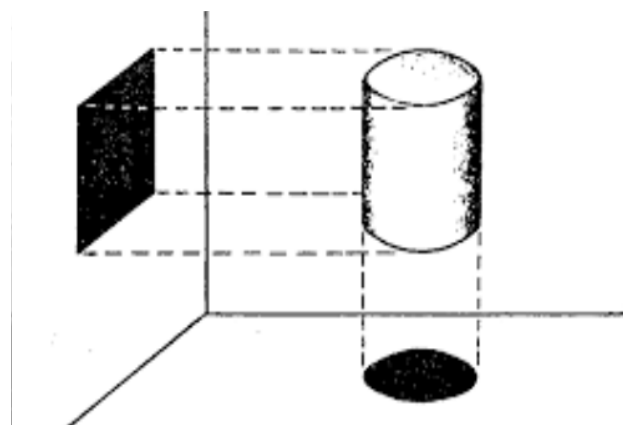


Figure 1. The First Law of Dimensional Ontology (Projection of One Object into Different Dimensions)



In other words, a person is a unity of opposites, and only in this does he achieve his integrity and completeness. What does this law illustrate to us on a personal level? That in one personality everything is combined, including different orientations, and holds them all, even with a wide range of disagreements, something third, a third dimension, noetic, exactly what a personality is invariably at every moment of his existence. And this noetic dimension reveals human nature as a potential, as an open system.

At the same time, introducing the noetic dimension into the human model, Frankl emphasized that this does not diminish the significance and importance of other dimensions. “A person, having become a person, remains in some way an animal and a plant. It can be compared to an airplane, which retains the ability to move on the surface of the earth, like a car. However, it can prove that it is a plane only after breaking away from the ground and rising into the air”, notes Viktor Frankl.

The second law of dimensional ontology postulates that different things can look the same. No longer one, but different objects, projected from their dimension not into different, but into the same, lower dimension in relation to it, are reflected in their projections in such a way that the projections are not contradictory, but multi-meaningful. If, for example, I project a cylinder, a cone and a sphere from three-dimensional space onto a two-dimensional plane, then in all cases I get a circle. Let us assume that we have shadows cast by a cylinder, a cone, and a sphere. These shadows are ambiguous, since I cannot conclude from the shadow whether it is cast by a cylinder, a cone or a sphere – in all cases the shadow is one and the same (*Figure 2*).

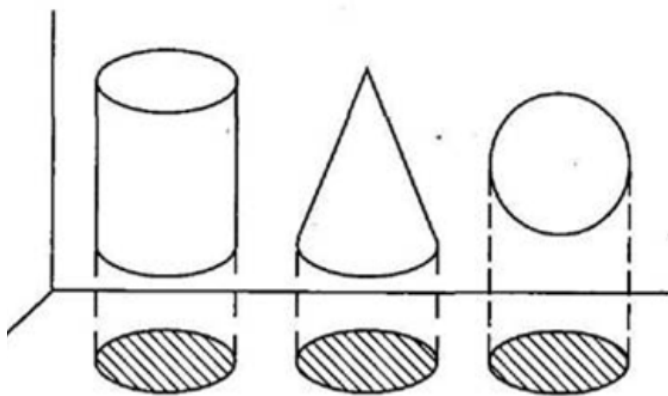


Figure 2. The Second Law of Dimensional Ontology: Projecting Different Objects into the Same Dimension

Frankl illustrates the application of the second law of dimensional ontology to humans. Suppose I project not just a three-dimensional image onto a two-dimensional plane, but figures such as Fyodor Dostoyevsky or Bernadette Soubiru onto the plane of psychiatric examination. Then, from the point of view of psychiatry, Dostoevsky is nothing more than an epileptic like any other epileptic, and Bernadette is nothing more than a hysteric with visual hallucinations. What they are apart from this is not reflected in the psychiatric plane. After all, the creative achievements of one person and the religious appeal of another person lie outside this plane. At the psychiatric level of consideration, everything remains ambiguous until something

else behind or above it becomes visible through it. And the shadow has many interpretations, until I manage to find out what casts it – a cylinder, a cone or a sphere.

In my next example, I would like to dwell on STEM and STEAM-approaches in the context of dimensional ontology, because now, in my opinion, they are the most favourable environment for revealing the potential of a person – a multidimensional person, and not exclusively in terms of intellectual parameters. While working on one project, each of the participants is focused on something else at the same time. That is, there is me, there is another one (my comrade(s)), and there is something third, in which we meet SIMULTANEOUSLY. And this third – the actual project – is the assembly point, the same third dimension, which unites, similar to the noetic ontological dimension, the divergent directions of each personality and sets them a single vector. That is, all the participants of the project here and now meet in something third, their attention is focused on something that goes beyond the boundaries of each of the participants and constitutes a whole, which is something much larger than just a collection of all elements. Each of the participants individually is unable to reach this point of the whole without feeling, interacting, synchronizing and connecting with each of the other participants.

In our opinion, this is a very powerful tool for the formation of that subordinate structure of the psyche, which harmonizes interaction with the surrounding world. Awareness of oneself as an important



and unique part of the whole without which the whole will lose some of its important characteristics. Each of the elements of this whole makes its individual contribution to what this whole will look like. In addition to the repeatedly noted positive aspects of promoting socialization and co-creation, the STEM approach forms a very important and such a subtle pattern of interaction with reality and understanding its nature – reality is dynamic, it is in the process of creation, it is an open system, it is a collection of all its elements and at the same time something more (both what unites these elements and what determines their interaction).

In addition, the STEM approach allows to avoid two errors of dimensional ontology, which we considered in the examples with the projection of figures. With this approach, no personality will feel redundant, because if it lacks relevance in the current request from the project, in the next moment a request will be formulated that will reveal its potential. From this point of view, the STEM approach can be considered as an open system and as a streaming living of experience, in which there are many options, offers, requests and vectors to feel one's involvement, to be needed, to synchronize with others and to tune in to the productive implementation of a simple life principle – just to be here and now and just be yourself, explore together, create together, enjoy the process and enjoy the common result. There is no need to prove anything to anyone, to compete for ratings, to feel or impose on someone clichés, formulated from a narrow slice of personality assessment, or, as we have seen, from projecting the dimension of personality into some one plane – whether it is the plane of mathematical abilities, or the plane of any social parameter. After all, project work provides space for self-expression and realization of each personality, it presents many vectors and opportunities to occupy a unique niche and – the most important – to do it by one's own choice, and therefore personally define and take on all the challenges associated with it.

In fact, following V. Frankl, we do not underestimate the importance of experiencing such phenomena as competition, dominance, feeling the limits of others, ability to defend one's boundaries, find one's place in the system of social hierarchy, and many others that an individual encounters in the space of school interaction. This is all natural, healthy, supported by evolutionary mechanisms and widely represented without any regulation. But, in our opinion, the inclusion of scientific education approaches in the school system opens the door to the formation of a child's awareness of something greater. Something beyond the world of competition, consumerism, selfishness, personal achievement, a sense of one's own inferiority or one's own privilege, liberation from false identifications, isolation.

All these habitats are evolutionarily justified. They are really related to certain, and even more so, to specific intellectual parameters, and our previous research has confirmed this. And they do not need to be suppressed, taken beyond the permissible limits, interpreted as something undesirable, not harmonizing. Yes, we are all evolutionary social animals, with a very powerful reptilian psychophysical regulatory center that is 100 million years old. We are all its carriers. But not only. A person, unlike an animal, has the third dimension, the neocortex. A dimension capable of vetoing any "decisions" or rather "signals" and "impulses" of our ape past. The noetic or spiritual dimension. The dimension in which decisions are made, responsibility is taken, meaningfulness is sensed, where there is a connection with the unconscious to release creative potential. **And this dimension surpasses the perspective of survival.** Competition, dominance, aggression, tendency to follow patterns, etc. are not excluded. But we can all meet in what stands above, in a position from which we can meaningfully use everything else as a tool to bring something good, eternal, valuable, unifying into this world.

This dimension opens the door to understanding WHAT actually makes us human. We previously described this phenomenon through the concept of the social brain. It can be more simply expressed in words: we are all part of a whole that exceeds the simple sum of its parts. Each of us in this picture is equal and unique. If we set aside the dimension of the psychophysical, in which we all differ, where each of us can be evaluated (and where evaluation appears, there is also hierarchy, and competition, and all derivatives of anti-virtue (envy, bullying, arrogance, a sense of one's own inferiority and so on), then a very simple truth remains, reflected even in international law as a point of reference – we are all (noethically) equal. And against the background of how often in the space of the family, the school



system, the environment of peers, an individual encounters setting that emphasize our differences, having the experience of how our differences can be harmoniously synchronized into a single whole, in my opinion, is extremely necessary. At least for balance. And from our point of view the STEM approach (as a supplement to already existing practices) is a breakthrough in the formation of a holistic worldview and a holistic personality.

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STEM(STEAM) ТА ЛОГОТЕРАПІЯ: ПЕРЕТИН ДИМЕНСІОНАЛЬНОЇ ОНТОЛОГІЇ ТА БАГАТОВИМІРНОСТІ НАУКОВОЇ ОСВІТИ (та їх актуальність у контексті війни)

Анотація.

Події останнього року в Україні на тлі військового вторгнення росії поставили український народ перед багатьма викликами, відповіді на які необхідно невідкладно шукати в контексті кризових ситуацій у всіх сферах життя, зокрема освіти. З часів пандемії реальність постійно та стрімко змінюється, вимагаючи швидкої адаптації. Щоб ці зміни враховували непередбачуваність майбутнього, на нашу думку, варто спиратися на цінності, які стоять вище таких тимчасових понять, як війна, криза, виживання, брак ресурсів, страх смерті, втрати тощо. Для цього в кожній зі сфер людського буття – від мікрокосму родини до глобальних трансформацій на рівні держави та світу в цілому – ми маємо керуватися картою цінностей, яка розглядає людину не лише у вимірі психофізичного, проявленого буття, а насамперед на рівні не проявленого, вічного – у вимірі ноетичного. Ноетичний рівень дає змогу підвестися над різноспрямованістю та непередбачуваністю як людської психофізики, так і будь-яких подій, що розгортаються навколо. Включеність ноетичного виміру в розуміння людської онтології перевірена подіями, які, на жаль, не назавжди залишилися в минулому, а розгортаються тут і зараз на теренах України, а саме – Другою світовою війною та концентраційними таборами. Логотерапія – напрям у психології, започаткований австрійським психіатром і в'язнем концтабору Віктором Франклом, заснований на теорії екзистенціального аналізу та розумінні того, що психічним і фізичним



людина володіє як інструментом, натомість духовним, або ноетичним. Це дозволяє їй протистояти будь-яким, навіть суперечливим, психофізичним різнонаправленостям, відкривати в собі самодистанціювання та самотрансценденцію, примиряти навіть найнестерпніші реалії свого існування.

Пропонуємо розглянути принципи та закони димензійної онтології, що становить теоретичне підґрунтя логотерапії, у контексті наукової освіти. Зокрема, на нашу думку, збагачення освітніх програм інструментами та підходами, які стверджують принципи ноетизму, сприятиме розвитку та зміцненню цього виміру як у кожній особистості зокрема, так і в підростаючому поколінні загалом. Це дасть змогу виростити покоління особистостей, вільних від стратегій виживання та націлених на утвердження цінностей, невідкладних війні, страху смерті чи будь-якому руйнуванню.

Ключові слова: логотерапія; екзистенціальний аналіз; Віктор Франкл; розмірна онтологія; ноетичний; STEM-освіта; освіта під час війни.

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ЧИННИКИ, ЩО СПОНУКАЮТЬ ТА ПЕРЕШКОДЖАЮТЬ РЕАЛІЗАЦІЇ ПОТЕНЦІАЛУ ОБДАРОВАНОЇ ОСОБИСТОСТІ

Анотація.

У статті здійснено аналіз чинників, що спонукають і перешкоджають реалізації потенціалу обдарованої особистості в психолого-педагогічному контексті. До об'єктивних чинників належать: соціально-економічний статус, раса, етнічна приналежність, стать та гендер, взаємини з однолітками, існуючий стан, зовнішня мотивація тощо. До особистісних чинників належать індивідуальні риси характеру, а також вроджені властивості темпераменту обдарованих, внутрішня мотивація. Визначено фактори ризику, що перешкоджають розвитку та реалізації особистісного потенціалу обдарованої особистості: перфекціонізм, інвалідність, аутизм, неблагополучна сім'я тощо. Також обґрунтовано детермінацію обдарованої особистості за декількома напрямками: холархічним, реципрокним, синергетичним.

Схарактеризовано наукові позиції чиновників, які спонукають до реалізації потенціалу обдарованої спеціальності низки зарубіжних і вітчизняних науковців.

Ключові слова: детермінація холархічна; реципрокна; синергетична; потенціал; самореалізація; обдарованість.

Обдарована особистість унікальна за своєю природою тому, що її потенціал не обмежений, а дуже багатий і глибинний. Для розкриття та повноцінної реалізації особистісного потенціалу в різних сферах життєдіяльності варто звернути увагу на чинники, що спонукають і перешкоджають відповідній поставленій проблемі. Сутність проблеми полягає в тому, як спрямувати обдарування, щоб не зашкодити, не закрити розвиток здібностей і талантів, а навпаки – примножити їх. Для психологів важливо врахувати причинно-наслідкові зв'язки як об'єктивних, так і суб'єктивних чинників, які впливають на обдаровану особистість.

Дослідженням особистісного потенціалу обдарованих займалася низка вітчизняних і зарубіжних учених. Сучасні вітчизняні вчені поєднують потенціал самореалізації в інтергративну