The Reality of the World and the Multidimensionality of the Reality of the Individual: The Semantic Meaning of Architecture of Consciousness

Svitlana M. Kalishchuk*

Department of Psychology of Personality and Social Practices, Institute of Human Sciences, Borys Grinchenko Kyiv University, 18/2, I. Shamo Boulevard, Kyiv, 02154, Ukraine

Abstract: In psychology, the world's multidimensionality is manifested in the study of consciousness, in identifying the methodological foundations of psychology and psychology of consciousness. The structure of the multidimensional world of a man is described from the point of view of the subject's understanding of the characteristic features of the realities where man lives. *Aims of study* are to formulate and consider the problem of the world's reality and the multidimensionality of the reality of the individual in the perspective of the semantic architecture of consciousness and within the framework of a holistic model of representation of the psychology of understanding the human world. The pragmatic aim of the present research is to set a quantitative measure in which a person is drawn into virtual reality (TER). The meta-analysis of publications with quantitative empirical data reporting on the results of staff training using virtual and augmented reality. The criteria of the search were that articles must be published exceptionally in peer-reviewed journals and be issued not older than in 2017. The platform for the effective search was the Google Scholar search engine. The transfer efficiency factor (TER) was the key element of the analysis. All gathered data extracted from the relevant literature sources were interpreted through observation, description, quantitative calculation, complex analysis, methods of comparison, generalization, and abstraction method. Although learning conditions with more virtual immersion lead to slightly worse results than real learning conditions, most people show similar results after learning, regardless of the level of virtual immersion. The inhomogeneity of acceptance by individuals of virtual reality is found out in quantitative data of the considered studies. The average score for the performance of each training condition represented in the scientific works considered for this study, as well as the 95% confidence interval, was calculated. It was found out that the value of TER 0.5 turned into a percentage by multiplication by 100%, indicates that training on the simulator can reduce the time of personal training by half. Presence is a psychological phenomenon that occurs in the human mind, not in specific technologies. The usage of virtual reality in learning affects the sense of presence and immersion. It directly affects an individual's perception of world reality. At the same time, the individual consciously accepts the picture of simulated reality, which emphasizes the multidimensionality of the individual's reality.

Keywords: Multidimensionality of the reality, the reality of the individual, the architectonics of consciousness, transfer efficiency factor (TER), confidence interval, passive perfectionism.

1. INTRODUCTION

The world is a reality which is surrounding a person. It has spatial, temporal, material, and energy characteristics. On the one hand, these characteristics act as a background on which a person's life arises, and the direction of his/her cognitive acts is set. On the other hand, these characteristics change under the influence of transformative actions of unique and autonomous integrity, which is the person himself. Consciousness as an individual system of creating reality allows a person to self-determine in this real world, modeling reality and actively influencing it.

However, the important questions are: "How is reality modeling? What determines the quality of personal reality and its basic "settings"? What is the genetic root that determines the organization of the semantic structure of the mental life of the individual?"

Aims of the study: the theoretical aim of the current study is to formulate and consider the problem of the reality of the world and the multidimensionality of the reality of the individual in the perspective of the semantic architecture of consciousness and within the framework of a holistic model of representation of the psychology of understanding the human world. The pragmatic aim of the present research is to set a quantitative measure in which a person is drawn into virtual reality.

2. LITERATURE REVIEW

The subjective experience of being in virtual reality has become one of the most important and main characteristics of evaluating virtual reality systems [1]. However, psychological approaches to studying human factors that can determine the depth of presence in a virtual environment are limited. Therefore, we have studied the correlation between the architecture of consciousness and virtual presence.

A person builds all actions not connected with reality but exclusively in connection with the living of

*Address correspondence to this author at the Department of Psychology of Personality and Social Practices, Institute of Human Sciences, Borys Grinchenko Kyiv University, 18/2, I. Shamo Boulevard, Kyiv, 02154, Ukraine; Tel/Fax: +38(044)553-97-87; E-mail: svitlana.mkal@gmail.com

reality and connection with his/her ideas about reality. We consider the key aspects are the points of view of the researcher [2] concerning the differentiation of the concepts of "reality" and "actuality". The author notes that actuality arises when reality and the challenges of life meet each other.

Scientist [2] rightfully refers to "actuality" as a personal effect of the influence of objective reality on a person, when reality "speaks" to human actuality and forms a subjective response: "What should I do with it? How do I have to live with this?" Searching and finding answers to these questions causes "tuning" to the real world, accompanying the semantic dynamics of individual consciousness, determining the processes of generating the image of the world and its "values".

It is undoubtedly, the function of consciousness is to reflect the existing reality. It causes the creation of many subjective worlds, which in each case are based on the individual-empirical experience of man. Each person represents the external objective world uniquely for himself. This is how subjective models of external reality are built. These models have infinite variability and a vector of direction from "individual empirical and unique separation from the world" with fixed filters and programs to free and unbiased "unique, substantial, sensual admiration for world perfection and trust" [3].

The relationship between objectively given reality and subjective models of the world, which are constructed by the individual, has been raised at various times in numerous theories of personality, perception, memory, way of thinking, and psychotherapeutic theories. The historical aspect of the study of subjective representations of reality is connected with the construct of "living space" by the researcher [4]. The researcher made one of the first attempts to find an answer to the question: "What world does a person live in? Is it physical reality or the social environment? Or there might be their fragments that are reflected in consciousness?" [4]. Levin proposed to consider the person and his environment as a constellation of interrelated factors. He understood the living space as the combination of such factors, which is clearly depicted as an oval with a circle inside. The circle is the inner sphere of the living space and consists of the self-created and self-reflecting "I" and the inner world [4].

The inner world contains many real, imaginary, past, and future situations in the form of expectations, goals, attractive and ugly images. The zone between the inner world and the outer boundary, which localizes the living space in the shape of an oval, is the sensory-motor region. According to Levin [4], this perceptual-motor zone serves as a filter between the internal and external environment and determines a certain focus of attention on a particular perception.

The subject of Mann at al. [5] attention is the so-called taxonomy of "realities", which presupposes a really differentiated and branched classification of realities into virtual, supplemented, mixed, mediated, etc. varieties. The author gives special importance to virtual reality, which replaces the individual's real-world with simulated experience (virtual world). At the same time, augmented reality allows you to experience the virtual world, while experiencing the real world. Simultaneously, the concept of mixed reality provides blends that interpolate between real and virtual worlds in various proportions. Speaking on the mediated reality, Mann *et al*. [5] dwell on modified reality. At last, the mediated reality concept is related to modifying reality with the aim to make it more understandable. Mann *et al*. [5] propose the complex and generalized concept of multimedia reality (or so-called "All Reality") to depict multidimensional multisensory mediated reality. With the phenomenon, the authors correlate some extra senses (in addition to five basic ones) involving synthetic synesthesia. It allows people to see how technology affects others, i.e., the privacy of personality that is an important functional element of consciousness architecture.

Levin [4] noted that living space is defined by knowledge of the world and the ability to influence the processes that take place in it. Its breadth is determined by the scale of the worldview of the individual. The expansion of living space in time and space is determined by the vector of maturation. The criterion for the expansion of living space is the growth of differentiation between real and unreal perspectives. Researcher [4] emphasized that differentiation is inseparable from integrative processes, which are manifested in the increased complexity and hierarchy of the organization of living space. At the same time, the author emphasizes that there is a temporary and sometimes irreversible narrowing – regression of living space, which is caused by emotional stress, loss of security, aging, disease, etc., and manifests in reduced time, reduced differentiation, and disintegration. Among the main characteristics of living space, Levin [4] included: structure, integration, breadth of time perspective, and the degree of permeability of boundaries. The researcher has noted that the

situational and random cut of living space creates a psychological field in the present, including relevant past circumstances, represented by attitudes, knowledge, feelings and plans, goals, and expectations for the future. In addition, Livin [4] noted that the living space always has a "zone of free movement", in which the accumulated experience provides a quality cognitive orientation such as a zone of professional knowledge. We believe that the expansion and regression of living space and the "zone of free movement" in the concept of [4] are directly related to the dynamics of the semantic architecture of consciousness.

The study with a similar context was conducted by Collins *et al*. [6], who explore the merits of physiological measures in evaluating emotional responses to virtual environments within the context of virtual-based learning. In the paradigm of this, the authors derive measures of cognitive load and moments of insight. At the same time, Glattfelder [7] speaks about the informational nature of consciousness. The author determines a novel scientific conception of a modern worldview based on the "unexpected intimate kinship" of subjective consciousness and objective reality. Virtual reality is the ultimate source is consciousness, and the author explores its nature. Rose *et al*. [8] aimed to understand human performance and health outcomes after utilizing virtual reality rehabilitation systems. Namely, its complex influence on the consciousness of the person.

In fact, the question of the means and mechanisms of human creation of a subjective model of reality as its reality directs us to the search for a common background, which has the property of implicitly hidden but intentionally given manifestation. Such a general background, which unfolds the ontological plan of human consciousness and determines the genesis of filters of perception and orientation in the world, should have "stable-dynamic" features, which will determine human modeling's subjective conditions of the objectively existing world.

Wu *et al*. [9] investigating the performance of a virtual reality system, pointed out two aspects in the human-virtual reality interaction loop: 1) the degree of immersion (quantifies the system using metrics); 2) presence, which measures the user response to the virtual reality system (it finds out the semantic meaning of architecture of consciousness in the context of virtual reality).

Human modeling of the objectively existing world is historically preceded by the author [10] and his discussion of the correspondence of objective reality to the world's subjective model [11].

The author introduced the concept of "lifestyle", which is an integral notion that conglomerates with the importance that the individual attaches to the world and himself, from the purpose and direction of own efforts, from certain approaches and tools used to solve life problems [10]. "Lifestyle", according to researcher [10], is characterized by three features: very early age of formation, fallaciousness, and considerable stability. In addition, the reproduction of a certain pattern of behaviour in different situations has the effect of repetition, from which the "lifestyle" becomes even stronger.

Despite the fallaciousness of the importance that a person attaches to life, forming his/her own "lifestyle" and despite the constant repetition of "usual" situations of distress, it is difficult for a person to realize and change the existing "childhood" lifestyle. Such a lifestyle is a formed and fixed adaptive complex. According to the author [10], this unique set of adaptive means is determined by the "scheme of apperception", which contains ideas about itself and the world on two levels:

1) at the level of construction of images of self and the world, consisting of elements, connections, and the inner condition of personality;

2) at the level of subjective interpretation of what is felt by the senses.

As a result, a filter of perception and response of the individual is created, aiming to find markers that confirm the relevance, modality, strength of influence, meaning, and degree of emotional fixation on internal and external events. Author [10] emphasizes: "You find what you planned to find". The subjective conception of the world determines human behavior because feelings are not a manifestation of the influence of real facts, but their subjective interpretation and, as a result, subjectively created images and unique reflection of the outside world.

The world is perceived through a constant "scheme of apperception", which provides the interpretation of experiences not after perception but before it. The mechanism of such fallaciousness and anticipatory interpretation is the obligatory harmonization of any interpretation with the original meaning, which was

given to live as a whole and accepted as its own "motto of life".

In addition, according to the author [10], the "scheme of apperception" has the quality to strengthen itself: our emotional and behavioral programs form a consistent and non-contradictory life concept, which confirms the existing "psychological truth" about the world and us. "Psychological truth" as a prism of perception and experience of the objective world influences the formation of a subjective model of reality. Such a model becomes a real-world for the individual, changing the focus of perception and reducing and sometimes making it impossible to feel and know it objectively.

Researchers [11-16] had a systematic and well-founded scientific view of the key problem of the genesis of the "inner world" (Eigenwelt) of the existence of the individual. The scientist emphasizes: "there is no relation to the world, the world is my relation: I do not reflect, do not interpret and do not appropriate, but form a relationship and then my world arises" [12]. The scientist's decisive thesis is that I am the world, which is not subject to analysis through subject-object relations and in which internalization is only a local operational mechanism, only the material of becoming "a person as a world".

The question of interaction with other worlds (Umwelt and Mittwelt), as rightly emphasizes author [17], - "is the participation in the creation of relationships and meanings and a certain transformation of other people's worlds". The author rightly notes: "Images formed as a result of the reflection of the world by man, in their sum, create what is called the" inner world "of the individual. They motivate activity and perform the function of self-regulation, but at the same time, they develop themselves" [11].

The inner world provides the action of experiencing something or someone in terms of one's own world. Therefore, the inner world has a genetically determined meaning, which gives space for the development of needs. The dynamics of the inner world is determined, as noted by the author [13], with his "original genetic sociality, which is embodied in necessity and sets the course - everything around can only be the world, and if this is not the case, it should be done and perceived-experienced in their inner world".

Therefore, the author refers to the inner world, not as space but as a means of human existence. Here primary images and primary experience are formed on the basis of emotional experiences when various signals about the surrounding world are emotional and sensual. The researcher actualizes the question of forming the image of the world, linking the answer to it with the phenomenon of experience when they transition from "folding" of sensory-sensory saturation to the emergence of a sign (word, concept, meaning) [12].

The position of the researcher in [12] outlines the ontological background of the construction of the "inner world" of the individual and, at the same time, determines the main conditions and the course of his relentless existence-formation: need → unconscious experiences → experiences → meanings. The following question asked by the scientist is fair and expedient: "How do images of objects that a person has never perceived arise?".

In our opinion, the main postulate of the researcher [13]: "If the inner world loses the ability to express itself, it stops to exist". "Ability to express" - what is it in the perspective of the epistemological plan for determining human reality? In our opinion, this is the action of correlating oneself ("I am") and the world (the world is, life is, other people are), as a result of which the image is formed, the "inner world" of the individual has formed in the zone in which the world "touches" personality, causing experiences, states and forming attitudes, linguistic meanings and signs and subsequent successive actions of self-attribution and correlation.

Analyzing the system of constructs "I and the World", the author [15] emphasized that the essence of human existence is to make constant attempts to establish effective and balanced connections between the subjective and objective worlds. One of the key ways to "bridge" the objective and subjective worlds, according to researcher [15], is to build and constantly develop the constructs "I" and "World", which must be in the balance due to the fullness, awareness, and reflections of both poles.

As the author pointed out, the dichotomy of the poles determines: "Who and what we are and what is the nature of the world where we live" [15]. The author noted that the imbalance of these links creates anxiety or other distress and determines crucial aspects of a person's perception, inner value system, the means of understanding the world, and seeing sources of strength and self-efficacy [15]. The emotional distress

component is a sign of the discrepancy between how a person defines himself and the world. In addition, this experience forms an intentional focus either on the introduction of an amendment to the existing semantic architecture or on the crisis discovery of its new facets.

The author rightly emphasized: "Only human beings are given a heavy responsibility and a wonderful opportunity to participate in solving the cosmic task of creating reality and to do so partially consciously" [15]. The "translation" of the language of the inner voice, which has subjective aspirations sound, into the language of the external world, which has important moments of possibilities and requirements, according to the author [15], are carried out in the very process of life, that is, in action, thought and experience. A person creates, as the author notes, his own form from the many potential lives. And here, expectations become relevant.

In our opinion, the category of "intentionality" studied by the researcher [15] and the seven phases of its sequence opens and approximates the plane of both genesis (instinctive, organic, mental, social sources of motivation) and, at the same time, the development of the semantic architecture of personality consciousness. "Intentionality is the meaning of what we express through life" [15]. The study of the components of intentional experience (preferences, beliefs, and attitudes) allows the reorganization of the individual's consciousness's semantic architecture.

An example of the search for the original genetic basis of "crystallized" patterns of the emotional coloring of the world is the position of the researcher [16] concerning the four worlds of life. The corresponding dominant action of overcoming the situation of impossibility or "superpowers" is in each of them [16]. The author explored the principles (pleasure, realism, values, and creativity) and means of the response of the individual (as an action of experience) to these situations in accordance with the type of life world, which is formed as a result of his life.

The question that we note as derived from the scientific ideas and discoveries of the author [16] concerns the genesis of the "usual", typical for a person's action of experience in a specific situation of "impossibility-super possibility". That is, it is a question of the genesis of the type of life world and the origin of a certain means of experience, as "overcoming the" gap "of life and restorative work that is perpendicular to the line of realization of life" [16]. However, it should be emphasized that the situations of difficulty identified by the author [16]: stress, frustration, conflict, and crisis - are not exceptional events. They are the normative cases of meeting the challenges of life: diversity, uncertainty, complexity, choice, and resignation, which determine the dynamics of life.

Such challenges are the forms of special life situations in their constant recovery, which are not always solved by means of subject-practical and cognitive activities. "Creativity inexperience is to experience as needed, and not to artificially lower the thresholds of critical situations" [16]. Life situations open the inner world and include the processes of experience, as "a special activity, a special work on the restructuring of the psychological world, aimed at establishing semantic correspondence - as the researcher - between consciousness and being" [16].

It means that the accumulation and initial beginning of the experience of hedonistic, realistic, value or creative overcoming of the difficulties of the individual, identified by the scientist, lies in the space of the semantic construction of the individual's consciousness. And psychotherapeutic work opens up opportunities to restructure this composition. Author [16] noted: "Sometimes it is necessary to artificially bring the patient to realize the futility of his hopes for a direct and immediate solution to problems in order to reorient his consciousness to another, adequate situation, activity - the activity of conscious experience instead of inadequate activity of subject-practical action".

So, there is a psychotherapeutic shift of the leading level of experience from the register of the unconscious to the registers of awareness, experience-contemplation, and reflection [16]. We consider a significant achievement of researchers [16] to find the definition of the action of experience as a mechanism for restoring the psychological possibility of realization of the important by finding a new fulcrum and a new perspective of orientation. The action of experience rebuilds consciousness to a condition of subjective possibility by discovering meanings by different means in each of the lifeworlds. It is about "hedonistic experience rejects reality, realistic - unconditionally accepts it, value - perfectly transforms it, creative experience builds (creates) a new the reality of life, correlating and combining the situational and supersituationality of life" [16].

Suppose we are talking about the operational side of the issue. In that case, this is done by the trajectory

of finding a semantic connection and linking distant plans, goals, intentions, expectations, and commitments that are not directly contained in a particular space-time situation but reveal a life perspective and personal unity. This leads, as indicated by the author [16], before creating a new life project. Such an externally controlled but self-generated product leads to a reorganization of the subjective perception of the world.

Researchers [17], studying the representation of the world, introduced the concept of a "cognitive scheme" as a generalized visual education that integrates visual, auditory, tactile modalities, and language. The author defined the idea of the world as a form of existence of the scheme of the world in a particular modality. The author conditioned the representation of reality with the presence or absence of a specific cognitive scheme: "You just do not perceive the types of information for which we do not have schemes" [17]. The author emphasized that the "scheme" plays a major role as part of the perceptual cycle. It is the source of external information and changes with experience. The key issue in the research of scientists [17] was the development of world schemes.

Conditionality of understanding of the environment by features of the person is the basic position of researcher Kelly's concept. The author emphasizes that the peculiarities of perception, interpretation, and evaluation of reality are due to a certain organized subjective experience, which Kelly defined by defining "personal constructs". The question of a holistic analysis of a person who actively knows and acts in the world - the main perspective of the theory of personality constructs. Kelly's followers point out that Kelly set the task of "explaining how a person builds a holistic, integrated image of the world that helps him/her anticipate and control events, own behavior and the behavior of others" [18].

A construct is a subjective tool (discrete content or differentiated scale) created to construct the environment, perceive, understand, evaluate, and predict an event. The construct shows a certain aspect of meaning in relation to the object or event. Also, it manifests an independent semantic formation, leading to the differentiation of objects in the area of a clear "range of suitability". The system of constructs as the construction of semantic formations determines the criteria for comparing objects, their evaluation, and interpretation, and constitutes a personal "means of the behavior of the individual, and the channel of movement, and the form of relations" [18].

Analyzing the process of subjective construction of images of reality, author [18] proposed in addition to the four dimensions of the image of reality (length, width, and height of space – the panorama of a particular image of the world and time – its subjective significance and dissection), to introduce the concept of "fifthquasi-dimension", which opens a person active world [19]. This becomes possible, as rightly notes researcher [20], due to the subjectivity of space and time in the image of the world. Researcher [19] emphasized: "We do build, but not the World, but the Image," exhausting "it from objective reality" and noted that the fifth quasi-dimension of the world is a multidimensional semantic field and a system of meanings that carry "dimensionality" of intra-system relations of the objective world. It means the system of values as something uniquely depicted, but not a real image. And the main thing, as the scientist noted, is not the means of "exhaustion", but the result - a constructed image of "the external multidimensional world, the world where we live and act, but not the subjective phenomena that it causes" [19]. Construction of the image of the world, highlighted by the researcher [19], has a vector from sensory perception, through the boundaries of sensuality, through sensory modalities that carry reality and create the texture of the image of the world to the modality of the world. There is "depersonalization" in this world and manifests "supersensible" and objective (with experience or experience associated with systems of other concepts) qualities of reality in the form of values. Value is an ideal form of existence of the objective world. On the one hand, there is "indifference" to the sensory modality of its design, but, on the other hand, each relevant human influence will find its representation in the world [19]. The idea of the world, as it was rightly emphasized by the researcher [19], is not a situational act of human perception, but is considered in the context of his past, personal history and learned historical and cultural experience, and, therefore, is an integral individual system of personality values.

Returning to the question of the correlation between the real world and the subjective reality of man, we find the answer in the differentiation of author [19] functions of experience:

- restoration of realization of internal "necessities" of life at the level of being;
- gaining awareness at the level of consciousness;

- achieving a semantic correspondence between consciousness and being. It means, on the one hand, providing being with meaning, and, on the other hand, semantic acceptance by the consciousness of being;

- connection of all intrapsychic processes (perception, thinking, attention, etc.), including emotional for processing of the experience received in a situation and drawing up of the relation;

- involvement to factive creative activity with the definition of the purpose of subject-practical activity generating and increasing "a stock of meaning of an individual life of the person" [16].

So, the experience and activity restructure man's inner psychological world through the generation of meaning (macrogenesis of the semantic architecture of consciousness), the result of which is the establishment of a semantic correspondence between human reality (his consciousness) and the real world of his being.

The existence of analysis on the ontological and epistemological planes of the continuous components of the "inner world of I" determines the uniqueness of the transformation of the consciousness of objectively existing reality into a subjectively perceived model (multiplicative reality). As a result, it creates a systemic conscious experience of each person, his/her life, and unique and inimitable life.

The individual's level of activity and the successful application of their activity are the most important criteria that determine the effectiveness of activities. Excessive stimulation leads to a deterioration in productivity, but this pattern applies only to external forms of activation, and the characteristics of internal (psychological) motivating forces remain little studied [5, 21].

What happens if the stimulation is not external but transferred to the internal plan? If stimulation requires the individual to accept conditional-external stimulation, as is the case with augmented or virtual reality. In this case, we encounter a paradoxical phenomenon called "passive perfectionism" [23], which, with a strong desire for goals, is also characterized by obvious emotional and behavioral reactions of the inhibitory type. Such reactions significantly reduce the efficiency and effectiveness of activities (educational, professional) and negatively affect the overall psychological well-being of the individual [24, 25].

The problem of the world's reality and the multidimensionality of the representation of reality in the individual's mind can find a practical dimension concerning virtual and / or augmented reality technologies.

At the same time, the issue of virtual reality is more complicated than journalistic discourse. In fact, to what extent can virtual and augmented reality "deceive" consciousness? Will human consciousness respond to the stimuli of virtual reality / augmented reality as real stimuli? This question is no longer speculative, and we can even introduce a quantitative measure of the "deception" of consciousness. To set a quantitative measure in which a person is drawn into virtual reality, we will conduct a meta-analysis of publications reporting on staff training results using virtual and augmented reality.

3. MATERIALS AND METHODS

One of the most useful aspects of the proposed assessment is that the transfer of learning from the virtual simulation to the target environment can be measured directly. The transfer efficiency factor (TER) determines the value of time spent training in a virtual simulator by calculating the effectiveness of (virtual) training as the ratio of the time required to achieve the desired level of development of trained skills in the virtual environment and traditional training [25]. The equation is as follows:

$$TER = \frac{Y_c - Y_x}{Y_c} \times 100\%$$

where Yc indicates the amount of time or number of attempts required to teach a person a specific task, and Yx indicates the time required to train someone who has already trained on the simulator to perform the same task to the same level of competence. So, the value of TER 0.5 turned into a percentage by multiplication by 100% indicates that training on the simulator can reduce the time of personal training by half. Using this formula, you can quantify the time saved by learning using modeling in general or specific XR-technology.

A search of the literature was conducted to identify the largest possible number of published articles in peer-reviewed journals, publications that have

quantitative empirical data on the topic of transferring learning in cases of learning based on augmented or virtual reality. The search terms consisted of a primary phrase describing forms of reality simulation, combined with a secondary group of phrases related to learning.

Search lines have been entered into the Google Scholar search engine. Many articles have been found. Drop-out was carried out among them; the criteria for selecting articles for analysis were the availability of quantitative data and statistical processing of these data, conducted by the authors of the article - data from such publications we consider appropriate. Also, the selection criterion was the fact of publication in a peer-reviewed journal. We included only such articles in the analysis. As they progress in reality, simulation tools have been very striking in recent years; we consider it appropriate to compare and include in the analysis only the works of recent years. The articles were included in the review no later than 2017.

To quantify the effect of presence, we analyzed data from the studies [26]-[30]. All gathered data extracted from the mentioned studies were interpreted by means of observation, description, complex analysis, methods of comparison, generalization, and method of abstraction.

4. RESULTS AND DISCUSSION

Among the many definitions, the most common concept of presence in a virtual environment concerns the subjective feeling of the user to "be there". Presence is a psychological phenomenon that occurs in the human mind, not in specific technologies. In this context, the technology of simulated reality is understood as a tool to achieve this psychological state [31].

In all studied works, the quantitatively measured effect of training was rather high, but it would be desirable to note one feature. The inhomogeneity of acceptance by individuals of virtual reality is found out in quantitative data of many analyzed works.

It is impossible to measure the degree of immersion directly in a simulated reality, and the authors report a high degree of immersion in almost all their works [32], i.e., in response to the question "what is the difference in the degree of immersion?" – the answer to the statement should be that there is no significant difference. However, since it is clear that different people have different learning outcomes, the variance should be used for each experimental group as an important measure of acceptance of simulated reality.

In each study, the characteristics under different immersion conditions were approximately the same. To this end, it was important to determine the similarity between the conditions instead of pointing out that the confidence intervals are zero for the immersion variables. For this reason, the estimates were compared to determine the match. Data could not be compared directly because different scales were used in each study to measure performance. So, the average performance of each training condition in the study was turned into some numerical evaluation.

The average score for each condition as well as the 95% confidence interval was found out. The dispersion of different kinds of realities is shown below in Figure **1**. Since these estimated variance values are obtained for different experimental conditions - only their size and magnitude matter; this assessment's very meaning does not make physical sense, except for emphasizing the difference between the participants' experiences in each experiment. The fact that the mean values were so small underscores the similarity between the conditions. The average score for deeper immersion conditions was lower than for lower immersion conditions and control conditions, but the overlap of confidence intervals was large.

These results show that, although learning conditions with more virtual immersion lead to slightly worse results than real learning conditions, most people will show similar results after learning, regardless of the level of virtual immersion. So, we can confirm that presence is a psychological phenomenon that occurs in the human mind, not in specific technologies. Accepting the conditions of the simulation is the choice of the individual; the success of this choice is emphasized by the fact that in the minds of the individual can coexist multidimensional pictures of reality.

Although this goes beyond the quantitative scope of this meta-analysis, it is important to note the next thing connected with the topic of our study. The usage of virtual reality in learning affects the sense of presence and immersion, i.e., directly affects an individual's perception of world reality [22]; at the same time, the individual consciously accepts the picture of simulated reality, which emphasizes the multidimensionality of the reality of the individual [32]. The research results correspond to other studies that suggest that virtual

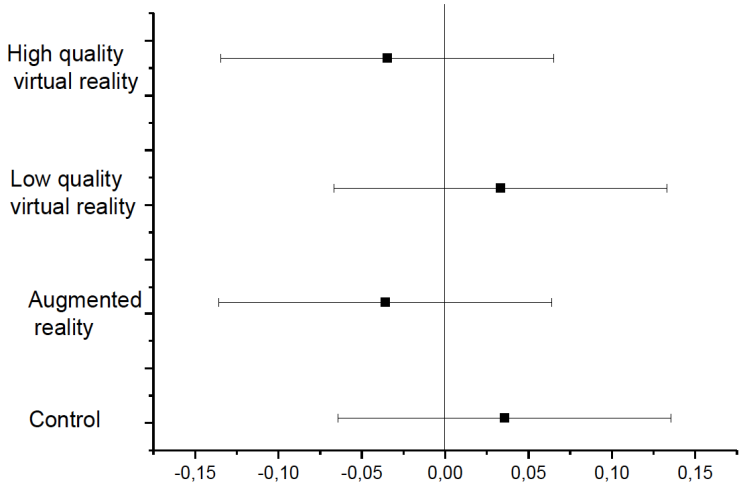

Figure 1: The dispersion of different kinds of realities.

reality may have the potential to improve quality of life, e.g., the attention is to the development of future virtual reality activities for people with dementia [33]. Virtual reality means are also useful for residential aged care to reduce apathy and improve mood [34], treatment of mental health disorders [35].

The psychological dimension of simulated reality is a debatable issue in the perspective of the architectonics of consciousness [31]. An important issue in cognitive science is how people conceptualize their minds and consciousness [35, 36]. Therefore, our study is not isolated and examines a critical area of knowledge studied by many scientists (for example [37, 38]).

5. CONCLUSION

So, the same and invariant for all people principles of structure and functioning of the mental coexist with the real presence of multivariate and multidimensional in different people in their ability to perceive and distinguish the world around them, accumulate sensory experience of its perception, form ideas and make a semantic assessment, and it means to build "self" in it.

The main vector of this action is to experience the real world and build an individual view of the world through a chain of genetic conditioning: intention → need → unconscious experiences → experience/action as meaning generation → meaning → materialized values → world, which, in the integrity of a continuous circle, determines the process of macrogenesis and the construction of the semantic architecture of personality consciousness.

The article analyzes the point of view concerning the role and place of understanding in the multidimensional world of the man of modern scientists. Methodological, theoretical, and empirical contexts related to the reality of the world and the multidimensionality of the reality of the individual in the perspective of the semantic architecture of consciousness are also considered.

Further research of the architecture of consciousness in the paradigm of virtual reality influence should deeply analyze the theoretical and practical aspects of the problem. The additional value will have works on the treatment-aimed implication of virtual reality conditions.

REFERENCES

[1] North MM, North SM. A comparative study of sense of presence of traditional virtual reality and immersive environments. Australasian Journal of Information Systems 2016; 20. https://doi.org/10.3127/ajis.v20i0.1168

[2] Langle A. Person. Existential-analytical theory of personality. Moscow: Genesis, 2006.

[3] Romenets VA, Manokha IP. History of psychology of the XX century. Kiev: Libid, 1998.

[4] Levin K. Field theory in the social sciences. Moscow: Academic Project, 2019.

[5] Mann S, Furness T, Yuan Y, Iorio J, Wang Z. All reality: Virtual, augmented, mixed (x), mediated (x, y), and multimediated reality. arXiv:1804.08386 2018; April: 1-14. https://arxiv.org/pdf/1804.08386.pdf%20%20pp.%2011-26.pdf

[6] Collins J, Regenbrecht H, Langlotz T, Can YS, Ersoy C, Butson R. Measuring cognitive load and insight: A methodology exemplified in a virtual reality learning context. In: 2019 IEEE International Symposium on Mixed and Augmented Reality (ISMAR) (pp. 351-362). IEEE, 2019. https://doi.org/10.1109/ISMAR.2019.00033

[7] Glattfelder JB. The consciousness of reality. In Information–Consciousness–Reality (pp. 515-595). Springer, Cham, 2019. https://doi.org/10.1007/978-3-030-03633-1_14

[8] Rose, Tyler, Chang SN, Chen KB. Immersion of virtual reality for rehabilitation-Review. Applied ergonomics. 2018; 69: 153-61. https://doi.org/10.1016/j.apergo.2018.01.009

[9] Wu TL, Gomes A, Fernandes K, Wangn D. The Effect of Head Tracking on the Degree of Presence in Virtual Reality. International Journal of Human-Computer Interaction 2019; 35(17): 1569-77. https://doi.org/10.1080/10447318.2018.1555736

[10] Adler A. Character Science. Understand human nature. Moscow: Academic project, 2015.

[11] Sidorenko EV. Therapy and training in the concept of Alfred Adler. St. Petersburg: Speech, 2002.

[12] Maksimenko SD, Koval IA, Maksimenko KS, Papucha MV. Medical psychology. Vinnytsia: Nova Kniga, 2008.

[13] Maksimenko SD. Genesis of personality existence. Kiev: KMM, 2006.

[14] Maksimenko SD. The way of life of an individual as a basic category of genetic psychology. Scientific Bulletin of Mykolayiv State University named after VO Sukhomlynsky: Psychological Sciences 2014, 2: 5-13.

[15] Bugental J. The art of a psychotherapist. St. Petersburg: Peter, 2001.

[16] Vasilyuk FE. Psychology of experience (analysis of overcoming critical situations). Moscow: Moscow State University, 1984.

[17] Neisser U. Cognition and Reality: Principles and implications of cognitive psychology. New York: WH Freeman and Company, 1976.

[18] Francella F, Bannister D. New method of personality study. Moscow: Progress, 1987.

[19] Leontiev AN. The psychology of the image. Psychology: Moscow University Bulletin 1979, 14: 3-13.

[20] Serkin VP. Methods of psychology of subjective semantics and psychosomatics. Moscow: Pchela, 2008.

[21] Kalishchuk SM. Methodology of Fred E. Fidler and the vitality of the change in the setting of the specialty of the program. Bulletin of the Kharkiv National Pedagogical University of the Name of G.S. Skovoroda, Psychology 2014; 48: 112-22.

[22] Johnston J, Shu CY, Hoiles KJ, Clarke PJ, Watson HJ, Dunlop PD, Egan SJ. Perfectionism is associated with higher eating disorder symptoms and lower remission in children and adolescents diagnosed with eating disorders. Eating behaviors 2018; 30: 55-60. https://doi.org/10.1016/j.eatbeh.2018.05.008

[23] Say G. Perfectionism in major depressive disorder. Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry 2020; 12 (4): 562-74. https://doi.org/10.18863/pgy.703132

[24] Vyunova NI, Larskikh VA, Kutashev VA. Review of research devoted to the interpersonal aspect of perfectionism. Scientific Medical Bulletin of the Central Black Earth Region 2015; 59: 22-7.

[25] Roscoe SN. Incremental transfer effectiveness. Hum Factors 1971; 13: 561-67. https://doi.org/10.1177/001872087101300607

[26] Andersen SAW, Konge L, Sørensen MS. The effect of distributed virtual reality simulation training on cognitive load during subsequent dissection training. Medical teacher 2018; 40 (7): 684-89. https://doi.org/10.1080/0142159X.2018.1465182

[27] Bailey SK, Johnson CI, Schroeder BL, Marraffino MD. Using virtual reality for training maintenance procedures. In: Proceedings of the Interservice/Industry Training, Simulation, and Education Conference 2017; 17108: 1-11. Available from: https://regattavr.com/wp-content/uploads/2019/10/Using-Virtual-Reality-for-Training-Maintenace-Procedures.pdf

[28] Bier B, Ouellet É, Belleville S. Computerized attentional training and transfer with virtual reality: Effect of age and training type. Neuropsychology 2018; 32 (5): 597. https://doi.org/10.1037/neu0000417

[29] Buttussi F, Chittaro L. Effects of different types of virtual reality display on presence and learning in a safety training scenario. IEEE transactions on visualization and computer graphics 2017; 24 (2): 1063-76. https://doi.org/10.1109/TVCG.2017.2653117

[30] Whitmer DE, Ullman D, and Johnson CI. Virtual reality training improves real-world performance on a speeded task. In: Proceedings of the human factors and ergonomics society annual meeting 2019; 63 (1): 1218-22. Sage, CA: Los Angeles, CA: SAGE Publications. https://doi.org/10.1177/1071181319631013

[31] Gaiseanu F. Human/humanity, consciousness, and universe: informational relation. Neuro Quantology 2019; 17 (5): 60-70. https://doi.org/10.14704/nq.2019.17.5.2122

[32] Hoemann K, Feldman Barrett L. Concepts dissolve artificial boundaries in the study of emotion and cognition, uniting body, brain, and mind. Cognition and Emotion 2019; 33 (1), 67-76. https://doi.org/10.1080/02699931.2018.1535428

[33] Moyle W, Jones C, Dwan T, Petrovich T. Effectiveness of a virtual reality forest on people with dementia: A mixed-methods pilot study. The Gerontologist 2018; 58(3): 478-487. https://doi.org/10.1093/geront/gnw270

[34] Brimelow RE, Dawe B, Dissanayaka N. Preliminary research: virtual reality in residential aged care to reduce apathy and improve mood. Cyberpsychology, Behavior, and Social Networking 2020; 23(3): 165-170. https://doi.org/10.1089/cyber.2019.0286

[35] Freeman D, Reeve S, Robinson A, Ehlers A, Clark D, Spanlang B, Slater M. Virtual reality in the assessment, understanding, and treatment of mental health disorders. Psychological Medicine 2017; 47(14): 2393-2400. https://doi.org/10.1017/S003329171700040X

[36] Lackey SJ, Salcedo JN, Szalma JL, Hancock PA. The stress and workload of virtual reality training: the effects of presence, immersion, and flow. Ergonomics 2016; 59 (8): 1060-72. https://doi.org/10.1080/00140139.2015.1122234

[37] Malle BF. How many dimensions of mind perception really are there? In: AK Goel, CM Seifert, and C Freksa Eds. Proceedings of the 41st Annual Meeting of the Cognitive Science Society. Montreal, QB: Cognitive Science Society 2019; 2268-74.

[38] Weisman K, Dweck CS, and Markman EM. Rethinking people's conceptions of mental life. Proceedings of the National Academy of Sciences 2017; 114 (43): 11374-79. https://doi.org/10.1073/pnas.1704347114

Received on 28-11-2020 Accepted on 30-11-2020 Published on 09-12-2020

DOI: https://doi.org/10.6000/2292-2598.2020.08.04.18