# Social and educational environment modeling in future vision: infosphere tools

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**Abstract.** The article is devoted to the study of information and communication environment tools for constructing a vision of the future. The research methodology is determined by the information paradigm providing a general theoretical basis for rational explanation of orienting interactions in socio-technical environment / system. The information model of interactions management in a social environment is noted to be of code nature, which is typical of an indirect influence on contemporaries' consciousness. The infosphere tools for the future modeling are presented by their structural, functional and motivational aspects. In the context of social and educational environment modeling, one should point out the material needs driven by the market code and background knowledge transmitting the stereotypes of thinking and behavior. Further, the authors specify the role of the worldview and educational paradigm in the future modeling. The results of mass expectations monitoring are presented, such as dynamic analysis of social sentiment indicators in Russia, youth assessment of the university's image and prospects for online learning. The study materials include data of sociological surveys among Peter the Great St.Petersburg Polytechnic University students. In conclusion, the authors emphasize the need for mental protection of a person in the digital hyper-net, which transforms the infosphere of communication thus creating potential threat of community and mental structures disorganization.
*Keywords* — environmental factors, future modeling, engineering education, infosphere, expectations monitoring, online learning

## 1 Introduction

In the modern worldview, the information environment correlates with the space of potential action choice that determines the life horizon of a modern engineer for his successful social adaptation and professional orientation. New trends in shaping the global vision of the future, characteristic of the fourth industrial revolution are associated with the

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key role of digital culture in social and professional activities organization [1]. The megatrends of the fourth industrial revolution are determined by the development of convergent technologies connecting physical, digital and biological blocks. And all the innovations that appear within these trends are provided by the computing power of digital technologies. The tasks of education in the new vision of the future are dictated by the expansion of information technology environments, which form a special kind of virtual reality and a special mentality, which substantially corrects the development of personality and the dynamics of relations in society [2].

The analysis of the infosphere tools for modeling the vision of the future is the current interdisciplinary task of modern science. In the logic of the fourth industrial revolution, the factors of production include not only natural and other material resources, but also the market of information and knowledge. In modeling the future, attention is focused, in addition to science and education commercialization, on the mental and ethical aspects of innovation activity. The specific objectives of our study are related to monitoring of potential expectations, which addresses mass sentiment indicators in terms of the global city strategy, as well as students' assessment of the negative effects of digital technologies on learning process.

Literature review.

In the scientific literature, the term *infosphere* appeared during the period of intensive development of electronic communications and programming languages. In a broad context, this term came into use in recent decades towards the whole symbolic environment of society and human life world [3]. In the modern sense, this concept covers a multi-level system of virtual representations. The symbolic form of mediated representation of an object allows multiple variations of semantic meanings, as well as their visualization via an apparent illustration, thus provoking an involuntary emotional response. Certain symbology, realizable within the discourse or mental image, allows you to save meanings and translate them into the future [4]. At the same time, the role of background knowledge ("pre-knowledge") is actualized, empowering an individual to directly perceive information in accordance with the common notions [5].

In cognitive sciences, the studies of semantic orientation of a person in the information field develop an idea about mental spaces and representations [6]. The mental representation of the present and the future has its own special structure and does not always coincide with the visual image, especially when it comes to representing an object through another one. In this case, mental activity of the subject is considered in terms of Model-Based Reasoning [7]. The relevance of the present is determined by future prospects, but the vision of the future is rooted in the past. Nervous activity cyclising in the space of orienting interactions familiar to the system, is described by U. Maturana [8].

In digital culture, the infosphere is associated with the global semantic network. In hierarchically organized semantic environments, orientation at various levels requires a certain specificity of information perception and processing. In particular, there are three qualitatively different ways of the infosphere's exposure upon a person: perceptual (similar to physical contact, through sensations); cognitive (influences through semantic structures, frames, sets of knowledge); reflexive (information perception along with value attitudes and limits awareness) [9, 10].

## 2 Materials and Methods

### 2.1 Theoretical research settings

The heuristic capabilities of the information paradigm established in the modern system of knowledge are associated with the formation of rational models for explaining and prediction of orienting interactions that are of clearly non-physical nature. In a complex system, information characterizes its functional abilities in accordance with external influence factors and internal state parameters. Information models of interaction explaining emphasize the code character of the causal relationship, which is revealed through the launching of a specific sequence of actions and the system's self-determination markers. The informative code function is to rate some potential vital space of the system by indicating explicit or implicit boundaries for motives and actions. According to the normative principle, we can determine the matrix models represented by code dependence in predicting the future. Thus, the market code serves as a global modeling tool in the scenario of the future capitalization, which defines the global city strategy and the engineering education system as service trades [11, 12].

The study of the infosphere tools for the future modeling is conducted in two aspects; these are structural-functional and motivational ones. In terms of the structural-functional aspect, we focus on the technological information tools for the society life world formation, where one should distinguish the basic environments, namely the socio-economic environment and the socio-cultural space of life, which models are guided by market code. Forecast of the future state of these environments depends on their dynamics in the present. We use sociological survey methods and statistics that relate to the dynamics of socio-economic indicators of mass expectations and environmental factors assessment. The infosphere tools in the motivational aspect of the future modeling are represented by mass expectations monitoring among the students of Peter the Great St. Petersburg Polytechnic University (SPbPU).

## 2.2 Methods of mass expectations study within the market matrix

For mass expectations monitoring in the market matrix, we use sociological survey methods that relate to socio-economic indicators dynamics (consumer sentiment index, social sentiment index, unemployment expectation index) and Levada-Center statistics (https://www.levada.ru/indikatory/sotsialno-ekonomicheskie-indikatory / appeal date 13.04. 2019).

The consumer sentiment index is an important tool for predicting consumer behavior and the economic situation, which is largely determined by the population solvency. The method of consumer sentiment index constructing includes a survey on five questions. A representative sample reflects the views of an adult (over 16 years old), urban and rural population of the country (the number of respondents = 2000). For each question, an individual index is constructed as the difference between the parts of positive and negative answers and 100 is added to avoid negative index value. The social sentiment index allows tracking the mass consciousness reaction to the economic situation changes, prediction of such changes in the future. Levada-Center provides statistical data by year and quarter since 2008.

## 2.3 Monitoring of public opinion on the public image of St. Petersburg Polytechnic University of Peter the Great (SPbPU)

The purpose of the study is to obtain sociological information about the contours of the university's visual environment, its main characteristics, and to compare the real public image of the SPSPU with the desired one. Research method is online questioning in the social networking site "Vkontakte" (www.vk.com).

The study is of reconnaissance character and utilizes random sampling. In total, 200 respondents were engaged in the survey, including students of both technical and humanitarian institutes of SPbPU. Respondents are aged from 17 to 35, with 57% men, 43% women among them.

The research objectives:

1. To find out students' seeing of the university visual environment.
2. To learn students' opinion on the existing public image of the university.
3. To outline the public image of the head of university.
4. To refine the desired image of the head of university.
5. To compare the real public image with the desired one.
6. To identify the most preferred content of the university television to form a topical agenda.

### 2.4 Monitoring of students' attitudes towards online learning

The purpose of the study is optimization of the educational process forms and mode. Research method is sociological monitoring aimed at identifying adaptation problems of students who receive fully distance education. The methodology includes group discussions in study groups and written survey.

The adaptation problems pointed out by the survey not only indicate a student's involvement into the educational process and the extent of educational modules mastering, but also reveal following important characteristics for obtaining an educational result:

- Activity in educational technologies mastering;
- Readiness for making choice and understanding of responsibility for it;
- Ability to find and process the necessary information;
- Skills of communication not only with the teacher, but also with other services included into the educational process;
- The degree of awareness of the distance education opportunities;
- Ability to resolve their problems immediately;
- Student self-esteem for learning success.

## 3 Results

### 3.1 The results of mass expectations study within the market matrix

The values of the mass sentiments indicators in relation to socio-economic environmental factors are presented in the general diagram (Fig. 1). The diagram data are taken from the statistics of the Levada-Center regular surveys (https://www.levada.ru/indikatory/sotsialno-ekonomicheskie-indikatory/ as of 13.04.2019). Indicators are given by quarters of the current year. Level below 100 indicates negative dynamics of sentiments.
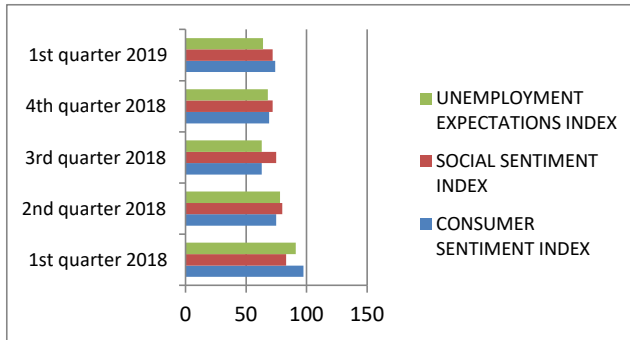
**Fig.1.** Socio-economic indicators of sentiment in Russia during 2018-2019 (2008 - 100%).

## 3.2 The results of public opinion monitoring on the public image of St. Petersburg Polytechnic University of Peter the Great (SPbPU)

The sociological questionnaire consists of four blocks of questions. The first block is on the symbols and image of the university. The second block addresses the public image of the university head. The third block of questions is devoted to the intra-university television: internal TV content, assessment of its necessity, and assessment of the TV influence on student life.

The main characteristics of SPbPU.

The first block is represented by 8 questions aimed at determining the image of the university, its characteristics, as well as the assessment of the visual environment and symbols of SPbPU. Respondents were offered both ready-made answers and the opportunity to give their own detailed answer. So, when asked about the reasons for entering the university, the majority of respondents pointed out the following qualities of the university from the students' point of view: the prestige of the university (50.5%), quality of education (43.5%), wide popularity (32%) and wide opportunities for career growth (26.5%). In addition, to a lesser extent, there are also noted convenience of location, opportunities for creative and social activities, competent academic staff, and suitable curriculum.

Choosing among the positive qualities of SPbPU, expressed in one specific characteristic, the majority of respondents described the university as well-known (51.5%), interesting (40%), promising (34%), cozy (28%). Among the negative qualities of the university, respondents mainly note the low quality of dormitories (42.5%) and the inability of teachers to interest in their subject (43%)

Value orientations in the formation of SPbPU public image.

Characterizing the university and its public image through its intrinsic values, the respondents particularly highlight scientific discoveries and innovations (24%) and the mood of friendship and cooperation (19.5%). Other values were chosen by the respondents in approximately equal proportions, but the smallest vote is given for such values as openness and freedom (4.5%) and creativity (3%), see Fig.2.
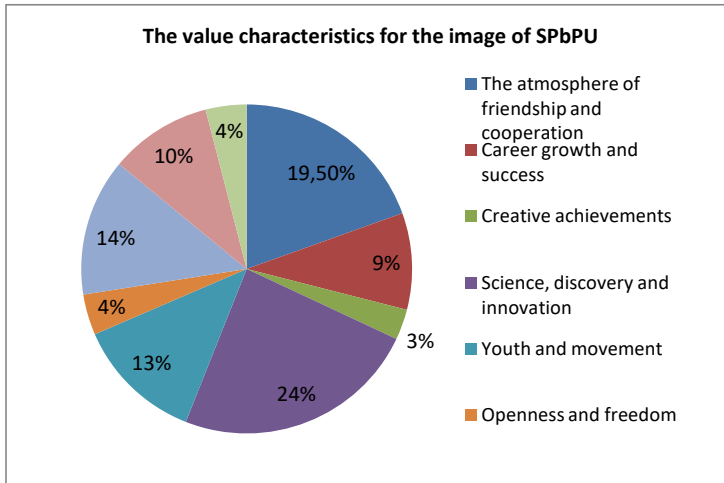
**Fig. 2.** Value characteristics for the image of SPbPU

## 3.3 Results of monitoring of students' attitudes towards online learning

The study tested the following hypotheses:
- Evaluation of digital culture introduction into the educational process as a factor of improvement of efficiency of obtaining knowledge.
- Along with digitalization, expectations increase in relation to the university educational environment, especially in the field of distance learning.
- The digital culture development at the university contributes to the communication development due to the fact that communication becomes easier and more accessible.
- Digital culture facilitates formation of creative educational environment.

A written survey according to the method of Yasvin [13] is held among students of "Psychology", "Advertising and PR", "Jurisprudence", "Computer Science and Computing" specialties; totally 114 respondents have competed the survey. The educational environment assessment is based on two projections: activity - passivity; freedom - dependence. Each alternative is characterized by 10 parameters rated on a scale of 1 to 10. Survey data analysis shows that the university educational environment assessment differs for students of humanitarian areas (Table 1) and technical areas (Table 2).

**Table 1.** The impact of digital culture on education

| The results of surveys of humanitarian students | |
|---|---|
| Positive sides | Negative sides |
| 63% of respondents | 26%of respondents |
| The format of distance learning is positive: access is from anywhere in the world, at any convenient time | The introduction of remote objects in the university has a negative impact: not productive, information is not remembered |
| Convenient to search for information | Does not discipline and is not always |

| than in the library | clear the proposed information for self-study |
|---|---|

**Table 2.** The impact of digital culture on education.

| The results of surveys technical students | |
|---|---|
| Positive sides | Negative sides |
| 46% of respondents | 39% of respondents |
| It's easier to get an education - it's not necessary to arrive at a particular place | The process of human socialization is difficult, communication skills do not develop |
| Less expensive than classic education | Does not discipline and is not always clear the proposed information for self-study |
| Permanent access to educational materials. The training literature is digitized, it can be downloaded to your smartphone. | The learning process is slower, because no one to explain and show everything personally |

Most humanities students advocate distance learning, but for further introduction of digital culture into the educational process it is necessary to consider the field of education, the proposed learning material, technical equipment and the level of students' adaptation to computer technology. During the group discussion, there appeared the proponents of prospective integration of classical and digital learning, since the learning process not only involves obtaining specific knowledge, but also develops communication skills, and this is facilitated by traditional education. Distance education technologies widen the opportunities for high-quality education, but do not provide it themselves. Here, the educational process organization and issue of motivation play a valuable role.

Active mastering and introduction of digital tools and means of communication into the educational process becomes an objective necessity. They increase the degree of students' responsibility for their education, make changes in socialization by reducing an interpersonal communication, increase individual achievements and simplify access to knowledge. The main factor of digital competence of modern students should be the readiness of students not only to master new information technologies, assess their capabilities and risks, but also to accept the ever-increasing rate of change and constantly update their knowledge, as well as acquire new competencies.

# 4 Discussions

## 4.1 The role of the worldview for constructing the future living environment

The subjective perception of time is determined by the present, its content is determined by the combination of the past and the desired future in the form of fantasy, dreams, utopia, ideals, which are represented in the mental image and carry a certain chronotope and context. The vision of the future is connected with education and understanding of the world which depends on the scientific or religious picture of the world order and the vector of the global development which is not disclosed since the subject of global governance is always hidden and available only in interpretations traditionally attributed to the super

knowledge of the priests. At the same time, a person is directed to the future. The lack of life prospects is a mental trauma which can lead to suicide.

Let's note that the general condition for future modeling is initial uncertainty of any scenario, since it deals with something that still does not exist. Rational or irrational basis for accepting this or that vision of the future consists of 1) the logic of circumstances, 2) the worldview paradigm, 3) intuition related to the set of knowledge and archetypes of the collective unconscious. The normative forecast is determined by the target vector which is not always clearly stated. There is a problem of the ideal social order which can be different, for example, in paradigmatic settings of cognitive capitalism and digital socialism, even though they utilize the same technologic base.

## 4.2 The educational paradigm in the future modeling

The problem of the ideal social order of the future is connected with the issue of ideal education which inevitably arises in every historical era and is associated with the fundamental model of socially adapted subject who has mastered cultural experience of his contemporaries. This issue is complicated in the temporal aspect of the generational bridge, since the process of education means formation of human consciousness of the future and thus violates the boundaries of historical and cultural experience and everyday life. The scenario of the future should be based on the generational bridge extended in time. It determines the content and role of the educational strategy in the future modeling.

Events and persons are assessed from a certain ideological position which defines the boundaries of understanding of the past and forecast of the future. Any program or educational system that does not have an ideological base is a headless system that creates an unpredictable and uncontrollable subject, because the basic value orientation indicating the criterion of truth is not set in advance. Changing worldview reorients educational strategies. Thus, in the history of European culture, the ancient cosmism, the philosophical basis of which was used by the intuitive-discursive educational strategy, is replaced by medieval theocentrism and exegetically-apologetic educational strategy, and then by the anthropocentrism of the New Age. This worldview also defines educational models in the present [14, p.289-295].

## 4.3 Trends of e-culture in modeling the educational environment of the future

Prospects for an information technology culture formation in a global society are determined by network technologies. The vision of the future in the context of information age evolution is associated with formation of a knowledge society with a pronounced economic attitude to education which is included into the system of services and focused on profit. The expansion of the network technologies format in educational practices that create new informational interactive environments, virtual games and multimedia teaching tools instead of traditional discursive means, however, does not answer the question about the ideal educational model in its time perspective. Moreover, the value aspect of the educational strategy is virtually eliminated except for the principle of freedom of choice of behavior in the virtual space.

The ideal education, according to Aristotle, is formation of the abilities of thinking and virtue. Since the transfer of knowledge and skills can be carried out at the imitative wordless level, discourse is of particular importance as a tool for the formation of the individual's mental experience and mental activity (reasoning, understanding and evaluation). Discursive technology in educational practice is a fundamental tool used to translate values and create semantic orientations, synthesizing cognitive, critical and value abilities in the process of emotional, intellectual and behavioral responses. The intuitive-

discursive paradigm of education developed in antiquity is still deeply rooted in the modern educational process. Moreover, in the conditions of the network information society discourse acts as a weapon of total mass impact on the mind, actions and emotions of a person, turning him into a limited subject (consumer) or vice versa into a disoriented subject (virtual).

The education system is included in the multilevel semantic network of socio-cultural community. The network is controlled by a program that is not visible from the inside, in the internal dynamics. The mental impact of discourse is associated with the subconscious algorithm: emotions – thoughts – actions. Language formula causes expected emotions as a reaction to the situation. Discourse provokes semantic dynamics, introduces phantoms into the mass consciousness and allows individual or group behavior modeling.

Traditionally, education translates cultural meanings and forms of behavior. The need for an in-depth study of the communication system impact on translation of meanings and values is caused by the dynamics of semantic structures produced in the new levels of reality characteristic of the information age. Network communication in modern information technology environments clearly demonstrates the difference between the semantic level of communication and information impacts, where the quantity (amount of transmitted messages) is the only factor of importance. Social network communication is characterized by instability of meanings, uneven distribution of meanings along with communication transformation, mutability of the communication subject. Both the addresser and the addressee of communication are transformed, new virtual entities and forms of communication emerge (fakes and multiple interfaces of the user). There is a virtual communicative universe which exists as a fundamentally unstructured whole. The semantic connection in the virtual community becomes uncertain, because the own dynamics of the Internet is able to create simulated events, which look like discourse but not really occur. The criterion of truth is invalidated. A post is rated for representativeness in a particular community [15].

Deliberately constructed and constantly reviewed fictions are based on the illusion which substitutes reality. Formation of the life world of the individual becomes dependent on information traffic. The network dependence creates potential conditions for mental and social transformations as a result of the collapse of illusions [16].

Network creative technologies open the way back for socialization of phantoms and virtual Internet parties. It's hard to escape a discouraging conclusion that the increase of the technological format in education, even being aimed at forming consciousness within a certain cultural tradition, provokes and enhances the design of a socially dangerous subject opposing the real community in the form of culture, language, state.

## 4.4 Axiological scenario in future modeling

Value attitudes in constructing of the life world correlate with the macro-system principle of the semantic network dynamics organization. System principles are undoubtedly significant for network organization and management. The system of values captures the semantic matrix in the infosphere of communication, forming a certain hyper net. Prediction of the network non-reflective semantic coherence of the community is possible only on the basis of fundamental value orientations rooted in the subconscious and triggered subconsciously in the processes of perceiving, reasoning and understanding.

Despite virtualization of the communicative and social space, transformation of meanings and creation of fakes, culture configures the network explicitly and implicitly. In this case, axiological attitude acts as a core semantic orientation for network tuning. In terms of education, the value system of culture should indicate an ideal of decent behavior, defining the social management program with account of a time perspective.

The prospect of the future is emotionally perceived by a person, first of all, in terms of life safety. Violation of this perspective is the most powerful channel of opposition to destruction of cultural and ethnic communities, even in the context of active social networks. Marginal situations with an implicit future constitute certain "singularities", on which boundaries request for changes emerges, stimulating transitions to a new state [17].

The preservation of community is the natural basis for its continued existence in time. The paradigm of education in the network society with its polylogos can be associated with the axiological paradigm which allows, when modeling a global society of the future, to combine the value attitudes with subconscious boundaries of mentality as ethnically normalized world perception, rooted in the chronotope of geographical environment. The ethnic stereotype forms a meta-discursive channel of communication between generations. It translates norms of relationships, perception of space-time, duty, honor, dignity, trust, a sense of community and security. Human memory, consolidating consciousness in time, connects it with cultural forms existing in the community.

The history of culture demonstrates the stability of traditions as a system of institutions and values. New ideological and axiological attitudes are rejected by the majority of people and treated as a riot; there followers don't receive public recognition and approval. At the same time, discursive practices of meanings transformation constitute a hidden mechanism of conflict environment production, as far as they introduce new meanings, change traditional attitudes in a covert struggle for minds and group values. In the context of generational bridge, ccommunication contains objective conditions for a hidden conflict of generations. The educational paradigm is intended to remove this divergence and breaks in the generational bridge through the formation of common worldview and historical memory.

## 5 Conclusions

The scenario of the future should seamlessly combine socio-cultural and mental dynamics on the basis of a certain system of values in the project of the global society. The tools of the infosphere in modeling the vision of the future are adjusted according to the paradigm, which is not proclaimed, or, alternatively, clearly declared, introducing specific guidelines for understanding the life perspective. Depending on what vector prevails, it is possible to speak about scenarios of exploratory or normative forecast. However in both cases forecasting is latently driven by worldview paradigm. The exploratory forecast relies on existing trends extrapolation into near future. It is supposed that objective conditions would not change. At the level of the instinctive program, the normative forecast (which is implemented unconsciously), oppositely, appears to be a model of the required past.

The paradigm of education in the project of the future implies such a method of the world interpretation which includes, on the one hand, historically determined cultural heritage and on the other, formation of practical consciousness as an individual way of world perception. The values linking the semantic sphere of the practical consciousness are constitutive signs of community.

Globalization gives rise to particular socio-cultural environment and new types of virtual communities forcing us to rethink typological characteristics of the cultural-historical process and life-world of the individual. The hyperactive network in digital culture transforms the communication infosphere, creates potential conditions for destruction of the community and mental structures of the collective unconscious, practical and discursive consciousness.

Implementation of the strategy of mental protection of a person in developing technological environments in order to preserve human community should determine

scenarios of the future in social forecasting and, first of all, in the strategy of education oriented to the future.

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