

## THE CONCEPT OF AN INFORMATION ENVIRONMENT OF AN ORGANIZATION ON THE BASIS OF THE THEORIES OF CONSTRUCTIVISM AND CONNECTIVISM: SPECIFICATION OF CONCEPTS AND CONTENTS

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### ABSTRACT

The article contains the analysis of the known approaches to the theory of constructivism and connectivism and the analysis of usage of cooperation and collaboration. Topicality of the research is stipulated by active improvement of organizations of different types and development of organizations, which studies.

The results of research enabled to present the information environment as a constructive system consisting of an information system of an organization, a professional collective information environment, a personal information environment, e.g. (within the context of networks) a corporate network, a professional network (suppliers, partners, consultants, and clients etc.), and the global network, which forms knowledge on the basis of constructivism, connectivism, cooperation, and collaboration.

The author pioneers the active use of both publications of scientists and specialists and blogs, discussions, and comments. This allows to make a conclusion that the article is a product of connectivism course "Network cooperation and professional development" written by I. Travkin.

**Keywords:** information environment organizations, connectivism, collaboration, constructivism, interaction, group work.

### РЕЗЮМЕ

Статья содержит анализ известных подходов к теории конструктивизма и коннективизма. Использование кооперации и коллаборации. Актуальность исследования обусловлена активным совершенствованием организаций разного типа и развитием обучающихся организаций.

Результаты исследования позволили представить информационное пространство как конструктивную систему, состоящую из информационной системы организации, профессиональной коллективной информационной среды, персональной информационной среды – в сетевом понимании – корпоративной сети, профессиональной сети (поставщики, партнеры, консультанты, клиенты...), глобальной сети, в которой знание формируется на основе конструктивизма и коннективизма, кооперации и коллаборации.

Автор впервые активно использовала не только публикации ученых и практиков, а и блоги, дискуссии, комментарии. Это позволяет сделать вывод о том, что данная статья – продукт коннективистского курса «Сетевое сотрудничество и профессиональное развитие», автором которого является И. Травкин.

**Ключевые слова:** информационная среда организации, коннективизм, коллаборация, конструктивизм, взаимодействие, групповая работа.

### РЕЗЮМЕ

Стаття містить аналіз відомих підходів до теорії конструктивізму і коннективізму, використання кооперації та колаборації. Актуальність дослідження зумовлена активним вдосконаленням організацій різного типу і розвитком організацій, які навчаються.

Результати дослідження дозволили представити інформаційний простір як конструктивну систему, що складається з інформаційної системи організації, професійного колективного інформаційного середовища, персонального інформаційного середовища – в мережевому розумінні – корпоративної мережі, професійної мережі (постачальники, партнери, консультанти, клієнти ...), глобальної мережі, в якій знання формуються на основ конструктивізму і коннективізму, кооперації та колаборації.

Автор вперше активно використовувала не тільки публікації вчених і практиків, а й блоги, дискусії, коментарі. Це дозволяє зробити висновок про те, що дана стаття – продукт коннективістського курсу «Мережеве співробітництво та професійний розвиток», автором якого є І. Травкін.

**Ключові слова:** інформаційне середовище організації; коннективізм, колаборація, конструктивізм, взаємодія, групова робота.

### FORMULATION OF THE PROBLEM

Development of the theory and the practice of construction of an information environment have become especially topical in the postindustrial society and in terms of development of network information technologies. Aside from these facts, the development is stipulated by active improvement of organizations of different types and by development of organizations, which study [1]. Exactly these tendencies caused the need for addition and specification of concepts of pedagogical theories, i.e. constructivism and connectivism and for analysis of the necessity of usage of the principles of collaboration and cooperation in the process of development of theories and applied measures of information environment formation.

Topicality of the research also relates to the necessity of a system approach to formation of an effective activity of an organization and of its information environment.

**Analysis of the last researches and publications.** Matters of usage of the theories of systems, constructivism, connectivism, cooperation, and collaboration are examined by scientists of different sectors of the economy. Among scientific publications and applied examples of the usage, the most noticeable are working papers and Internet-blogs of K. Buhaichuk, S. Downes, O. Zakharchuk, V. Kukhareno, O. Lavrov, V. Naumov, V. Popkov, H. Siemens, P. Senge, I. Travkin [1-11] etc. The results of this research formed as a result of reflection after studying the open-access course "Network cooperation and professional development" written by I. Travkin. Materials of participants of the course were also used in the process of writing the article. Work at the course substantiated necessity of specification of the theory of organization information environment [8; 11; 13].

**A purpose of the article** is to specify the main concepts and senses of application of the theories of constructivism, connectivism, methods of cooperation and collaboration in the process of formation of organization information environment.

## RESULTS OF THE RESEARCH

Analysis of working papers on application of constructivism showed it is actively used in pedagogic [6], theory of systems [5] and economics [9].

According to a definition of V. Popkov, "economic constructivism is conscious construction of an economic activity in compliance with valuable preferences of a social (an individual and collective) subject, which takes into consideration a structural and parametric interface of an object and a subject on the basis of principles of self-reference, duality, circularity, and cyclical causality" [10].

The main principles of constructivism in the theory of information environment may be presented in such a way:

1. Unity of an object and a subject in a functionally integral process of analysis, synthesis, and management is first of all an integral process of existing and development of an organization and its information environment (the concept of two mirrors).
2. A principle of functional complementarity of interrelated systems (as interpretation of a famous principle of "dialectic controvercy") enables to realize double reflection, which means, on the one hand, monitoring of a present activity and, on the other hand, prognostication of the future activity [5; 12].
3. Reduction of any higher level of general insight into a model of complicated system to any level concretizing its insight (within any aspect concretizing the model and for any functional state of this model): presentation of an information environment in the form of a set of sub-spaces, i.e. from the global network to a personal professional environment.
4. Modeling elements based on algorithms enable to optimize an information environment, using detection of duplicating operations, estimation of frequency of usage of instruments and relations [5; 13].
5. Topicality of insight into all models that means recurentive and recursive development (as gradual specification) of each model on the basis of the method of consequent approximations, which realizes in a structured form).

A general system algorithm is applied to a previous state of specifying development of a model, which is determined in a model's external information environment, that is to say, a topical amount of information on an objective area (i.e. recurentively). This principle may be specified by a quote of P. Senge: "System thinking ... needs skills and disciplines enabling creation of new insight, development of intellectual models, and organization of group studying and encouragement of personal mastership". Aside from this opinion, this principle is coherent with a definition of mathematical constructivism: the main method of construction of mathematical theories should not be the deduction, but the constructive and genetic method, according to which any mathematical object and any assertion about it shall be a result of thinking regarding creation of more simple constructions from more complicated constructions on the basis of determined, simple and easily controlled rules of creation, i.e. algorithms, which allow to unambiguously receive a final construction, using a finite number of steps, a finite number of operations and during a finite period of time [5; 1; 14].

The principles of constructivism of V. Popkov may be adapted to an organization and its information environment in such a way:

- 1) the principle of self-reference contemplates application of cybernetic systems of the second degree, i.e. space, containing an observer;
- 2) the principle of circularity results in cycle organization of a system, which can be defined as organizational closure, i.e. closedness, autonomy, compliance between the outcoming information and final information. Any product of such system automatically turns into its outcoming product for a next volute. The principle of spiral development is actively used in the process of information environment formation as a principle of development of collective information knowledge, application of the known ideas and principles at a new level of development;
- 3) the principle of duality contemplates that a system interrelates with factors of the external environment acting as initiators of continuous structural changes, which form the dynamics of its states, but always save circularity and closure of an area, which interrelates with the external environment. The information environment expends to interrelate with the external environment, remaining closed at a level of a user and/or a team of users;

4) the principle of cyclical causality in the information environment may be presented as a principle of application of data and knowledge, which become a cause of formation of new ideas and projects, actively influencing development of the information environment and an organization [10].

Using the definition of P. Senge, which claims that “an organization, which studies is a place, where humans constantly reveal that exactly they create the reality, in which they live and act” [1] and taking into account a fact that a modern successful organization is an organization, which studies, the author suggests that pedagogical theories of education may be used in researches on an activity of organization and its information environment.

Ideas of constructivism in pedagogy are presented in working papers of D. Siemens, S. Downes, V. Kukharenko, V. Naumov, O. Lavrov etc.

V. N. Kukharenko determines constructivism as a direction of development of education in the form of an active process, in which students construct knowledge on the basis of own experience and previously obtained knowledge [6]. An information environment of an organization should contain obtained knowledge and experience. The main principles of constructivism within an organization, which studies are realized completely and reasonably due to activeness of a user: a user does not only study, but also study to solve determined tasks or occurred problems. An information environment should consist of variative models for solution of similar tasks and problems (according to materials of V. Naumov [8]).

Let's consider the main principles and definitions of the theory of connectivism within the context of formation of information environment of organization aimed at active cooperation and decision-making.

I. Travkin, referring to the working papers of D. Siemens and S. Downes, considers connectivism as a theory “on passing of an education process in the epoch of digital technologies”. Connectivism departs from an idea that decisions are made on the basis of rapidly changeable views and knowledge. New knowledge is always obtained and “there is a vital importance to distinct essential and unessential knowledge”, especially those influences making key decisions [11].

V. N. Kukharenko says in his blog that a relation to connectivism is ambiguous [15]. Citing K. Buhachuk's suggestion that “connectivism attempts to characterize “successful” networks being different, autonomic, open, and having relations and practices, which result in such networks” [2], connectivism can be projected on an organization and its information environment. As a result, such situations can be emphasized:

1. Solution of functional tasks, as a rule, does not contemplate usage of connectivism (except procedures of improvement of technological processes) and constitutes proper algorithms of execution of operations, formation of data, their proceeding and protection.

2. Execution of tasks aimed at preparation of making complicated decisions; work of groups aimed at development of an organization and intellectual projects contemplate formation of an active society, for which connectivism is a theory enabling to form new knowledge, to propose specifications for an organization activity, and to form this knowledge on the basis of digital technologies and collaboration.

The theory of S. Downes and D. Siemens characterizes studying as a process of creation of connection and development of networks. It is based on a pre-condition, which suggests that knowledge exists in the world, but does not exist in a mind of a human. Connectivism appears within a network and develops from a junction to a junction with a different power of influence of relations. Of course, connectivism develops a network due to turning it into sustainable and effective one. Such process affirms the theorem of Ashby [8].

Analyzing the working papers of Siemens and Downes, A. Riabinin emphasizes such main principles of connectivism [16]:

- studying and knowledge form a variety of opinions;
- continuous education on account of setting of new essential relations;
- decision-making as a process of education;
- variation of appropriateness of answers depending on changes of an environment.

To organize its information environment these principles can be presented in such a way:

1) development of an organization is directly related to development of its knowledge and its information environment, which can be realized on the basis of diversity of knowledge of organization's agents (agents encompass persons, program applications, databases, forums, and scientific and applied developments);

2) permanent renewal of relations. The author absolutely agrees with a comment of V. Naumova, who states that ““connectivism” of Siemens and Downes becomes connectivism, if the first one remind and act in accordance with the theorem of Ashby in order to improve self-organization: “More opportunities regarding choice of behavior has a system, a higher degree of coherence of behavior of its parts is” [8];

3) decision-making on the basis of knowledge of an organization, which studies and formation of a received decision as knowledge-experience from further activity;

4) variative models of decision-making and execution of functional processes depending on changes of an environment.

Taking into account that the theory of connectivism contemplates usage of a mutual activity, there is a need to consider the concepts “collaboration” and “cooperation”. According to a definition of Wikipedia [17], collaboration is a process of a mutual activity, e.g. in the intellectual area, of two and more persons or organizations in order to attain mutual goals, which results in exchange of knowledge, education, and achievement of agreement. As a rule, this process requires existence of a managerial authority. A managerial authority may also be public in cooperation of

equal members of a decentralized society. There is an opinion that participators of collaboration may receive more opportunities for success achievement under conditions of competition and scarce resources. Collaboration may also exist in terms of contrary of goals, but within this context the concept is rarely used.

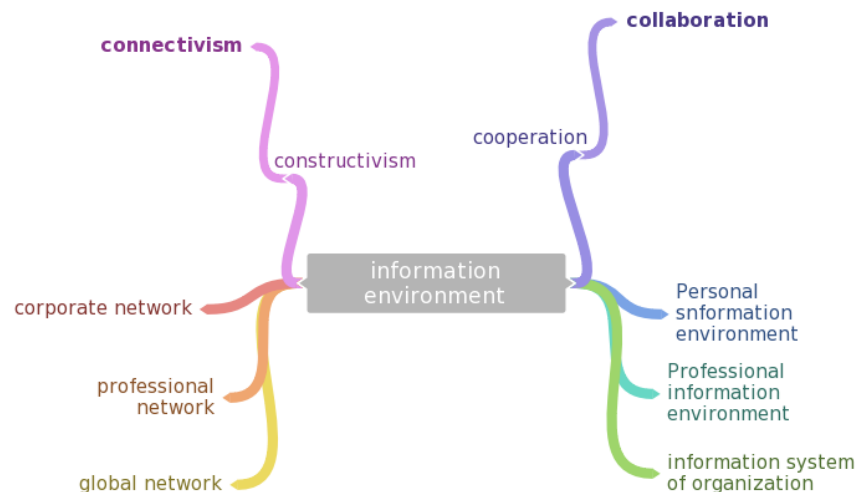
In his blog I. Travkin presents the concept “collaboration” (a group form of cooperation), which is characterized by “sameness” of participators of an interrelation (their internal organization). The author means that same participators easily create a collective thing. Also, there is diffusion of mutual and synchronized knowledge, which obviously contains insight into a mutual goal. Working at drawn sub-tasks, participators of collaboration always solve a mutual task, i.e. individual attempts are semantically coherent and form perceivable by everybody insight [11; 3].

Cooperation may be understood as the usage of a mutual system or an infrastructure for communication. In such terms a society is determined by this interaction and relations between participators. A total result of cooperation may be described from the point of view of interrelations within an infrastructure, because a total result of cooperation cannot follow a mutual plan at a level of detached participators. Referring to the metaphor of a brain, a thought is not an impulse passed from a neuron to a neuron, but a substance arising as a result of their interaction (qualitatively another level) [18]. Such a radical, according to an opinion of S. Downes, approach to organization of cooperation welcome the difference of interests. Arranging in the process of communication, participators form relations. Such process constitutes a sense of cooperation [11; 3;4].

The understanding of cooperation and collaboration within an organization, especially if they are related to business, may be specified by definitions proposed by F. Kotler and K. Keller [19, p. 258]. Corporative systems within the operational context are accomplished by close cooperation; but none of them do not demonstrate a structural interest in the form of legal obligations or adaptation to needs of another participator. Collaboration contemplates that trust and interest are so considerable that this results in formation of a true partnership.

All mentioned above caused construction of a chart of the information environment of an organization presented in Figure 1. This chart demonstrates the information environment as a constructive system containing an information system of an organization, a professional collective information environment, a personal information environment and, within the network context, a corporate network, a professional network (suppliers, partners, consultants, clients etc.), the global network, where knowledge is formed on the basis of constructivism, connectivism, cooperation, and collaboration. Connectivism contemplates active confident interactions in order to obtain new knowledge and make substantiated decisions; collaboration is the basis of a true partnership.

*coggle*



**Figure 1. The chart of the information environment (an environment, a system, a network, methods, and theories)**

## CONCLUSIONS

The information environment of an organization may be presented as a constructive system containing an information system of an organization, a professional collective information environment, a personal information environment and, within the network context, a corporate network, a professional network (suppliers, partners,

consultants, clients etc.), the global network, in which knowledge is formed on the basis of constructivism, connectivism, cooperation and collaboration. At the same time connectivism contemplates active confident interactions in order to obtain new knowledge and make substantiated decisions; collaboration is the basis of a true partnership.

A successful organization, which studies, uses connectivism and collaboration to support diversity, openness, relations, and knowledge enabling to achieve determined goals of development.

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