

THE USE OF NETWORK MODELING IN THE STUDY OF SELF-ORGANIZATION ACTIVITIES OF GRADUATE STUDENTS

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Abstract

The article is devoted to the problem of self-organization of activity and psychological factors of success of educational activities of graduate students. The concept of "self-organization", actively discussed in Russian science, does not have an exact equivalent in English-language publications. From the point of view of proceduralism, self-organization is an independent step-by-step construction by a person of the structure of his features, motives and ideals. Self-organization has two aspects: the construction of an "I-image" or self-esteem — an internal aspect, and the organization of one's activity or its success — an external aspect. In the works of S.N. Kostromina, S.I. Rozum, N.A. Loginova, as well as in our previous works, showed that the integrity of the structure of personal qualities ("I-image") determines the success of an activity. At the same time, the structure of personality traits changes in the process of performing activities (abilities are formed, self-esteem changes, etc.). This study is devoted to the external aspect of self-organization, which we call "self-organization of activity", and its relationship with personality traits.

The purpose of the study is to describe the model of self-organization of graduate students. The task of the study was to build a network model of the relationship between the characteristics of students' activities and their personality traits and values. The graph method or the network modeling method was used as a tool. The sample consisted of 44 graduate students (mean age 20.6 ± 2.6 years, m-19, f-25). At the first stage a correlation analysis of the relationship between the characteristics of the activity and the personality traits of the subjects was carried out. At the second stage a model of self-organization of students' activities was built with the help of the program "Gephi 0.9.2".

As a result, it was found that such characteristics of activity as flexibility (correction), purposefulness (goal setting), planning and self-control are most deeply integrated into the structure of personality traits. Personality features are manifested in these characteristics of activity, forming complexes of features or stable combinations around them. In this case, the connecting link of the entire model is such features as risk avoidance, sociability and self-control of behavior. The ability to plan and self-monitor the implementation of activities, developed in this group of subjects, is aimed at achieving such value as recognition of the success of the people around them. Orientation to the creative approach is manifested in the adjustment of the activity, but it prevents the adequate analysis of the conditions of the activity. In addition, the identified complexes of features are associated with a particular area of the individual. When planning activities, subjects are guided by relations with the closest environment, while in self-control of activities they based on high demands and their own prudence. Flexibility of activity is connected with domination in society and adaptation to new situations, while goal-setting - with self-confidence. In conclusion we must say that the described model of self-organization of activities ensures the successful implementation of students' learning activities. It is proposed to conduct training sessions with students in

order to form additional motivational attitudes of students' activities and the development of qualities necessary for the organization of activities.

Keywords: network modeling, self-organization, graduate students, personality, educational psychology.

1 INTRODUCTION

The problem of self-organization of students is becoming one of the urgent problems in the modern system of Russian education. In this case, special attention should be paid to psychological factors that ensure the dynamics and direction of the process of self-organization of the individual. Self-organization is included in the processes of personal development and professional development of students. Self-organization, being at the same time a condition for the development of a personality and its result, is a complex phenomenon that cannot be described. The systems approach assumes that the self-organization of the individual manifests itself in the formation of interconnections between the characteristics of the personality of different nature. The highest level of integration of various personality characteristics is described in Russian psychology as an "integral individuality" or as a "subjectivity". Despite the deep methodological development of these concepts, the empirical study of these categories is difficult. This is due to the large amount of data describing the person, and the complexity of the graphical representation of all the identified relationships. In this regard, it seems relevant to use the network modeling method, which allows you to capture the integrity of the structure of the phenomenon and describe the relationship between its components. Despite the novelty of the application of this method to the analysis of psychological research data, it has sufficient resources to study complex phenomena.

2 LITERATURE REVIEW

2.1. The Genesis and Content of the Concept of "Self-Organization" in Psychology

The problem of integrating the properties and qualities of a person of different nature has profound traditions in domestic and foreign psychology. In foreign psychology, the beginning of such studies is associated with the concept of "I-concept" and its structure. Today, Western psychology tends to combine the qualities of various natures into a system of factors of traits. In Russian psychology, the fundamentals of the holistic study of man were laid in the works of A.F. Lazursky, P.K. Anokhin, L.S. Vygotsky, which is reflected in the deep and integrated development of human psychology (Khinkanina, 2014, Rozum, 2001). The problem of the structural organization of the individual is closely related to the concept of integral individuality. So the work on the integral qualities allowed the study of self-organization of the individual.

The problem of self-organization acquires particular importance at the stage of vocational training, when the basic psychological qualities of a future professional are formed. The relationship between the educational activities of students and their self-organization has been shown in many studies of the past century (Kostromina, Gnedykh, 2015). The obtained descriptions of the external characteristics of students with a high level of self-organization allowed modern researchers to come to the study of the relationship between the subject's self-organization and various types and forms of learning activities.

2.2. Empirical Study of Self-Organization of Personality

In modern studies special attention is paid to the activity aspect of self-organization of the individual (Paatova, Chermit, Naumenko, 2018). The developed methods of self-organization diagnostics are aimed at diagnosing the skills of the subject to implement their activities. However, indicators of self-organization, as a process of change, development and complication, the source of which becomes the subject of the activity itself, are not currently described. In the works related to the integral approach in psychology, the way of practical study of self-organization of a person is outlined. We understand the self-organization of an individual as an integral system of personal qualities and characteristics of a subject of activity, united by a dominant attitude toward activity, and realized in the organization of this activity (Pakhmutova, Bakhtina, Rybakov, 2017). The content of self-organization becomes the integral qualities that are formed in accordance with the requirements of the activity. Psychological indicators of self-organization at the level of activity become the skills and abilities to organize this activity, and at the level of the individual: a formed attitude towards activity, the development of integral properties and the conformity of their components to the characteristics of activity, the integrity of the structure of integral properties.

2.3. Modern Methods of Systems Approach

Modern methodology of psychological research is characterized by a tendency to a comprehensive analysis of human individuality. However, the tools of the research psychologist are limited by the capabilities of the statistical packages. Therefore, the main methods for studying personality today remain: a comparative analysis of groups of subjects, a correlation analysis of the relationship between different characteristics and typology of the subjects. These research methods are based on averaging the data on the sample, which allows us to name only the general laws of the distribution of variables, but prevents a specific description of the phenomenon under study. This problem is particularly acute in studies related to complex psychological phenomena, which, as a rule, have a multi-level structure and change over time. In our case such a phenomenon is the self-organization of the students' personality.

In modern studies, the network model includes "nodes" and "links" between them. In this case, it is the "connections" between the elements of the systems that become the subject of research. Traditionally, network modeling has evolved through a conceptual approach, which was later replaced by a structural approach. The model is a direct visualization of the array of data describing the system. At the same time as the "nodes" of the model can be a variety of phenomena. The topology of the resulting network is analyzed with the help of mathematical methods; forecasts of network changes are made (Morozova, 2017).

3 MATERIALS AND METHODS

The purpose of the study is to describe the model of self-organization of graduate students. The task of the study was to build a network model of the relationship between the characteristics of students' activities and their personality traits and values. The main research methods were correlation analysis and network modeling. The study included two phases:

- 1) Identification of correlation relationships between the characteristics of activity, personality traits and value orientations;
- 2) Representation of relationships in the form of a network model.

The complex of psychodiagnostic methods included: "Questionnaire "Diagnostics of features of self-organization-39" (Miloradova, 2005), method "Self-assessment of organization" (E.P. Ilyin), method "Five-factor personal questionnaire" (R. McCray, P. Costa) (Khromov, 2000), methodology "Value Orientations" (M. Rokich) (Raigorodskii, 2004). The study involved senior students of the Volga State Technological University (N = 44, age = 20.6 ± 2.6 years, m - 19, f - 25).

4 RESULTS AND DISCUSSIONS

Using the correlation analysis, statistically significant connections (p-level <0.05) between the characteristics of students' activities and their personal characteristics (Table 1) were identified. It can be noted that the characteristics of the activity are most strongly associated with such value orientations as "the happiness of others", "self-confidence", "productive life", recognition from others. The features related to the factors "extraversion", "responsibility" and "openness to new knowledge" are interrelated with the characteristics of activity.

It should be noted that behavioral traits are also interrelated with each other. In particular, emotional instability and demonstrativeness are positively associated with plasticity ($R = 0.60$, $R = 0.61$, with $p < 0.01$). Empathy is associated with sensitivity ($R = 0.45$, $p < 0.01$), and risk appetite with a sense of trust ($R = 0.44$, $p < 0.01$). Credulity is associated with a low level of depression ($R = -0.41$, $p < 0.01$), and demonstrative behavior with emotional instability ($R = 0.43$, $p < 0.01$). Value orientations, which are connected with the severity of certain features, describe a certain area of activity of students, as well as their psychological space. The desire to recognize their success on the part of others causes depression ($R = -0.55$, $p < 0.01$), but also develops accuracy in business ($R = -0.45$, $p < 0.01$). The desire for diligence is associated with the desire for cooperation ($R = -0.41$, $p < 0.01$), and the focus on efficiency in business is connected with responsibility ($R = -0.47$, $p < 0.01$). Value orientations of psychological well-being are associated with features related to collaboration and anxiety. The desire to seek love is associated with sensitivity ($R = -0.43$, $p < 0.01$) and anxiety ($R = -0.43$, $p < 0.01$).

Table 1. The results of the correlation analysis of the relationship between the characteristics of the activity, personal qualities and value orientations

Scale name	R
Activity Characteristics and Values	
Self control - V. happiness others	0,42**
Goal setting - V. self-confidence	-0,40**
Goal setting - V. productive life	0,33*
Situation Analysis - V. Creativity	0,33*
Planning - V. recognition, respect	-0,37*
Planning - shopping center happy family life	-0,35*
Self-control - V. recognition, respect	-0,32*
Correction - V. Creative	-0,36*
Scale of organization - V. Health	-0,31*
Scale of organization - V. friends	0,38*
Personality Traits and Activity Characteristics	
3.4 Behavior Self-Control - Situation Analysis	0,43**
1.3 sociability - Correction	0,39**
5.1 curiosity - Correction	0,35*
3.4 Behavior Self-Control - Planning	0,33*
5.5 plasticity - Correction	0,32*
Scale name	R
1.2 dominance - Correction	0,32*

1.4 Search for impressions - Correction	0,31*
3.5 Forethought - Self Control	0,31*
3.4 self-control behavior - goal setting	0,30*
1.3 sociability - Planning	-0,30*
1.5 demonstrative - Goal-setting	-0,31*
4.3 Depression - Correction	-0,31*
2.5 respect of others - Self-control	-0,32*
1.3 sociability - Self-control	-0,33**
4.2 Tension - Strong effort	-0,33*
4.2 Tension - Correction	-0,33*
1.4 Impressions Search - Targeting	-0,34*
1.3 Sociability - Targeting	-0,36*
3.3 Responsibility - Correction	-0,37*
1.3 Sociability - Situation Analysis	-0,40**
1.4 Impressions Search - Planning	-0,40**
3.4 Behavior Self-Control - Correction	-0,45**

* - $p < 0.05$, ** - $p < 0,01$

At the second stage of the study a network model of interrelations between self-organization of activity and students' personal characteristics was built (Fig. 1).

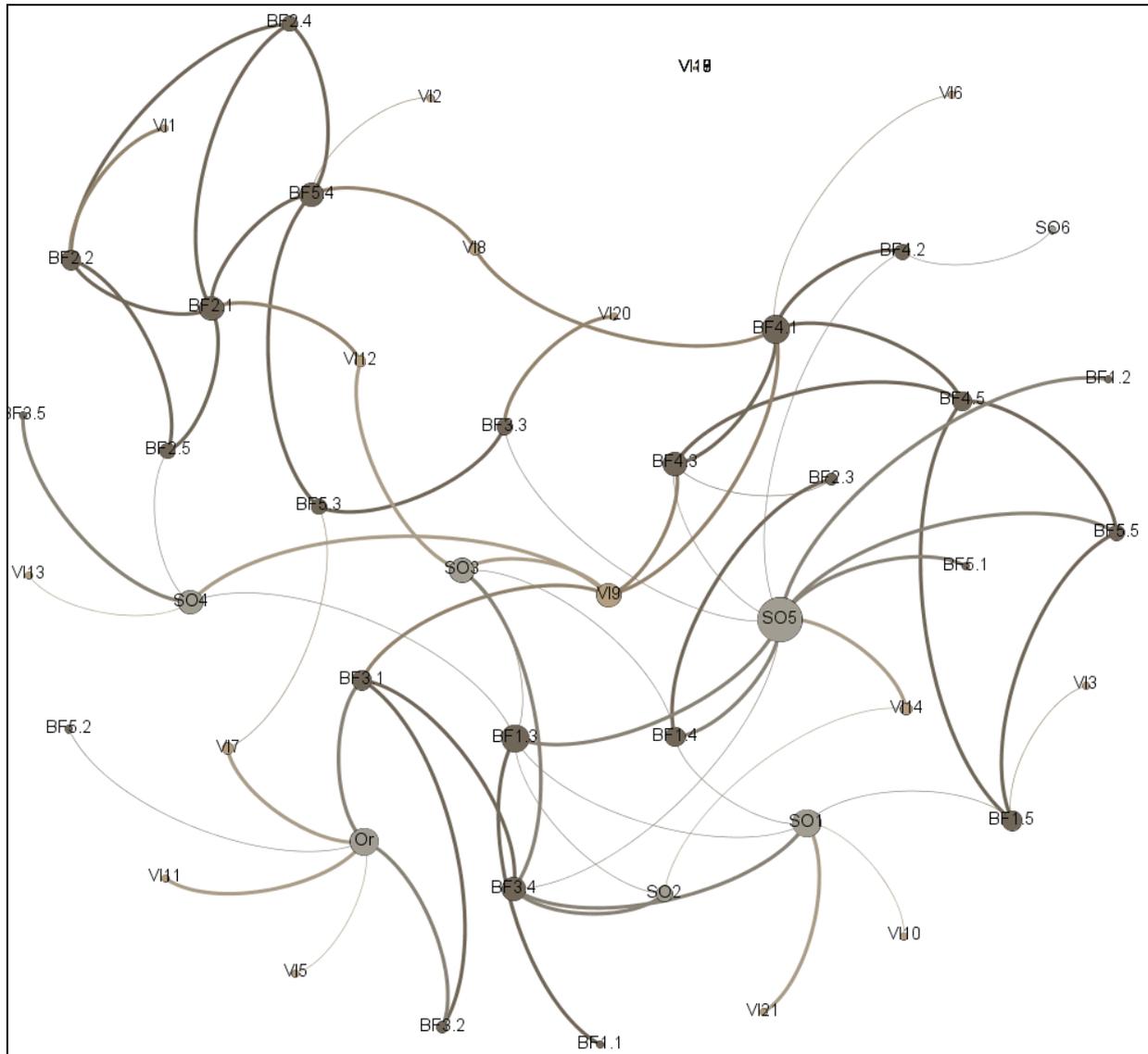


Fig. 1. Network model of student self-organization (n=44).

SO1 - Goal setting, SO2 - Situation Analysis, SO3 – Planning, SO4 - Self control, SO5 – Correction, SO6 - Power of will, Or - Scale of organization. Personality Traits (BF): 1.1 – activity, 1.2 - dominance, 1.3 - sociability, 1.4 - impressions search, 1.5 - demonstrative, 2.1 – warmth, 2.2 – collaboration, 2.3 – trust, 2.4 empathy, 2.5 - respect for others, 3.1 – accuracy, 3.2 – perseverance, 3.3 - responsibility, 3.4 - behavior self-control, 3.5 - forethought, 4.1 - anxiety, 4.2 - tension, 4.3 - depression, 4.4 - self-criticism, 4.5 - emotional instability, 5.1 - openness to new knowledge, 5.2 – curiosity, 5.3 - susceptibility to art, 5.4 – sensitivity, 5.5 - plasticity. Values (VI): 1. – executive, 2 - irreconcilability to defects, 3 - self control, 4 - business efficiency, 5 – friends, 6 – wisdom, 7 – health, 8 – love, 9 - public respect, 10 - productive life, 11 – freedom, 12 - family happiness, 13 - happiness of others, 14 - creative activity, 16 – independence, 17 – tolerance, 18 - will power, 19 – honesty, 21 - self-confidence.

As a result, it was found that such characteristics of activity as flexibility (correction), purposefulness (goal setting), planned actions (planning) and self-control are most deeply integrated into the structure of personal properties. Personality features are manifested in these characteristics of activity, forming complexes of features or stable combinations around them. In this case, the link of the entire model is such features as risk avoidance, sociability and self-control of behavior. The ability to plan and self-monitor of the implementation of activities, developed in this group of subjects, is aimed at achieving such value as recognition of the success of the people around them.

5 CONCLUSION

The conducted research made it possible to describe the model of self-organization of students studying at the senior courses. The graphical presentation of the data allowed to establish that the orientation of students to the creative approach manifests itself in the case of the need to change the course of activity. But it is precisely the desire for creativity that prevents an adequate analysis of the conditions of activity in the initial stages of its implementation. In addition, the identified complexes of interrelated features are differentiated into various areas of personality activity. So when planning activities, subjects are guided by the opinion of their closest associates (family, loved one), and at the stage of monitoring and analyzing results of their activities they rely on their own requests for results and their foresight. The ability to change activities is associated with such personality characteristics as dominance and adaptability to new situations. The ability to goal-setting is associated with self-confidence.

Thus, the described model of self-organization of activity allows us to identify the psychological factors of successful student performance of learning activities. Based on the results obtained, it is possible to develop and conduct training sessions with students. Such classes will allow to form additional motivational attitudes to activities and to develop the necessary personal qualities.

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