

IDENTIFYING A MODEL FOR MATH STUDENTS' CREATIVE ACTIVITIES: A QUALITATIVE STUDY

IDENTIFICANDO UM MODELO PARA ATIVIDADES CRIATIVAS DE ESTUDANTES DE MATEMÁTICA: UM ESTUDO QUALITATIVO

IDENTIFICACIÓN DE UN MODELO PARA LAS ACTIVIDADES CREATIVAS DE LOS ESTUDIANTES DE MATEMÁTICAS: UN ESTUDIO CUALITATIVO

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ABSTRACT: This study aims to examine the experience of creative activities of undergraduate students and identify a model for a better understanding of these activities. Data were collected using a qualitative approach using grounded theory (grounded theory or foundation data theory) and semi-structured in-depth interview tools. The statistical population consists of students studying mathematics at public universities in Russia. Thirteen math students participated voluntarily through purposive and theoretical sampling methods. Data were analyzed through a coding process in two stages: free and axial. Credibility, reliability, transferability, and verification criteria were used to ensure the quality of research. The conceptual model extracted from the data in a systematic paradigm model of grounded theory method includes phenomena, strategies, intervening factors, contextual conditions, contexts, and consequences. The model indicates that several factors affect the sensation of mathematical creativity.

KEYWORDS: Creative activities, Undergraduate students, Mathematics, Mathematical creativity.

RESUMO: Este estudo tem como objetivo analisar a experiência de atividades criativas de alunos de graduação e identificar um modelo para uma melhor compreensão dessas atividades. Os dados foram coletados por meio de uma abordagem qualitativa, utilizando-se

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teoria fundamentada (grounded theory ou fundamentos teóricos dos dados) e instrumentos de entrevista em profundidade semiestruturada. A população estatística consiste em estudantes que estudam matemática em universidades públicas na Rússia. Treze alunos de matemática participaram voluntariamente através de métodos de amostragem intencional e teórica. Os dados foram analisados por meio de um processo de codificação em duas etapas: livre e axial. Critérios de credibilidade, confiabilidade, transferibilidade e verificação foram usados para garantir a qualidade da pesquisa. O modelo conceitual extraído dos dados em um modelo de paradigma sistemático do método de teoria fundamentada inclui fenômenos, estratégias, fatores intervenientes, condições contextuais, contextos e consequências. O modelo indica que vários fatores afetam a sensação de criatividade matemática.

PALAVRAS-CHAVE: *Atividades criativas, Alunos de graduação, Matemática, Criatividade matemática.*

RESUMEN: *Este estudio tiene como objetivo examinar la experiencia de las actividades creativas de los estudiantes de pregrado e identificar un modelo para una mejor comprensión de estas actividades. Los datos se recopilaron utilizando un enfoque cualitativo utilizando la teoría fundamentada (grounded theory o teoría de los datos fundacionales) y herramientas de entrevistas en profundidad semiestructuradas. La población estadística consiste en estudiantes de matemáticas en universidades públicas de Rusia. Trece estudiantes de matemáticas participaron voluntariamente a través de métodos de muestreo intencional y teórico. Los datos fueron analizados a través de un proceso de codificación en dos etapas: libre y axial. Se utilizaron criterios de credibilidad, confiabilidad, transferibilidad y verificación para asegurar la calidad de la investigación. El modelo conceptual extraído de los datos en un modelo de paradigma sistemático del método de la teoría fundamentada incluye fenómenos, estrategias, factores intervenientes, condiciones contextuales, contextos y consecuencias. El modelo indica que varios factores afectan la sensación de creatividad matemática.*

PALABRAS CLAVE: *Actividades creativas, Estudiantes de pregrado, Matemáticas, Creatividad matemática.*

Introduction

In order to begin a detailed analysis of the features of the functioning of the Komsomol shock construction as a voluntary mechanism for mobilizing labor resources in the Soviet state, it is advisable to conduct a brief overview of this historical phenomenon, note its significance, scale, determine the main activities and territorial distribution (Rohid & Rusmawati, 2019).

To define the concept of “shock Komsomol construction” can be approached on the basis of two points of view: formal-legal and journalistic. The first is due to the consolidation of the definition in the legal acts of the Soviet period, the second-a characteristic that is contained in scientific and periodical literature. It should be noted that these approaches do not imply any significant contradictions, and, in

totality, allow us to determine the essence of the phenomenon under consideration (Schukajlow et al., 2018).

Despite the fact that the first shock Komsomol construction projects appeared almost immediately after the establishment of Soviet government – in 1921, this institution received full legal regulation in official acts quite late, and only twice – in 1972 and in 1985.

The position of the all-Union shock Komsomol construction of 10 February 1972, approved by Decree of the Secretariat of the trade unions and the Secretariat of the Central Committee of the Komsomol № 27/4A, reinforcing that all-Union shock Komsomol construction projects are declared critical national facilities, construction of which is stipulated by the Directives of the party Congress, resolutions of the CPSU Central Committee and USSR Council of Ministers, the State plan for the development of the national economy.

In 1985, the Decree of the Presidium of the trade unions and the Bureau of the Komsomol Central Committee “On approval of Regulations “On all-Union shock Komsomol construction” and Exemplary provisions “On important national, regional, provincial Komsomol construction” definition has been expanded and slightly modified. According to this act, the all – Union shock Komsomol construction site is a particularly important national economic object, built with the active participation of Komsomol organizations of the country, which ensure a worthy contribution of Komsomol members and youth to its timely commissioning (Puspitasari et al., 2018).

Also, the definition of the institution in question can be found in many scientific reference publications. For example, the “Historical encyclopedia of Siberia” defines Komsomol construction sites as the most important new national economic objects that were patronized by All-Union Leninist Young Communist League (Komsomol). According to the “Great Russian encyclopedia”, they are understood as national economic objects, the responsibility for the construction of which was assumed by the Komsomol, and one of the ways of organizing construction and redistribution of labor in the national economy (Tohir & Abidin, 2018).

In addition, it is important to note that Komsomol shock construction projects are certainly part of a broader phenomenon – “construction of communism” – the process of constructing large-scale industrial facilities that are of crucial

importance for the national economy and the development of the economy as a whole. At the initial stage, the construction of communism and Komsomol shock construction, in particular, were directly related to the implementation of the state plan for the electrification of Soviet Russia (GOELRO) and Stalin's plan for the transformation of nature. In the following years, they are designed to resolve issues related to the accelerated construction of the industrial complex provided for by the goals of the five-year plans. Geographically, this phenomenon extended to the entire Soviet state—from the virgin lands of Kazakhstan, Siberia and the Urals to the Central black earth region and the Far East (Ummah & Yuliati, 2020).

The results of the Komsomol shock construction projects were unprecedented—both in terms of the number, speed of construction and scale of objects built, and in terms of the number of participants. For example, from 1959 to 1986 alone, more than 12 million people took part in Komsomol construction projects. Among the objects erected by the efforts of Komsomol members were almost all significant objects for the Soviet industry – the largest hydroelectric power plants, machine-building plants, transport highways, mining and processing plants, etc. The pace of Soviet industrialization is still impressive, but its methods are certainly controversial among researchers.

Methods

The methodological basis of the research is a complex of general scientific methods and methods of scientific knowledge (analysis, synthesis, deduction, induction, system-structural, formal-logical approaches), as well as private scientific methods – historical-legal, formal-legal, comparative-legal and interpretative.

Results and discussion

In recent years, there has been a new wave of interest in the Komsomol movement. In addition to the subjective reasons associated with a certain tendency of nostalgic “romanticization” of the Soviet period by some public figures and researchers, the need to study the mechanisms of social activity of young people becomes objectively obvious. By decree of the President of the Russian Federation, 2018 was declared the year of the volunteer. In the same period of time, the regulatory framework governing the activities of volunteers in Russia was improved,

and national network resources were created to coordinate volunteer activities. The significance of the development of the volunteer movement among young people was particularly acutely demonstrated in 2020, which required the world community to maximize the mobilization of all available human potential.

Despite the known difficulties and the use of not always justified methods to achieve the goals of the state, the institution of mobilization of economic and labor resources of the population has become widespread and actively used throughout the entire period of the Soviet system, becoming one of its key symbols. It is worth emphasizing that in the framework of this study as one of the varieties of voluntary movement is dedicated to attracting young people to the Komsomol shock construction projects, since other ways of increasing the number of workers in the national economy are a subject for separate consideration.

In order to determine the common lines of contact between the Soviet shock Komsomol construction projects and the concept of volunteerism itself, it is necessary to determine the main features and principles of the latter's functioning. It is also necessary to consider this concept in the modern context, since the key provisions on volunteerism as a single institution were formulated only in the second half of the XX century- previously, it was associated mainly with voluntary military service (Nurlaily et al., 2019).

The concepts of “volunteerism” and “dobrovolchestvo” are equivalent, and this position has been consolidated in Russia, including at the legislative level. The difference is only in the historical practice of using these expressions- volunteerism is an international category, the concept of dobrovolchestvo is more often used in Russian legal and social reality.

Based on the semantic interpretation, the very concept of “volunteering” has Latin roots and almost identical meanings in translation from French and English – expression or manifestation of will, expression of will, volunteerism, voluntary activity (Nuha et al., 2018). This fact, among others, confirms the validity of the position of the Russian legislator on the identification of the two above-mentioned concepts. Thus, based solely on their semantic meaning, it is not possible to formulate General institutional criteria. As a rule, one of the ways to achieve such goals is to analyze the legal framework governing the phenomenon under study.

The fundamental international act in this field is the universal Declaration of volunteerism of 14.09.1990, adopted in Paris at the 11th Congress of the

International Association of Volunteers. This act was based on the universal Declaration of Human Rights of 1948 and the international Convention on the Rights of the Child of 1989, its provisions were subsequently reflected both in General UN resolutions and in the positions of its individual commissions (Commission for Social Development, 47th Session Chairperson's Summary. Date Views 25.11.2020). The 1990 Declaration of volunteerism not only contains the key elements of the concept of "volunteerism" that allow us to fully characterize it and highlight its main features, but also includes separately formulated principles of volunteerism. Let's compare these criteria and principles with the mechanism for sending young workers to Komsomol shock construction sites.

According to the Declaration, volunteering is a voluntary choice that reflects personal views and positions. It is appropriate to ask whether participation in the Komsomol construction projects was a personal choice of a citizen, and how much this type of activity actually corresponded to his own worldview and personal motivation. To resolve this issue, it is necessary to refer both to the Soviet regulatory framework and to the analysis of sources that reflect the memories of participants in those events. According to the Regulations on the all-Union Komsomol shock construction site of 1972 and in 1985, the recruitment of teams was carried out at the expense of the public appeal of young people for Komsomol vouchers, which, as is known, was not a compulsory event. In addition, after the collapse of the Soviet Union, many researchers and publicists contributed to the compilation of an extensive information base of memoirs, diaries and biographies of participants in shock construction projects – for most Komsomol members of those years, a generalized positive image of the generation was characteristic, young people sought to take a direct part in the construction of the industrial complex, fully realizing the need for this process (Chen et al., 2020).

The Declaration of volunteerism also states that volunteering involves active participation of citizens in the life of human communities, contributes to improving the quality of life, personal prosperity and deepening solidarity. In this case, the Komsomol shock movement fully meets each of these criteria – designed to accelerate the pace of development of the Soviet economy and improve the industrial infrastructure, it contributed to the professional development of young workers, the cohesion of youth assets, and made it possible to form stable social ties.

According to the Declaration, volunteerism is usually expressed in joint activities within various associations. Associations are usually understood as associations and unions created to achieve certain goals, in most cases non-commercial. Such group work is rather a general rule of volunteer activity, including individual volunteerism (Esteban-Guitart et al., 2019). However, by consolidating common efforts within a single team, volunteers gain more opportunities to achieve their goals and objectives together. As such an Association in the Soviet state was a single organization – the All-Union Leninist Young Communist League. Having a strict hierarchical structure and having a significant sphere of influence both in the party apparatus and in the youth community as a whole, the Komsomol concentrated in its hands the entire mechanism of influence on the processes of consolidation of Komsomol members to perform joint activities. This factor also contributed to the accelerated recruitment of numerous teams at shock construction sites, and, accordingly, reduced construction time.

The next feature is the promotion of basic human needs on the way to building a more just and peaceful society. In general, there is no contradiction between this provision and the motivational basis of the Komsomol shock movement. For example, the documents of the Komsomol noted that Komsomol members should base any direction of their activities on conscientious work for the benefit of society, everyone's concern for the preservation and multiplication of the public domain, a high sense of public duty, intolerance to violations of public interests, comradesly mutual assistance, humane relations and mutual respect between people, etc. Of course, the vast majority of formalized principles always retain a certain declarative character, but, as noted above, the propaganda mechanism in the Soviet state had a huge impact on the social environment.

The 1990 Declaration also states that volunteerism contributes to a more balanced economic and social development, creating new jobs and new professions. Komsomol shock construction allowed young people at the very beginning of their professional development to get practical skills in production, to acquire the necessary skills in a short time. Of course, given the specifics of the organization of labor activity in the Soviet state, in the future, the experience gained did not affect the possibility of employment or significant career advancement, but it allowed the young specialist to quickly adapt to the production environment. Therefore, the above-mentioned sign of volunteer activity can be correlated with the Komsomol

shock movement only indirectly, since it generally did not affect the increase in jobs and the formation of new types of professions. This is due to the peculiarities of the Soviet planned economic system of management, in which the processes of employment of the population and the establishment of a list of professions were strictly regulated and could not be influenced from outside (Bozkurt Altan & Tan, 2021).

In addition to the general characteristics that characterize volunteerism as a special type of activity, the Declaration of volunteerism also lists the principles of its functioning: equality, respect for the dignity and culture of others, promotion of solidarity, etc. In the process of analyzing these principles, it is necessary to compare their content with the main provisions on which the Komsomol shock movement was built. The most significant contradiction arises from the fact that some of the principles of volunteerism show a personal, individualistic approach (recognition of the equal importance of personal and collective needs, volunteerism as an element of personal prosperity), which was alien to the Soviet ideology based on collective values. However, most of the principles of volunteerism will still be organic and applicable, because despite the different time period (the first shock construction was announced in 1921, and the principles of volunteerism were formed only in 1990) and a heterogeneous motivational base, a common creative message, not based on material benefits, unites volunteers of any historical period.

Conclusion

As a result of the analysis of the features of the functioning of Komsomol shock construction sites as one of the types of volunteer activities of young people during the existence of the Soviet state, it is advisable to formulate the following conclusions.

The consideration of Komsomol construction sites as an example of youth volunteerism seems justified. Despite the fact that this Institute appeared in the first quarter of the last century, the modern volunteer movement and the participation of Komsomol members in shock construction have both common features and a similar basis for the principles of activity.

Despite the fact that in the second half of the XX century, value orientations were mainly focused on the personal freedom of a person, his self-development,

self-realization and individual interests, volunteerism does not lose its relevance. Historical analysis shows that to achieve large-scale tasks, point-based, decentralized impact is usually ineffective. The experience of the Komsomol shock movement is important for research, since it is based primarily on the personal desire of young people, supported, of course, by the influence of ideology, but at the same time has a large-scale creative force.

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